RECORDS

OF THE

BOTANICAL SURVEY OF INDIA

VOLUME XIX, No. 2, 1965

CONTRIBUTIONS TO THE FLORA OF EAST NEPAL

By
M. L. Banerji
Superintendent,
Botanical Survey of Nepal, Department of Medicinal Plants,
Thapathali, Kathmandu, Nepal.

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The Director
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Foreword

1. *How my exploration of East Nepal came about*

During my training at the Botanical Survey of India, 1947-49, one of the duties assigned to me was the cataloguing of the sheets of Nepal plants housed in the Calcutta Herbarium. In the course of this work I soon realised that the whole of Nepal was one of the botanically least known parts of Asia. This presented to me a challenge and a problem, which I decided to tackle at the earliest opportunity. In 1948, I was on deputation with the Central Waterpower and Irrigation Commission, which organised a Soil Conservation Expedition to East Nepal. In the course of my work as a botanist to the Commission, I made an extensive collection of plants mainly from the Kosi Catchment area; these plants are now preserved in the herbarium of the Indian Botanic Garden, Calcutta.

This was my first experience in the study of the flora of Nepal in the field. On termination of the training scheme of the Botanical Survey of India in 1949, I joined the Meerut College, Meerut, and thanks to the kindness of Dr. B. R. Chatterjee and of Shri Madan Mohan, the Principals of the College, I have for several years been given facilities to carry on my exploration of Nepal.

Obviously the whole of Nepal is too wide an area for a single botanist to explore even cursorily; for this reason after my first visit to Nepal I decided to limit my field of exploration to East Nepal. In all seven expeditions have been organised to East Nepal between the years 1948 and 1957.

It is with a deep sense of gratitude that I wish to place on record my indebtedness to the Uttar Pradesh Research Grants Committee and to the Sir Dorabji Tata Trust through the Bombay Natural History Society, whose generosity made it possible to me, a poor student, to undertake this costly and difficult exploration in the area.

2. *Methods of work*

Before proceeding to the field, the area was divided into appropriate sectors; convenience of accommodation and in general of travel decided the arrangement of the sector.

The general plan of work was as follows :

Early in the morning after a light meal the expedition set out from any given resting place towards an objective which had been clearly set out before. The party consisted of myself, occasionally accompanied by my wife, who was not daunted by the possible dangers of the expedition nor by the long marches involved; then there were a number of porters varying between 4 and 8, according to the magnitude of previous collections and availability of rations. My travelling equipment was reduced to the bare minimum and this was possible because on principle I aimed at spending the nights in villages; where this was not possible in the more isolated parts of the country, the night was spent under tents or if the weather was not too severe simply under the open sky.

The average distance covered in any one day was seldom beyond 10 miles; occasionally, however, due to unfair weather or scarcity of provisions, we had to cover a good deal more, sometimes nearly twice as much in a day.

On reaching the destination for the night halt, great attention was paid to the pressing of the plants and completion of field-books. So, in general, everyday was, as it were, started afresh. Attention was paid to the collections of the previous days, particularly in moist weather, which required careful attention to prevent specimens from becoming mouldy or from disintegrating into pieces.

3. *Results of my explorations in East Nepal*

(i) The area which botanically was scarcely known previously, has been covered extensively, and large collections of plants have been made in it and at the same time abundant field notes taken on the spot.

(ii) In these explorations whatever was known of the botany of East Nepal has been carefully checked and, where necessary, corrected.

(iii) As a result of the work, well over 75 new records have been established for the area under study. Further a number of new taxa have been described for the first time.

(iv) Both the taxonomy and the distribution of the plants in East Nepal have been studied personally in the field so that the data which is presented in the following pages are all first hand and reliable.

(v) From the phytogeographical point of view this exploration has been able to produce a number of 'missing links' between the plants of the eastern and those of the western Himalayas. In this way the range of a large number of plants has been extended far beyond the previously known limits.

4. Difficulties in the botanical exploration of East Nepal

(i) Perhaps the greatest difficulty, which has been constantly experienced in the course of this work, has been on financial grounds. As the distances to be covered were large and the number of porters engaged often considerable, the expenses involved have been beyond my means. It is through the generosity of the donors mentioned above that this work has been made possible.

(ii) A very great difficulty throughout all these years has been the constant fight with the weather. At high altitudes the weather is apt to be rather cold, even in summer. In lowland valleys the heat is intense. Constant rain made travel difficult and demanded great attention for the preservation of the previously collected plants; flooded rivers and streams resulted from heavy rain.

No real difficulty has been experienced from the local inhabitants, except that of language in the first part of the work. It is through the hospitable and kind nature of the people of Nepal that this exploration, in spite of the length of the marches and the vagaries of the weather, has left very pleasant memories and grateful regards for our friendly neighbours. Whatever the more sensational literature may say on the subject, I have never encountered any 'abominable snowman' or other unpleasant characters; I have in fact met many cheerful and hospitable snowmen in the higher parts of Nepal.

5. Herbarium and Library work

All the specimens collected in East Nepal were in the first instance identified through Hooker's *Flora of British India*, our standard work. These identifications were checked by comparison with specimens of Calcutta and Dehra Dun herbaria which had been identified by experts.

In this work of identification and checking much time was spent in the laboratory carefully dissecting the specimen; notes taken in the field were again and again checked in the laboratory and herbarium, and generally have been of real help for the final determination of the species.

Another part of the work, possibly the hardest in the herbarium, was the checking of the nomenclature of many of our plants. In this part of the work use has been made of numerous monographs on families or on genera of plants of which the libraries of the Calcutta, Dehra Dun and Blatter herbaria are well supplied.

6. A few notes on the thesis

Generally full descriptions of plants are not given in the body of the thesis; the order of families is the same as in standard works on our flora. The order is that of Hooker's *Flora of British India;* the delimitation of some families occasionally differs from that of Hooker's and in such cases Hutchinson's *Families of Flowering Plants* is followed.

Within a given family, genera are given in alphabetical order; this is also the case with the species within a genus. For each specific name the references have been reduced to the original reference where the species was first described, secondly to Hooker's *Flora of British India* and thirdly, where a modern monograph has been consulted, to the pages of the same.

The only notes given after each species are the most striking characters that may help in identifying the plant and often such notes are taken from the field books.

Where possible, the Nepali vernacular name has been given; this is often difficult because in my experience only 'useful' plants do have vernacular names. Next the exact location where the plant was found and the altitude of the place above sea-level in metres is given. Where the plant is known to be used medicinally by the people of Nepal, such data are briefly given. Finally a reference is made to the plants of my collection and this is expressed by the initial of my name followed by the reference number [thus for instance (B. 1025) is my reference for *Aconitum lacinatum*]. Occasionally some of the more interesting or disputed species are illustrated either by a line drawing or by a photograph.

Throughout the course of the thesis the system recommended in Appendix V of the *International Code of Botanical Nomenclature*, 1956, for reference and bibliography is followed to the best of my ability.

ACKNOWLEDGEMENTS

I owe sincerest thanks and deep gratitude to Rev. Fr. H. Santapau for his kindness, encouragement and guidance, and to my friend Shri Tapash Ghosh for the financial loans, without either of which it would not have been at all possible for me to bring this work to its present form. To Dr. D. Chatterjee and Dr. S. K. Mukerjee for the facilities in the Calcutta Herbarium and the help in the identification of specimens and for many valuable suggestions; to Shri M. B. Raizada for granting me all facilities to work in the Dehra Dun Herbarium, and in fact to the Staff of both the herbaria for the unfailing courtesy and readiness to afford me the advice and assistance for which I was perpetually asking, I beg to offer my thanks and acknowledgements. I have to thank the authorities at Kew for checking some of my identifications and attending to many of my enquiries. My indebtedness also goes to Dr. Shiu-Ying Hu of the Arnold Arboretum for helping me with the correct identity of *Acer campbellii*, clarification of some points of interpretation and supplying much valuable information, I am under many and deep obligations to Prof. P. N. Mehra for his never-ending interest in my work since my studentship under him some 20 years back. Dr. S. P. Ray Chowdhury had my soil samples analysed and Dr. R. Prasada identified the aecidial stages of *Puccinia agropyri* on *Berberis aristata* var. *micrantha;* Dr. V. Puri for all the facilities granted, to them all I wish to express my gratitude and indebtedness.

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Introduction

Geographical Position

The Kingdom of Nepal occupies about one-third of the Himalayas and extends from 80° 15′ to 88° 10′E and 26° 20′ to 30° 10′N. The total area is 54,000 sq. miles ; length being about 525 miles and the breadth from 90 to 140 miles. The entire kingdom approximately corresponds to the Central Himalayas.

Historical Background of the Kingdom

The oft-quoted lines from the famous traveller Marcopolo that 'Nepal is a wild and mountainous country, and is little frequented by strangers whose visit the King discourages' no longer holds good. In recent years there have been many expeditions and the number of tourists is on the increase. Nepal's magnificient scenery and unique art and architectural wealth have caught the attention of the World and spread their fascination amongst the tourists. The Nepal Himalayas became a centre of attraction to mountain climbers of the world and this has not ceased even after Mt. Everest was conquered. Kathmandu, the capital, is placed in a picturesque valley full of charm. It remained *terra incognita* for centuries on account of the closed-door policy of the Ranas. If Kashmir is a play-ground of nature, surely Nepal is a fairyland with enchanting beauty. Kathmandu, Lalitpur (also known as Patan) and Bhaktpur (also known as Bhatgaon or Bhadgaon) are the chief towns in the valley.

Whatever may be its mythological history, present day geologists all agree that the valley was once a lake ; many fossils of aquatic animals have been found in the district.

Geographical Position and Main Features of the Area

The area covered by the present studies and referred to in the following pages as EAST NEPAL, consists of about 22,500 sq. miles ; its geographical position is 85° 20′-88° 10′E and 26°30′-28°N and corresponds to the administrative eastern districts of the Government of Nepal. The highest mountain of the world lies in this area, which is also the catchment basin of the river Kosi, a perennial river causing untold havoc in Bihar. The main tributaries of Kosi are seven in number, each draining a semi-independent valley. The valleys are bound by ranges of average height of 6575 m at their northern ends and 3600 m at the southern ends. Of the total area of east Nepal about 2,300 sq. miles are under glaciers, the average elevation of this region being above 4,500 m. The principal streams are the Sun Kosi with a catchment area of 7,570 sq. miles coming from the west ; the Arun with a catchment area of 12,750 sq. miles coming from the north and the Tamur coming from the east and with a catchment of 2,170 sq. miles. These three streams meet at Tribeni to form the Sapt Kosi which, flowing through a narrow gorge for about 6 miles, debouches into the plains near Chatra.

The population, as estimated in the first census taken in 1954, is 516,000 in the whole of Kathmandu valley. The census figures for the different districts of East Nepal are not available. Rice is the staple diet. Wheat, barley, maize, beans, soyabeans, pulses, gram, millets, lentils, linseed, mustard and sesamum are extensively cultivated. In the valley all vegetables are grown, and the soil is very fertile. Beet, brinjal, beans, cabbage, cauliflower, carrot, lady's finger, peas, radish, spinach, tomato, cress and many other vegetables grow. Garlic is a great favourite, and grows to a very big size. Of the fruits, Pokhra oranges are famous but they come from West Nepal. Guavas, bananas, pears, peaches, persimmons, walnuts and chestnuts grow in profusion. In the interior, to the east, all the big villages up to 1,200 m have some fruit trees; bananas, guavas and custard-apple are the most common. Mangoes have also been planted at many places but the quality is poor. At certain places papayas are also found and at times one comes across pine-apples also. Except for the pine-apples, I have tasted all the available fruits on different occasions and have found the taste in no way inferior to that of our Indian fruits.

In and around the valley, flower gardens, or flower-pots on terraces are a common sight. As one moves towards the east the fashion for flowers seems to decline. In district head-quarters one finds Geranium--*Pelargonium zonale*, grown in all types of pots and placed on terraces. At certain places *Bougainvillaea* is also seen. Similarly someone seems to have taken a fancy for *Eichhornia* and carried some rootstocks from India and planted them for its beautiful flowers. It has spread so luxuriantly that by now it has become a menace. Thus at Lebang *Eichhornia* covers most ponds and swamps. In the far eastern side of Nepal and also amongst the Sherpa women, orchids are a great favourite ; women are often seen with orchid flowers in their hair. Orchids are locally known as 'Suna-Khari'.

Climatic Conditions

General : Kathmandu has a temperate climate. The valley, 10-12 miles in diameter, is saucer-shaped and is protected from strong winds. But the conditions in the east are variable ; the rice crop is harvested in the valley—Banepa and Bhadgaon while at Those the crop may be just about 0·5 m high. In brief, it may be said that because of the topographical features of the area and the considerable variations in altitude and terrain, climatic conditions in different parts of East Nepal show a great range of variation.

Rainfall : The rainfall of the area is similar to that of Bihar, Sub-Himalayan Bengal and Upper Assam. The bulk of the rain occurs in association with the southwest monsoon, the rainfall during this season being 75% to 80% of the total annual rainfall, the mean rainfall of the area being 114·3 cm. The annual rainfall in East Nepal increases from about 127·0 cm near the Nepal-Indian border to more than 381·0 cm on the southern slopes of the greater Himalayan Ranges. Then it rapidly decreases towards the north. 85% of the rainfall occurs during June to September, very little rain occurs during the months of November to February. Western disturbances are active over the area during January to March, when short spells of rainfall are experienced. During April and May sporadic thunderstorms are common.

Humidity : The relative humidity at all stations except Kathmandu is highest during the months July to September, and lowest during March and April. A second maximum in the relative humidity occurs during January or February.

Temperature : The mean maximum temperature is highest during June and lowest in December or January. The mean minimum temperature is highest during the month of July or August, and lowest in December or January. There is very little variation from month to month in the values of the mean maximum during the two periods—December to February and June to September. The mean diurnal variation is of the order of 1° to 1·5° C during the months June to September. The diurnal variation is highest at Kathmandu. The seasonal mean temperature for the lower parts of the area according to the heights has been found to be :

	June to Aug.	September	October	Dec. to Feb.
1,374 m	22.8°C	21.6°C	16.1°C	13.3°C
2,135 m	16.1°C	20.0°C	18.3°C	9.4°C
3,054 m	12.2°C	12.2°C	10.0°C	1.1°C

Soil and Geology

According to Auden (1935) 'Udaipur Garhi stands on an outcrop of lower Siwalik or Nahan sandstone which underlies the main boundary thrust. In Dharanbazar area there appears to be no Siwalik range here, since the Gangetic alluvium occurs northwards so as to about on the pre-Tertiery rocks'. The Mahabharat Lekh on which is situated Dhankuta at 1220 m (4,000 ft) is a quartzite ridge. The geology is comparable to that of Ranikhet.

Geographically, Nepal and the Eastern Himalaya may be divided into five units:

(1) the Terai, belonging to the Gangetic alluvium;

(2) the Siwalik ranges;

(3) ranges running in general WNW-ESE, such as the Mahabharat Lekh;

(4) long ridges running in general NNE-SSW, from the main Himalayan range ; these often occupy the greater part of Nepal *e.g.* the ridge between the Arun and Tamur rivers and the Singalila ridge;

(5) the Great Himalayan range.

The Siwalik ranges are probably the only ranges in which geological strike and geographical extension properly coincide. Their width in Nepal across the strike is from 12 to 13 miles.

The Mahabharat Lekh consists of ranges that are roughly parallel to the Siwaliks and is composed of a varied assemblage of rocks.

The successive Mt. Everest Expeditions have brought forward data from which it is possible to interpret the tectonics of this region. Both the Tertiary (Siwalik-Nummlitic) zone of the foot-hills and the autochthonous belt are greatly narrowed in this part, though the tectonic relations indicate

large-scale inversions. The Siwaliks are in mechanical contact with the terrestial and fluviatile Permian beds (Gondwana), which again are over-thrust northwards by the pre-Cambrian Daling series of Darjeeling. This thrust bounds the nappe zone of this area, which has here transgressed considerably further southward over the autochthonous.

Mt. Everest and its satellite peaks lie on a culmination of the Great Himalaya range, marking approximately the southern limit of the Tibetan sedimentary zone. Altered and crushed rocks belonging to the latter, rest over the foliated gneissic complex of Everest with a prevalent northernly dip, commencing with metamorphosed Permian series of shales, limestones and quartzites containing a brachiopod fauna. The actual summit of Mt. Everest is composed of a limestone coming below this Permian series. From this bottom bed there is an ascending series of strata towards the north encompassing the Triassic and Jurassic systems, indicating a decreasing degree of mechanical deformation. In the longitudinal synclinal folds into which these are plicated Cretaceous and Eocene strata are recognised by their fossils.

Botanical Explorations of the Area

To the scientific world the flora of Nepal has been known by the collections of Hamilton made in 1802-03 and Wallich in 1820-21. These specimens have been described in D. Don's *Prodromus Florae Nepalensis* and Wallich's *Tentamen Florae Nepalensis*. Besides these two works, Burkill's 'Notes from a journey to Nepal' in Rec. bot. Surv. India. 4(4) 1910 was another publication dealing with the flora of Nepal. But all these works concern the collections made in the middle of Nepal, *i.e.* from Raxaul to Naiakot and further north to Gossain Than. The collections were made at 85° to 85°30′ E and 27° to 28°15′ N.

Many persons have collected from different parts of Nepal. After Wallich, Sir J. D. Hooker in 1848 explored and botanised in the Tamur valley; Dr. J. Scully in 1876; Burkill in 1907; Sir C. Wigram and Sharma in 1927-31. In the Calcutta Herbarium there are sheets of Gimlott and of Maries, though not many. In 1947 Dr. S. K. Mukerjee made his collections along the Nepal-Sikkim boundary which is approximately 88° E. Zimmerman, a member of the Swiss Expeditions to Mt. Everest collected specimens along the route and from Namchebazar area.

During the years 1884-86 Duthie and Reid made extensive collections from British Gharwal to North Kumaon and Western Nepal. Basant Lal in collaboration with Lal Dhowj collected plants from West Nepal in 1929. From West Nepal collections have also been made by botanists sent by the British Natural History Museum from 1949 to 1954. Tillman's mountaineering party went to Langthang Himal in 1949, and Polunin, who accompanied the expedition, has given a list of plants collected in Tillman's *Nepal Himalayas* (1952). The Japanese Expeditionists to Mansalu have also collected during 1952-53, and have published *Fauna and Flora of Nepal Himalaya* Vol. I (1955). The area of the Japanese expedition covers the Northwest districts of Nepal—The Annapurna Massif, the Mansalu-Himalchuli and Ganesh Himal. Robert Fleming made a collection of Ferns from West Nepal—Pokhra area in particular, and his collection has been described by Raizada and Vaid (1952). Maheshwari collected Ferns in the Kathmandu valley but the collection has not yet been worked out. Janaki Ammal brought back a collection of Grasses for Cytological studies. There have been other collectors such as Stoner of the Daily Mail Expedition but about them and their collections the information is meagre, as no publication or reference to the collection has appeared so far.

A census of the species listed by different workers from different parts of Nepal is as follows :

D. Don's *Prodromus Florae Nepalensis* (1825), contains 766 species of phanerogams.

Burkill's 'Notes from a Journey to Nepal' (1910), contains 572 species of phanerogams while Landon's NEPAL (1928) Vol. I, London, mentions 1672 species. This, however, does not include the collections made by Lal Dhowj & Sharma.

Plants collected by the Japanese Himalayan Expedition 1952-53 from West Nepal as given in 'Fauna and Flora of Nepal Himalayas' total to 924 species. Of the angiosperms, 33 new species and 15 new varieties and forms have been described therein.

My Explorations of the Area

In April, 1948 I accompanied the Soil Conservation Expedition organised by the Central Water-Power & Irrigation Commission, Government of India. The route was from Kathmandu to Okhaldunga *via* Ramechappe, northwards to Namchebazar and Nangpa La, returning to Dingla *via* Aisylukherka and again northwards to Popti La, returning to Chainpur, thence to Terathum, Ilam and Manebhanjang

and finally to Darjeeling. During this visit collections are made during the pre-monsoon period, April to June ; the number of species collected was 417. Out of this collection a new species of *Pimpinella* (Banerji 1951), a new variety of *Hypericum hookerianum* Wt. & Arn. and some new records have also been described. (Banerji 1952A).

The aim of the author both in his collections in the field and in the preparation of this thesis, may be summarized in the words of E. Matuda in the *Amer. Midland Nat.* 44 : 513, 1950 : ".....plants have been neglected by professional botanists because of social disorder and poor means of communication in this state. The present contribution is a report on.....plants.....The collections on which it is based were made by the author.....at his personal expense and without official auspice. Moreover it comprises 'preliminary report which is the first in a series of publications by the writer which will eventually culminate in a Flora of .....'—the lifelong ambition of the author".

Thus, with the intention of working out the flora of East Nepal in a systematic manner and as intensively as was possible to do single-handed, the work was again taken up in 1951 and Kathmandu was visited during the month of May. Due to political disturbances in the country, exploration was not possible, and I had to return with very few plants. From this collection the occurrence of turions in *Caldessia reniforme* was described. (Banerji 1952B.)

East Nepal was revisited in the months of April and May 1952; the route followed was from Kathmandu to Charikot, northwards to Kalinchok, returning to Charikot, proceeding to Jata Pokhri *via* Those and finally returning to Kathmandu by way of Ramechappe. The area covered lies approximately between 85°20′-86°20′ E and 27°20′-27°40′ N, the valleys are bound by ranges of approximate 4,885 m.

In 1953 the fourth visit was made again during the pre-monsoon months, April to middle of June, and the area traversed was the far eastern side. Wallangchung Gola area was not visited, as Sir J. D. Hooker had botanised this part in 1848, and J. Banerji had re-visited in 1947 and made a collection of plants therefrom. The adjoining small valley of Topke Gola at 87°35′ E and 27°38′ N was explored to the best of my ability. This valley is separated from the Walangchun Gola valley by a lofty range of approximate height of 5,200 m. The first object of visiting this valley was to study the eastern and western extension of species particularly of *Rhododendron* and of the family *Vacciniaceae*. The area covered lies between 87°40′-88°10′ E and 26°55′-27°38′N. The findings on the distribution of species of *Rhododendron* was accordingly published (Banerji 1954).

The fifth visit made in 1954 was again during the months of May and early part of June. The route was from Biratnagar to Dharanbazar, thence to Chainpur, Dingla and Bhojpur and returning to Dharanbazar and Biratnagar. During this tour no collection was made in the 'Terai', but only beyond Dharanbazar. In this fifth visit during the pre-monsoon months a representative collection of the pre-monsoon vegetation was made from the area lying between 87° 5′-87° 15′ E and 26° 50′-27° 50′ N.

The sixth exploration trip was undertaken during the months of August, September and early October of 1956. This has been the only post-monsoon tour, and the route was from Kathmandu to Charikot, northwards to Kalinchok, returning to Charikot, thence to Those, Junbasa, Phaplu, Okhaldunga and finally returning to Kathmandu via Ramechappe and Dhulikhel. This collection was made between 85° 20′-86° 35′E and 27° 15′-27° 45′ N.

During the course of this work many plants have been seen that were not in flower. They were not collected, for on principle only specimens in flower or fruit have been gathered. However on certain occasions specimens have been collected in their vegetative condition because of their relative abundance or for other ecological reasons. Special attention has always been paid to note the colour of the flowers and the relative abundance of the species in the locality.

The collecting of the specimens, writing of the field notes, pressing of plants and changing of the driers have always been done single handed except during the tours of 1953 and 1954 when Mrs. Banerji accompanied me and gave me valuable assistance in the work. On numerous occasions, when the day's collection have been heavy and the lodging provided was not very suitable, it was thought best to keep the plants for pressing the next day. To overcome partial wilting and also for convenience in collecting specimens during any day's trek a vasculum was devised (Banerji 1955C) that proved very suitable for field work. I have tried to ascertain the medicinal uses of plants from local people; in the beginning I experienced difficulty on account of language but in later years I have had little trouble from this source. I had noticed that local names are so very divergent that little help can be derived

from their use; thus in one part *Paris polyphylla* Don. is known as 'Thulo okhto', while at another place 'Thulo okhto' is the name given to quite a different plant. It must be admitted that some names are uniformly agreed upon, such as 'Pakhan bhed' which is for *Saxifraga ligulata* Wall. Very often confusion occurs because the name may be of Nepalese, or of Sherpa dialect. I have tried to mention the dialect wherever I have noted the vernacular name.

Ecological observations on the associations at some typical localities have also been made, and soil samples therefrom have been analysed for pH and CaO%.

Some fossil specimens have also been collected by me from Chainpur area. The locality from where the fossils have been collected is at 87° 18′ E and 27° 17′ N, and is about five miles to the South-west of Chainpur District Headquarters.

General Account of the Vegetation

Hooker's explorations in Sikkim and eastern Nepal resulted in one of the botanically least known areas becoming one of the best known. Since the publication of 'Himalayan Journals' (1854) Hooker's results for Sikkim and eastern Nepal have been extended. Banerji, J. (1948) and Burkill (1906 and 1916) have added to our knowledge of the botany of East Nepal.

Clarke (1876) noted that the "dripping forest of Sikkim extends from about 1676 m to 2743 m (5,500 ft to 9,000 ft); above 2743 m (9,000 ft) the Rhododendrons come in; below 1676 m (5,500 ft) is cultivation". Three zones have also been distinguished by Hooker. The tropical zone extends upto 1980 m (6,500 ft) and has at its base the Terai covered with a loose undergrowth of shrubs, coarse grass and the herbs common to the Gangetic plain. Secondly is the temperate zone from 1980 m to 3520 m (6,500 ft to 11,500 ft) which is roughly divisible into a lower non-coniferous and an upper coniferous and Rhododendron belt. The conifers are chiefly confined to a belt from 2743 m to 3660 m (9,000 ft to 12,000 ft) in elevation. The monarch and the most common is *Abies spectabilis* (D. Don) Spach which is also gregarious. Thirdly, the Alpine zone has a lower or outer humid, and an upper or inner dry Tibetan climate, and conforming vegetation.

Cowan (1929) has dealt with the ecology of the forests of Kalimpong which is to the east of Darjeeling. According to him altitude, configuration of the ground, geological formation, soil and rainfall are the principal factors influencing the vegetation. Three vegetation zones are recognised by him : "the tropical or lower hill zone from the plains up to 914 m (3,000 ft); forests which are mainly deciduous and come within Schimper's (1903) monsoon forest type form the climax vegetation. The sub-tropical or middle hill zone occupies the area between 914 m to 1828 m. Much land is cleared for cultivation. Most of the trees of this belt are evergreen. The temperate zone occurs from 1828 m to 3170 m. At places there is great humidity and the trees are thickly covered with moss and lichens".

The vegetation of the Himalayas has also been classed altitudinally by Brandis (1872) and that classification has been accepted by Drude (1890). It has been divided into four belts : (1) Alpine belt, (2) Temperate forest belt, (3) Sub-tropical forest belt and (4) Tropical forest belt. Gamble (1875) has used Lower Hill forest and Middle Hill forest corresponding to the Tropical and Sub-tropical forest belts respectively. Champion (1936) refers 'Forest Types' for the better and more stable stages in the history of forests. And for practical forestry purposes a simple classification has been offered by him. The close relationship between climate and the form of climax forest is so marked that one finds the vegetation itself the best indicator and measure of the climate factors; the chief of these factors are temperature and moisture. My attempts to classify the forest types of the area under consideration according to Champion have yielded poor results. Champion's major physiognomic types can easily be referred to, but for detailed analysis I have experienced better results in following Gamble. In the laboratory Champion's system looks very attractive; in the field it is rather difficult to make it fit with my findings. In this I am not alone. H. Santapau in the '*Flora of Khandala*' in *Rec. bot. Surv. India* 16(1) : writes "on several occasions.....my own description".

Gamble has based his classification *mainly* on altitude. van Steenis in *Bull. Jard. Bot. Biutenzorg* ser. 3, 13 : 289-417, 1935 and Brass in *Journ. Arn. Arb.* 22 : 271-340, 1941, follow a system similar to Gamble, where the altitude is used as the main criterion in the study of the forests of New Guinea.

Champion gives the 'Dry Temperate Forest' as occurring in the inner ranges of the Himalayas just below the 'Alpine Forest'. Some of the forests are indeed dry temperate. The area is crossed by many deep ravines along which some important rivers flow; the vegetation in such ravines can in no way be called 'Dry Temperate Forest' as may be seen from the study of the common components listed. Hu in *Journ. Arn. Arb.* 39: 392, 1958 while dealing with the statistics of Compositae in China has mentioned "the change in topography and vegetation is sudden"; and the present author has also been confronted with such a situation.

Burkill in *Rec. bot. Surv. India* 4(4): 60, 1910 has taken 'belts of vegetation' and discussed the vegetation of Tropical forest belt, Subtropical forest belt and Temperate forest belt. He has (p. 92) taken the Sal forests and Pine forests of the tropical forest belt as well; while on p. 97 he has used Lower forests, Cultivation belt and Upper forests.

The Japanese botanists who worked in area 83°30'-85°15' E have also taken altitude as the primary factor and have designated the forests as 'Zone of Shorea forest', 'Zone of Castanopsis forest' etc.

Puri (1954) has expressed that "no hard and fast rules can be made for characterisation of forest types in different forests in India and such a characterisation may have to wait until proper data has been collected". I have for reasons of convenience adopted Gamble's system of classification.

In the following pages the general account of the various forest belts is given.

The Terai

The Sal forests spread from the foot-hills for about 8-10 miles on to the plains. At most of the places along the Nepal-India boundary the forests begin abruptly forming a long wall stretching from east to west with cultivation abutting on it. This definiteness is apparently due to cultivation. The 'bhavar', as the sal forests are known, are becoming shallower than what they were a century back as is evident from accounts given by Kirkpatrick and Hamilton. The clearing is proceeding at a much faster rate in recent years. In Biratnagar area the clearing appeared to me to be the most pronounced.

In the Terai the waste grass-lands are spoken of as 'Kharauls' and at most of the places these Kharauls have given place to uninterrupted tilled fields. The present cultivation near the forest limit is so intense that almost all land has been brought under the plough. Rice is the chief crop. The thaching-grass meadows are composed of *Andropogon intermedius* Willd. and *Setaria glauca* Beauv. with abundant plants of *Cassia mimosoides* L. and *Alysicarpus rugosus* DC.

The commonest weeds of the Terai are *Sida rhombifolia* Linn., *Urena lobata* Linn., *Triumfetta bartramia* Linn., *Indigofera* spp., *Cassia tora* Linn., *Mimosa pudica* Linn., *Eclipta prostrata* (L.) Linn., *Chrysanthellum indicum* DC., *Solanum xanthocarpum* Schrad. & Wendl., *Rungia parviflora* Nees, *Leucas* sp., *Amaranthus spinosum* Linn., *Achyranthes aspera* Linn., *Alternanthera sessilis* R. Br., *Polygonum glabrum* Willd., *P. hydropiper* Linn., and *Euphorbia hirta* Linn. Of the Cyperaceae and Gramineae, *Cyperus* spp., *Fimbristylis* spp., *Panicum* spp., *Andropogon* spp., and *Eragrostis* spp. are commonly met with. The pH of the soil is 6·5.

The small patches of forests, that often occur in this area, are mostly composed of *Lagerstroemia parviflora* Roxb., *Mallotus philippensis* (Lamk.) Muell.-Arg., *Trema* sp., *Toona ciliata* Roem. (*Cedrela toona* Roxb.), and *Salix tetrasperma* Roxb. At places *Butea monosperma* (Lamk.) Taub. forms an open scrub, similarly trees of *Salmalia malabarica* (DC.) Schott. & Endl. stand here and there. The other species that are found in such forest patches are *Adina cordifolia* Hk. f., *Dillenia pentagyna* Roxb., *Spondias axillaris* Roxb., *Terminalia tomentosa* Bedd., *Emblica officinalis* Gaertn., *Thespesia lampas* Dalz. & Gib., *Phoenix humilis* Royle, *Kidya calycina* Roxb., *Semecarus anacardium* Linn., and species of *Grewia*. *Spatholobus* sp. and a *Bauhinia* are the prominent woody climbers and the other climbing and twinning species are *Cissampelos pareira* Linn. *Melothria heterophylla* Cogn., *Smilax* spp. and *Dioscoreas*.

Kathmandu Valley

(1220-1350 *m*)

The valley is thickly populated and heavily cultivated. Small groves of trees are well grown and saved from the axe. The grove near Pashupathinath Temple is composed of *Acer oblongum* Wall., *Schima wallichii* Choisy, *Fraxinus floribunda* Wall., *Alnus nepalensis* D. Don, and some *Aesculus* sp. All over *Sambucus adnata* Wall. is very common. Along the slopes of the hills that

bound the valley are specimens of *Pyrus pashia* Buch.-Ham., *Symplocos theaefolia* Buch.-Ham., *Myrsine semiserrata* Wall., *Cipadessa baccifera* Miq., *Quercus spicata* Sm., *Ilex excelsa* Wall., *Salix tetrasperma* Roxb., *Maesa* sp., *Luculia gratissima* Sweet, *Oxyspora paniculata* DC., *Melastoma malabathricum* Linn., *Dichrea febrifuga* Lour., *Hydrangea* sp. and some other minor constituents. In the valley many species are planted. The ground is covered by a number of species of herbs ; the chief amongst them are *Drymaria cordata* Willd., *Boenninghausenia albiflora* Reichb., *Anaphalis contorta* Hk. f., *A. triplinervis* Clarke, *Swertia angustifolia* Buch.-Ham., *Aechmanthera wallichii* Nees, *Anisomeles ovata* R. Br., *Pteridium aquilinum* (L.) Kunm., *Gleichenia* sp. and some others. In sunny situations *Campanula sylvatica* Wall., *Potentilla fulgens* Wall., *Hypericum japonicum* Thunbg., *H. elodeoides* Choisy, *Swertia paniculata* Wall., and *Micromeria* sp. have been observed. It is of interest to find vast areas covered by a *Cuphea* on the slopes. Along the streams in Godavari area *Impatiens prainii* Hk. f. is in plenty. On the sides of Sundarijal task a yellow-flowered balsam flourishes well. The flowers have an exceptionally long spur which is about 5 cm in length.

The common grasses are *Paspalum distichum* Poir., *Pogonatherum crinitum* Hk.f., and *Imperata* sp.

The Sal Forest

Shorea robusta Gaertn. is the dominant species in the zone between 500-1,000 m and sal forest are abundant in the valleys of the principal rivers and 'Kholas'. As observed by me, Sal always stood on red lateritic soil, without much undergrowth. There is much variation in the form of Sal forests. In some localities the forest constituting a continuous canopy was observed along the course of Arun and Sabhaya khola, particularly near Tumling Tar. In most cases Shorea trees are more or less scattered and stunted. This sort of formation has been noticed in Khurkot and Thakla. In Sun-kosi catchment, sal has been observed to be associated with *Rhus parviflora* Roxb. at most of the places. Sal has also been observed to be associated with *Duabanga*, *Terminalia*, *Casearia* and *Madhuca* and this association has been observed to be common further east particularly between Chainpur and Mialay. Along the course of Arun a *Sal-Lagerstroemia parviflora* community is mostly found. At this locality the soil is red lateritic and conglomerate along with large blocks of stones. Sometimes along the river or 'Khola' valleys a narrow belt of dense forest facing the river is seen, which is composed of *Holarrhena antidysenterica* Wall., *Adina cordifolia* Benth., *Calicarpa arborea* Roxb., *Acacia* spp. and some others. Above 1000 m along with *Shorea* appear *Wendlandia coriacea* DC., *Ardisia solanacea* Roxb., *Woodfordia fruticosa* (Linn.) Kurz, and *Osyris wightiana* Wall. ex Wight. In the inner valleys it has been observed that *Heynea trijuga* Roxb., *Schima wallichii* Choisy, and *Andromeda elliptica* Seib. & Zucc. come in contact with *Shorea*. It is common to find that Sal forests lead to a *Pinus roxburghiana* formation. At two places in East Nepal I have found Sal occupying a higher altitude than *Pinus* on the same slope between Ramechappe and Deorali and also at Narkata. I have on many occasions checked that Sal grows up to 1220 m (4,000 ft) and of localities where it is found at that altitude I may make a mention of Dhulikhel to Kuwapani via Karkatatar and Bella; Ramechappe to Deorali; Wapsakhani to Bhulu (Sitang); and Aisyalukherka to Banspani near Magpa village.

Lower Hill Forest

Up to 916 *m* (3,000 *ft*)

The forests in this belt may either be Mixed Dry forests on the ridges or Mixed Wet forests in the valleys or in deep ravines or along the banks of streams.

Along the dry slopes the species commonly met with are *Rhus parviflora* Roxb., *Aegle marmelos* Correa, *Zizyphus* spp., *Acacia concinna* DC., *A. catechuoides* Benth., *Caesalpinia sepiaria* Roxb., *C. crista* Linn., *Jatropha curcas* Linn. At most of the places one comes across a typical sclerephyllous bushwood composed of *Rhus* and *Aegle*. Other species found and observed are *Lagerstroemia parviflora* Roxb., *Celastrus paniculatus* Willd., *Cipadessa baccifera* Miq., *Premna barbata* Wall., *Calicarpa arborea* Roxb., *Vitex negundo* Linn., *Ostodes paniculatus* Bl., *Mallotus philippinensis* Muell.-Arg., *Macaranga pustulata* King, *Emblica officinalis* Gaertn., *Adina cordifolia* Benth., *Capparis olacifolia* Hk. f., *Wendlandia exserta* DC., *W. coriacea* DC., *Ardisia solanacea* Roxb., *Trema politoria* Planch. Along the banks of the streams where the valley is broad and rocky *Annona reticulata* Lour. grows in profusion. On the sandy flats of Arun I have come across *Tamarix dioica* Roxb. at many places; the specimens were about 1 m tall.

At a typical dry slope with red-lateritic soil a line transect was made and within 15 m (50 ft) there were 6 individuals of *Rhus parviflora*, 3 of *Trema politoria*, 3 of *Pinus roxburghii* and 1 of *Shorea*.

robusta. The only shrub was *Woodfordia fruticosa*. *Rhus parviflora* was dominant and *Pinus* and *Trema* showed to be very abundant while Sal as occasional. This observation was made in September, 1956.

In the ravines where the soil is moist and the atmosphere humid, a dense vegetation composed of *Madhuca butyracea* (Roxb.) Macbr., *Albizzia lucida* Benth., *A. procera* Benth., *Heynea trijuga* Roxb., *Beaumontia grandiflora* Wall., *Ehretia accuminata* R. Br., *Alstonia scholaris* R. Br., *Holarrhena antidysenterica* Wall., *Ervatamia coronaria* Stapf, *Melastoma malabathricum* Linn., *Wendlandia exserta* DC., *W. coriacea* DC., *Randia fasciculata* DC., *Gouania leptostachya* DC., *Smilax* spp., and *Cissus* spp. The climbers form a tangle over the shrubs. In these ravines near the top appear a few *Castanopsis indica* A. DC. Along the Nepal-Sikkim boundary near Ilam an *Alsophila* is occasionally found in the deep ravines. *Duabanga grandiflora* (Roxb.) Walp. and *Terminalia chebula* Retz. have been seen in the ravines of the far eastern side of Nepal only.

The common grass is *Pogonatherum panicum* Hack.

Middle Hill Forests

916-1830 *m* (3,000-6,000 *ft*)

The appearance of *Schima wallichii* Choisy and the occurrence of *Alnus nepalensis* D. Don, on the old cultivation marks the beginning of the Middle Hill Forests. The belt between 916-1830 m is the cultivation belt. All along the Himalayas cultivation is intense in this belt and distinctly the upper forests are cut off from the lower forests. Villages and hamlets are dotted over the hill faces, and there is a strong tendency to clear the ground more and more for cultivation. Fire-wood is brought in large quantities from the forest or scrub, whatever is there. The result is a rarity of well-grown trees. Near most of the villages are small groves where a 'bio-edaphic' community exist, mostly composed of *Schima wallichii* Choisy, *Andromedia elliptica* Seib. & Zucc., *Eurya symplocina* Bl., *Rhododendron arboreum* Sm., *Maesa chisia* Don., *Symplocos ramosissima* Wall., *Ostodes paniculatus* Bl., *Castanopsis indica* A. DC., *C. tribuloides* A. DC., and the shrubs present are *Rubus ellipticus* Sm., *Eurya acuminata* DC., *Melastoma malabathricum* Linn., *Oxyspora paniculata* DC., *Myrsine semiserrata* Wall., *Boehmeria platyphylla* D. Don, and the woody climber *Bauhinia vahlii* Wt. & Arn. Near the villages *Bauhinia purpurea* Linn., and *Psidium guajava* Linn., are common. At places *Acer oblongum* Wall., *A. laevigatum* Wall., *Engelhardtia spicata* Bl., and *Fraxinus floribunda* Wall., are also seen. Old cultivation terraces are invariably occupied by *Alnus nepalensis* D. Don, and some terraces have *Clerodendrum colebrookianum* Walp. This reveals that the cultivation soil is left fallow as it becomes impoverished, eventually becomes suitable for these species. Erosion is wide-spread, and on the eroded slopes grow *Juncus prismatocarpus* R. Br., *Eriophorum comosum* Wall., and *Pogonatherum crinatum* Kunth and these sedges and grasses and *Agave* sp. are the other species that also occur on the eroded slopes. In many places under *Agave* the root parasite *Aeginetia indica* is commonly found.

The commonest grasses of the belt are *Pogonatherum saccharoides* Beauv., *Polypogon littoralis* Sm., *Pogonatherum panicum* Hook., *Brachiaria villosa* A. Cam. and *Eragrostis nigra* Nees. In this belt *Dendrocalamus sikkimensis* Gamble and *D. hookerii* Munro, are always found near villages. Big clumps of these species are also seen near the river banks.

The common ferns as observed by me are *Pteridium aquilinum*, *Gleichenia dichotoma*, *Drynaria mollis*, *Nephrolepis* sp., *Polypodium* spp. and *Equisetum* sp. (a fern ally) was also commonly found.

At a locality at 1832 m a belt transect was made to study the association. The belt that was convenient at the place was 15 m by 1·5 m (50 ft by 5 ft). The results of the charting gave a *Rhododendron-Alnus-Pinus* association with *Berberia* as the dominant shrub. *Gaultheria fragrantissima* Wall. individuals were much lopped. The pH of the soil was found to be 5·5 and the CaO % as 0·0852.

Upper Hill Forests

1830-2440 *m* (6,000-8,000 *ft*) *and* 2440-3050 *m* (8,000-10,000 *ft*)

In this belt Oaks predominate. *Castanopsis tribuloides* DC., *C. hystrix* A. DC., and C. *indica* A. DC., which make their appearance in the Middle Hill Forests, increase in profusion, and many ravines are dense with these species. In this belt the other species present are *Eurya acuminata* DC., *E. symplocina* Bl., *Ilex dipyrena* wall., *I. insignis* Hk. f., *Symplocos ramosissima* Wall., *S. caudata* Wall. *Myrsine semiserrata* Wall., *Quercus glauca* Thunb., *Q. semicarpifolia* Sm., *Q. lamellosa* Sm., *Rhododendron abroreum* Sm., *Pyrus pashia* Buch.-Ham., *Prunus puddum* Roxb., *Elaeagnus latifolius* Linn., and the

Commonest shrub species are *Berberis* spp., *Mahonia acanthifolia* Takeda, *Euonymous theaefolia* Wall., *Piptanthus nepalensis* D. Don, *Indigofera dosua* Buch.-Ham., *Rubus calycinus* Wall., *Prinsepia utilis* Royle, *Viburnum stellulatum* Wall., *Gaultheria fragrantissima* Wall., *Andromedia elliptica* Seib. et Zucc. and *Colquhounia coccinea* Wall. The commonest climbers are *Holboellia latifolia* Wall., *Vitis semicordata* Wall., *Sabia campanulata* Wall., and *Smilax minutiflora* A. DC. The herbs are too many to mention. At about 2440 m a site was selected along the grassy flats. The soil of the locality is of a grey colour, the pH value is 6·6 and CaO % 0·4475 at the site. A meter quadrate was charted and the inference drawn therefrom was a *Halenia-Swertia* association. *Agrimonia* plants were very small.

Liverworts are quite common in this belt.

Between 2440-3050 m (8000-10,000 ft) *Prunus racemosa* Lamk., *P. cerasoides* D. Don, *Sorbus foliolosa* (Wall.) Spach, *Acer pectinatum* Wall., *A. caudatum* Wall., *A. campbellii* Hk.f.&Th., *A. villosum* Wall., *Symplocos theaefolia* Buch.-Ham., *Litsea* sp., *Salix elegans* Wall., *S. sikkimensis* Anders., *Quercus lamellosa* Sm., *Ribes desmocarpum* Hk.f. & Th., *Betula utilis* D.Don, and shrubs of *Piptanthus nepalensis* D.Don, *Berberis wallichiana* DC., *Viburnum erubescens* Wall., *V. grandiflorum* Wall. ex DC., *Andromedia formosa* Wall., *Cotoneaster thymifolia* Hort., *Rubus calycinus* Wall., *Rosa sericea* Lindl., *Dichroa febrifuga* Lour., *Camellia drupifera* Lour., *Daphnea cannabina* Wall., and *Schisandra grandiflora* Hk.f.& Th., *Arundinaria maling* Gamble, are the common species. At some localities *Acer papilio* King is also found; this species along with *Ilex fragilis* Hk.f., is in great abundance along the slopes of Lamjura Bhanjyang. *Wikstroemia canescens* Meissn. has been observed to be in plentiful in the Sun Kosi valley, and further east it has been noticed to be absent. Similarly along the Nepal-Sikkim boundary *Daphniphyllum himalayense* Muell.-Arg., is commonly met with; so also *Zanthoxylum hamiltonianum* Wall. Banerji, J. (1948) mentions of the Western slopes of Singalila range to be dry and of having been denuded of forests. According to him the Singalila range "Not only forms the watershed between the Kosi in Nepal, and the Tista in Sikkim, but also constitutes a 'vegetational divide' between the moist flora of the Tista Valley and the comparatively drier association of the Kosi basin. It stands towering across the path of the monsoon clouds, most of which falls as rain to the east of it and to the south of the Mahabharat Lekh range, leaving a comparatively dry corner between the two". At certain narrow valleys in the area that forms the Kosi catchment the vegetation is not of a dry character. Trees are densely covered with lichens and heavily laden with moss. Such vegetation conforming to Clarke's 'dripping forests' occur in the Topke gola gorge, Chempaua, a part of Ghorebisa (above Bhojpur) and the Jatapokhri gorge.

Between Mura to Okhaldunga at about 3050 m a site was selected on the ridge and the association was studied by a meter quadrate. It was an *Anaphalis triplinervis-Potentila fulgens* association. *Anaphalis contorta* was abundant and specimens of *Euphorbia maddenii* were rarely met with. The pH of the soil on determination was found to be 6·2 and CaO % 0·2535. This is a typical association of open grassy slopes and ridges at about 3050 m. Such grassy slopes are heavily grazed by Yaks and 'Zhoos' but these species are left untouched by the animals.

In this belt ferns are common, most abundant are *Gleichenia dichotoma*, *Pteridium aquilinum*, *Polypodium* spp., and particular mention may be made of *Osmunda* and *Botrychium*. Species of *Vaccinium* and many orchids are also found in this belt. The common sedges and grasses of this belt are *Juncus ochraceus* Buch.-Ham., *Luzula effusa* Buchen., *Carex nubigena*, *Brachiaria villosa* A. Cam., and *Eragrostis nigra* Nees.

The family Vacciniaceae is represented by 6 species in the area under survey. The orchids are extremely abundant between 1830 m to 2440 m and they are mostly epiphytic, and do not entirely disappear till an altitude of about 3050 m has been attained. Exactly similar is the distribution of orchids in Sikkim. The orchids in Western Himalayas are entirely terrestrial. In East Nepal 39 species of orchids have been collected by me and the greater majority are epiphytic. However there are 10 species of terrestrial orchids that I have collected. Most of the species are Eastern Himalayan. The West Himalayan orchids of my collection are only two—*Herminium gramineum* Lindl. and *Luisia trichorhiza* Blume.

The Rhododendron Forests

2400—3660 *m* (8,000—12,000 *ft*)

At lower altitudes 1500 m *Rhododendron arboreum* Sm. grows with other species such as *Schima wallichii* Choisy, *Eurya acuminata* DC., *Castanopsis* spp., *Syzygium jambolanum* DC., *Engelhardtia spicata* Bl., and many others. Such an association has been observed between Nabughat and Ramechappe

where there is a dense association of *Schima* and *Engelhardtia* along with the other species. A similar association has also been observed between Katonje and Okhaldunga. This association was composed of *Rhododendron, Schima, Castanopsis* and a few *Pinus*. At still higher altitudes the other species that commonly appear with *Rhododendron* are *Acer* spp., *Prunus racemosa* Lamk., *Betula utilis* D. Don, *Quercus lamellosa* Sm.

It is generally from 3050 m (10,000 ft) that pure Rhododendron forests begin to appear. A typical instance of having a pure *Rhododendron* forest as low as 3050 m is at Tinjure. At most of the localities the pure forests have begun after 3360 m (11,000 ft). Vast stretches are covered by different species of *Rhododendron*. The highest altitude reached by such pure forests as observed in East Nepal is 3970 m and that was on the Lamjura bhangyang. Here the soil under the Rhododendron forest gave the pH value of 5·7 and CaO% 0·0617. The common species present in the Rhododendron forests are *campylocarpum, campanulatum, cinnabarinum, hodgsonii, fulgens, thomsoni*. I have not been able to collect good specimens of two more species but what they appeared to me in the field were *wightii* with yellow flowers and ferrugineous woolly ovaries, and *camelliaeflorum* with white flowers. In open sunny situations occur *R. lepidotum* Wall., *R. setosum* Don. and *R. hypenanthum* Balf. f.

In the Rhododendron forests *Boschniackia himalaica* Hk. f. & Th. is very common. At Kalinchok, at altitude 3360 m, a *Rhododendron campylocarpum-Abies spectabilis* association exists. The results of a reading of belt transect 15 m by 1·5 m (50 ft by 5 ft) a ratio of 7:3 of the two species was found. The ground is covered by *Swertia dilatata, Senecio graciliflorus, Polygonum viviparum, Primula* sp. and *Corydalis casimiriana*.

The striking difference between the temperate floras of Eastern and Western Himalay is the paucity of species of Rhododendrons in the later. In Eastern Nepal I have recorded 15 species of Rhododendron which number becomes gradually lesser as we cross the ridges to the west. (Banerji 1954).

It has been rather intruging to find the great variation of the pH value of the soil under Rhododendron forests. At Lamjura the pH is 5.7 while at Kalinchok it was found to be 6.6.

Coniferous Forests

2750—3360 *m* (9,000—11,000 *ft*)

Pinus roxburghii Sargent appears at about 610 m and at many situations forms pure stands. *P. wallichiana* A. B. Jack. generally makes its appearance at about 1832 m and from 2595 m it forms pure forests. Such pure forests of *P. wallichiana* A. B. Jack. are common in Junbesa, Phaplu, and Taplejung areas. It had been observed that *P. wallichiana* A. B. Jack. forms forest in the inner ranges, while *P. roxburghii* Sargent is found both in the outer as well as in the inner ranges but the inner ranges being a little humid the forests are not very extensive. At many situations *P. wallichiana* A. B. Jack. occurs in association with broad-leaved species, and gradually leads into a *Tsuga-Pinus* association. Such associations are often seen at about 2750 m to 3050 m. A pure Tsuga forest has not been observed by me. *Abies spectabilis* (D. Don) Spach. appears at 2440 m, where it is few and scattered and appears in association with *Tsuga* and *Pinus wallichiana* A. B. Jack. Higher up along the slopes pure *Abies* forests are common. Such pure forests of *Abies* are observeable in Topke gola area, Namchebazar area, and also in the Jatapokhri area. On the top of the ridges *Abies* is generally scattered into clumps while in sheltered ravines it grows dense. All over the Kalinchok ridge scattered clumps of *Abies* are seen, such also occur on the Lamjura ridge (the main ridge being occupied by a Rhododendron forest). *Juniperus recurva* Buch.-Ham. is abundantly found between 3050 m and 3660 m and its maximum development is on exposed sunny situations. Vast stretches of Junipers with fastigiate branches cover the slopes above 3360 m and form the principal vegetation along with *Salix daltoniana* Anderss. and *Ephedra gerardiana* (Wall.) Stapf. *Juniperus pseudosabina* Fisch. *et* Mey. attains a size of about 15 m and at Thami I have seen the best specimens of this species growing. At other localities the plants are small in stature.

Ephedra gerardiana (Wall.) Stapf is very common between 3800 m and 4850 m, and is abundant in Namchebazar area towards Panghochee—Tangmochee side. It is lesser towards Tangmochee—Langmoche side, similarly in the Topke gola area the species is not so abundant. *Taxus baccata* Linn. usually forms pure patches in the inner ranges and is in association with an undergrowth of malling. This pecies has been observed at 2290 m in Patek-Tinjura forest to occupy a big area. *Larix griffithi* Hk. f. as been observed at present along the Nepal-Sikkim boundary only. (Banerji 1952 C).

ALPINE AND SUB-ALPINE BELT

In the alpine and sub-alpine zones grazing brings about interesting changes in the vegetation. The grazing at high altitudes is mainly by yaks and the hybrid known as 'Zhoo'. These animals choose their food rather carefully and plants like *Primula, Rhododendron, Meconopsis* and *Berberis* are avoided by them. I have observed that *Rosa* and *Salix* are also species that are not browsed by them, but a number of plants were found to have indications of browsing.

The zone above 3050 m to 3660 m consists chiefly of *Rhododendrons;* shrubs hardly exceeding 4-5 m filling up the valleys so as to render them impassable, *Salix*, and in sheltered places *Abies*. In this zone meadows are prominent but not very extensive. Above 3660 m is a kind of 'heath' and is formed by the smaller species of *Rhododendron* and of *Salix*. The pH value of the soil is very variable. The soil sample from Kalinchok gave pH value as 6·6 while the sample from Lamjura gave 5.7. Similarly the CaO% is also very different depending on the parent material.

The sub-glacial fell-fields are gneissose with a little micaceous schist. It is a litter of scree and rocks covered by crustaceous lichens and mosses. It was only in Namchebazar area that I noticed limestones. Due to the wide daily range of temperature and congelation of water weathering of the parent material leads to the production of a loose soil *in situ* known as the 'talus'. The herbaceous species in this region are with deep root-system, bulbous and tuberous. Most of the species attain the 'espalier', caespitose, fastigiate or rosettes, in other words those morphological features are exhibited which seem to be brought about by heat and wind.*

In the course of my explorations I touched this belt on a number of occasions; only at four places I have stayed for four to six days and the collections and observations made therefrom are given below :

TOPKE GOLA AREA

(27°37'N & 87°35'E)

It is a small cup-shaped valley with ranges of average height 5800 m. The adjoining valley to the east is Wallangchoong Gola. The valley of Wallangchoong Gola and the catchment of Tamur was explored by Hooker in 1848, an account of which is given by him in Himalayan Journal (1854) and reference to the specimens collected therefrom are made in Flora of Biritish India. This valley has recently been visited by Banerji, J. (1948). I visited Topke gola in 1953 and gatherings were made from 27th to 31st May.

The common species that were in flower at the time of the visit are—*Ranunculus affinis* R. Br., *R. diffusus* DC., *R. hirtellus*† Royle, *Caltha scaposa* Hk. f. & Th., *Oxygraphis polypetala* Hk. f. & Th., *Meconopsis paniculata* Prain, *Baraya alpina* Sternb. & Hoppe, *Thlaspi cochlearioides* Hk. f., *Rosa sericea* Lindl., *Potentilla ambigua* Camb., *P. macrophylla* var. *acheilleaefolia* Hk. f., *P. sibaldii* Haller, *Chrysoplenium griffithii* Hk. f. & Th., *Saxifraga purpurascens* Hk. f. & Th., *Ribes desmocarpum* Wall., *Gaultheria pyrolaefolia* Hk.f., *Gassiope fastigiata* D. Don, *Rhododendron hypenanthum* Balf. f., *R. lepidotum* Wall., *R. setosum* D. Don, *Primula aequalis* Craib, *P. boothii* Craib, *P. glabra* Klatt., *P. listeri* King, *P. stuartii* Wall., *P. wattii* King, *Androsace geranifolia* Watt, *Mandragora cauliscens* C. B. Cl., *Salix sikkimensis* Anders., *Aletris nepalensis* Hk. f., and *Fritillaria cirrhosa* D. Don. The plants of *Fritillaria* were drying up at the time.

In this area Eastern Himalayan species abound, in fact all these mentioned above are East Himalayan species.

NAMCHEBAZAR AREA

(27°50'N & 86°42'E)

This locality lies to the west of the Great Himalayan range. To the east of Namchebazar is Kantega (6800 m—22,297 ft) ; on the north is Taweche (6500 m—21,388 ft) and Khumbila (4,800 m —19,297 ft) and on the west is Kwande (6100 m—20,320 ft) and the south is open. Through a narrow gorge flows the Dud Kosi. The area is subjected to strong currents of cold wind that bring about dessication. The atmosphere is dry during May, and not moist as in Topke gola. The mist rises very early in the morning.

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*See Warming—Oecology of Plants (1925) p. 26; W. B. Medougal—Plant Ecology (1931) pp. 57&175; R. F. Daubenmire—Plant and Environment (1947) pp. 195; 282-285.

†A small variant which has been mentioned on p. 20.

The sub-glacial fell-fields support a sparse vegetation and the species observed are *Juniperus recurva* Buch.-Ham., which along with *Berberis angulosa* and *B. concinna* Hk. f. & Th., and *Cassiope fastigiata* D. Don form small bushes all over. Besides these *Ephedra gerardiana* (Wall.) Stapf is the other species that is distributed all over. A narrow path is to be followed amongst these species. Along the banks of streams grows *Myricaria bracteata* Royle (*Myricaria germanica* Desv.) and at places it forms a thick growth.

The other species that were noticed and collected in May 1948 are *Caltha palustris* var. *himalayensis* Brühl ex Banerji, *Arenaria densissima* Wall., *A. polytrichoides* Edgew., *Meconopsis horridula* var. *typica* Prain, *Thermopsis barbata* Royle, *Rosa sericea* Lindl., *Potentilla fruticosa* Linn., *Saxifraga saginoides* Hk.f. & Th., *S. ramulosa* Wall., *Cortia hookerii* C.B.Cl., *C. lindeleyii* DC., *Leontopodium fimbrilligerum* Drumm., *Saussurea gossypiphora* D. Don, *S. tridactyle* Schultz-Bip., *Primula* spp., *Androsace sarmentosa* Linn., *A. chaemajasame* var. *uniflora* Hk.f., *Mandragora caulescens* C.B.Cl., *Salix daltonianus* Anders., *S. sikkimensis* Anders., and *Iris kumaonensis* Wall. In this locality some scattered specimens of *Euphorbia himalayensis* were also seen but they were in a dry condition. Also in this area a compositae was collected which could not be identified by Kew as there are no flowers on the head but scales only. I have noticed that *Iris kumaonensis* Wall. makes its eastward extension up to this locality. This species was noticed to be absent in Topke gola area.

Kalinchok Area

(28°2′N & 86°46′E)

It is a long ridge running north to south. The other ranges are far apart and as such this ridge is subjected to strong currents of wind from the east, as is evidenced by the bent and lopsided trees. On the east facing slopes is a dense coniferous forest composed of *Abies* and *Tsuga*. Lower down is a mixed broad-leaved forest. On the west facing slopes there is a narrow belt of Rhododendron forest which is followed lower down by a mixed broad-leaved forest belt. Over the ridge there is heavy grazing and there are many sites that can be termed as alpine meadows and alpine fell-fields. The pH value of the soil over the ridge and also under the Rhododendron forest is 6·6 and the CaO% has been estimated to 0·4475.

This area has been visited twice ; the first time during May 1952, and the second time during September 1956. The vegetation showed differences as it should be before and after the rains. The species collected during the pre-monsoon period are *Anemone obtusiloba* D. Don., *Oxygraphis polypetala* Hk. f., *Meconopsis paniculata* Prain, *Capsella bursapastoris* Linn., *Fragaria vesca* Linn., *Oenanthe thomsonii* C.B.Cl., *Gnaphalium luteo-album* Linn., *Leontopodium alpiniun* Cass., *Senecio diversifolia* Wall., *Primula denticulata* Sm., *Gentiana albicalyx* Burk. An *Iris* was seen but without flowers ; I presume it was *I. kumaonensis* Wall.

The vegetation during the post-monsoon period consisted of a number of species and the most prominent amongst them and in flower were —*Delphinium vestitum* Wall., *Thalictrum chelidonii* DC., *Corydalis casimiriana* Duthie & Prain, *Saxifraga fimbriata* Wall. ex DC., *S. strigosa* Wall. ex Ser., *S. nutans* Hk. f., *Parnassia nubicola* Wall., *Pleurospermum apiolens* C.B.Cl., *Heracleum sublineare* C.B.Cl., *Selinum tenuifolium* Wall., *Dipsacus inermis* Wall., *Triplostegia glandulifera* Wall., *Aster tricephalus* C.B.Cl., *Cremanthodium oblongatum* C.B.Cl., *Senecio alatus* Wall. ex DC., *S. gracilliflorus* DC., *Cynanthus linifolius* Wall., and *C. lobatus* Wall., *Primula glomerata* Pax, *Swertia dilatata* C.B.Cl., *Halenia elliptica* D. Don, *Pedicularis gracilis* Wall., and *P. longiflorus* Rudolph, *Elsholtzia strobilifera* Benth., *Polygonum viviparum* Wall., besides *Rhododendron setosum* D. Don. and *R. lepidotum* Wall. There were a number of species of *Primula* that were without flowers.

Lamjura Area

(27°35′N & 86°30′E)

This is another ridge that runs north-east to south-west and it separates the Dud Kosi catchment from the Tamba Kosi catchment. On the north-west facing slope there is a deep belt of a mixed forest which leads higher up to a broad Rhododendron forest which is approximately 300 m in depth. These are heavily laden with moss and lichens, and the ground is covered with a thick carpet of mosses. *Boschniackia himalaica* is very commonly met with. This north-west slope of this ridge is unlike that of Kalinchok. Greater humidity is evidenced on this ridge due to the dense growth of mosses. The pH value of the soil is 5·7 and CaO% 0·0617. There is no grazing. It was noticed that many herbs that were in profusion at Kalinchok were rather occasional, while some other species were more common

on this ridge. There were no meadows or fell-fields on this ridge and as such species that prefer open sunny situations were absent or very poorly represented. As one descends along the east facing slope there is a narrow coniferous belt of *Abies* which leads lower down to a still narrower belt of a mixed forest. On the fringe of the forest is the hamlet named Bhandara which I crossed. All around Bhandra terraces were being prepared for potato cultivation which is the principal crop of the Sherpas. On grassy borders of the terraces *Anaphalis contorta*, *A. triplinervis* and some *Potentila* grow. The collection over this area was made during the month of September, 1956. The flowering specimens that were then present are *Meconopsis nepalensis* DC., *Stellaria sikkimensis* Hk.f., *Corydalis casimiriana* Duthie & Prain, *Impatiens falcifer* Hk. f., *Lespedeza stenocarpa* Maxim., *Saxifraga fimbriata* Wall. ex DC., *S. strigosa* Wall. ex Ser., *Bupleurum* sp., *Gaultheria trichophylla* Royle, *Cynanthus hookeri* C.B.Cl., *Pedicularis regelians* Prain, *P. gracilis* Wall., *Gentiana ornata* Wall., *Elsholtzia strobilifera* Benth., *Habenaria urceolata* C.B.Cl.

The striking difference between the Kalinchok ridge and Lamjura is the occurrence of a broad Rhododendron forest which is heavily laden with moss and also the broad-leaved mixed forest, which is in accordance with Clarke's 'dripping forest of Sikkim'. The species that appeared in greater profusion at this locality are *Acer campbellii* var. *serratifolia* var. nova.,* *A. papilio* King, *Ilex fragilis* Hk. f., *Sorbus foliolosa* (Wall.) Spach.

Summary

During the course of this investigation, the total collection includes 583 species of flowering plants belonging to 342 genera, out of 109 families of Dicotyledons only, and the dicotyledons only have been enumerated in the following pages. Out of this collection a new species of *Pimpinella*, and a new variety of *Hypericum hookerianum* Wt. & Arn. have already been described (Banerji 1951 & 1952 A). In the following pages a new variety of *Caltha palustris* Linn., and of *Acer campbellii* Hk. f. ex Hiern are being described.

Burkill (1910) has drawn up a list of the Eastern & Western elements, of species of irregular distribution, and of endemic elements in the vegetation of Central Nepal. Besides the species mentioned by him under the different headings, in my collections there are a number of new records for Eastern Nepal and they are :

Caltha scaposa Hk. f. & Th.
Berberis bhutanensis Ahrendt (=*B. wallichiana* DC. var. *pallida* Hk. f.)
Corydalis leptocarpa Hk. f. & Th.
Meconopsis horridula Hk. f. & Th. var. *typica* Prain
Thlaspi cochlearioides Hk. f. & Th.
Cardamine trifoliata Hk. f. & Th.
Stellaria bulbosa Wulf
S. sikkimensis Hk. f.
Camellia caudata Wall.
Impatiens arguta Hk. f.
I. falcifer Hk. f.
I. laevigata Wall.
I. radiata Hk. f.
Ilex fragilis Hk. f.
Acer campbellii Hk. f. & Th. both vars. *campbellii* and *serratifolia** var. nova.
A. papilio King
A. sikkimensis Miq.
A. stachyophyllum Heirns.
Indigofera dosua Buch.-Ham. var. *tomentosa* Baker
Chrysoplenium griffithii Hk. f. & Th.
Ribes griffithii Hk. f. & Th.
Saxifraga nutans Hk. f. & Th.
S. purpurascens Hk. f. & Th.

*This new variety is described on p. 34.

Cortia hookerii C. B. Clarke
Heracleum sublinerare C. B. Clarke
Oenanthe thomsonii C. B. Clarke
Pimpinella acronemaefolia C. B. Clarke
P. clarkeana Watt ex Banerji
P. sikkimensis C. B. Clarke
Pleurospermum apiolens C. B. Clarke
Lactuca macrantha C. B. Clarke
Saussurea tridactyla Sch.-Bip.
Campanumaea inflata C. B. Clarke
Lobelia affinis Wall. ex DC.
Agapetes incurvata (Griff.) Sleumer var. *hookerii* (C.B. Cl.) Airy Shaw [=*A. hookerii* (Cl.) Sleumer]
A. serpens (Wight) Sleumer (=*Pentapterygium serpens* Klotsch.)
Vaccinium dunalianum Wight
V. nummularia Hk. f.
Gaultheria pyrolaefolia Hk. f.
Rhododendron cinnabarinum Hk. f.
R. dalhousiae Hk. f.
R. triflorum Hk. f.
Androsace croftii Watt var. *scaposa* Sant. & Banerji
A. chamaejasme var. *uniflora* Hk. f.
Primula aequalis Craib
P. boothii Craib
Symplocos caudata Wall. ex DC.
Osmanthus suavis King ex C. B. Clarke
Ligustrum confusum Decne.
Alstonia neriifolia D. Don
Ehretia wallichiana Hk. f. & Th.
Porana stenoloba Kurz
Mandragora caulescens C. B. Clarke
Boschniackia himalaica Hk. f. & Th.
Tarphochlamys affinis (Griff.) Brem.
Clerodendrum japonicum (Thunbg.) Sweet
Ajuga microsperma Wall. var. *thomsonii*
Peperomia pellucida (L.) H. B. & K.
Cinnamomum impressinervum Meissn.
C. parthenoxylon Meissn.
Neolitsea zeylanica (Nees) Merr.
Ostodes paniculata Bl.
Pilea smilacifolia Wedd.
P. tenuifolia Wedd.
Salix daltoniana Anderss.
S. sikkimensis Anderss.
Agrostophyllum callosum Reichb. f.
Cirrhopetalum parvulum Lindl.
C. flavidum Wall.
C. hookerianum Lindl.
Dendrobium rotundatum Benth.
D. anceps Swartz.
D. sphegidoglossum Reichb. f.
D. pierardi Roxb.
Eria bractescens Lindl.

Habenaria urceolata Hk. f.
Microstylis khasiana Hk. f.
Oberonia myriantha Lindl.
Sarchochilus luniferus Reichb. f.
Stauropsis undulatus Benth.
Trichosoma suavis Lindl.
Zeuxine goodyeroides Linn.

and this number of new records comes to 82.

There are some species that were previously known from Kumaon in the west and Sikkim, Bhutan or Khasia in the east and their presence in Nepal was not known. The following are such species and their occurrence in East Nepal is being recorded :

Saxifraga saginoides Hk. f.
Edgaria darjeelingensis C. B. Clarke
Androsace geraniifolia Watt
Trachelospermum axillare Hk. f. & Th.
Wikstroemia canescens Meissn.

Besides these, there are some species worth a mention as well, such as :

Carpinus viminea Lindl.—This species has however been reported by Burkill from Chessapani pass and Fakel in Nepal, my collection is from further east.

Saxifraga corymbosa Hk. f. & Th. was described from material collected from Sikkim and later reported from Wallangchoong in Eastern Nepal ; is now being reported from locality further west. The type locality of *Cyananthus hookeri* C.B. Clarke, is Wallangchoong and later more material was collected from Chumbi, Sikkim & Tibet. I have been able to collect specimens of this species further west from Lamjura (86°30′ E & 27°35′ N).

To the Western elements mentioned by Burkill the species that have their eastward extension as recorded, based on the collections made by me from the district are :

Braya alpina Sternb. & Hoppe.
Stellaria webbiana Edgew. & Hk. f.
Sageretia oppositifolia Brongn.
Rhus wallichii Hk. f.
Cyananthus microphyllus Edgew. (=*C. linifolius* Wall.)
Marsdenia tenacissima Wt. & Arn.
Strobilanthus atropurpureus Nees
Lusia trichorhiza Blume

The endemic elements in the district as far as it came under my observation consists of *Thalictrum rotundifolium* DC., *Cardamine violacea* Wall. ex Hk. f. & Th., and *Hypericum hookerianum* Wt. & Arn. var. *lineare* Banerji.

There are four species in my collection that have an irregular distribution. These four species are in addition to those already mentioned by Burkill (*loc. cit.*).

Eryngium foetidum Linn.—This is an introduced species. It has previously been reported from Burma, Manipur, Assam and Jalpaiguri. It makes its reappearance in Eastern Nepal.

Pimpinella clarkeana Watt ex Banerji—Watt's specimens were collected from Manipur in Assam and it was rediscovered in East Nepal. (Banerji 1951).

Peperomia pellucida (L.) H.B. & K.—This is a native of South America and having run wild it has become a weed in Bombay and Madras. It also appears in East Nepal but is a rare species.

Cinnamomum parthenoxylon Meissn.—This is a species of Burma, Malaya and China. It has been recorded from Assam by Das (Fl. Assam 4: 60). It appears in Eastern Nepal. It has not been so far recorded from Bhutan or Sikkim.

A careful examination of herbarium material has brought light some leaf variations in *Rubus foliolosus* D. Don and *Trachelospermum axillare* Hk.f. and these are also described.

There is a scarcity of *Thalictrum rotundifolium* DC. material in our Indian herbaria. I have been able to collect specimens of this species only during the end of September and very few individuals were

found. The fruits are ribbed and provided with a twisted style. The fruit of *T. chelidonii* DC. have a long stalk, and the fruit is not as long as the stalk as given by Hooker in Fl. Brit. Ind.; but is much shorter in mature fruit (Fig. 1). Finally a mention may be made of a Compositae collected from Lonakh (27°55′ N & 86°37′ E) at 4580 m (B. 355) that could not be identified in the Indian herbaria. It was consequently sent to authorities at Kew who sent it back as 'Indeterminate' and drew attention to the flowerless heads. The heads being occupied by scales only. There were quite a few individuals growing in

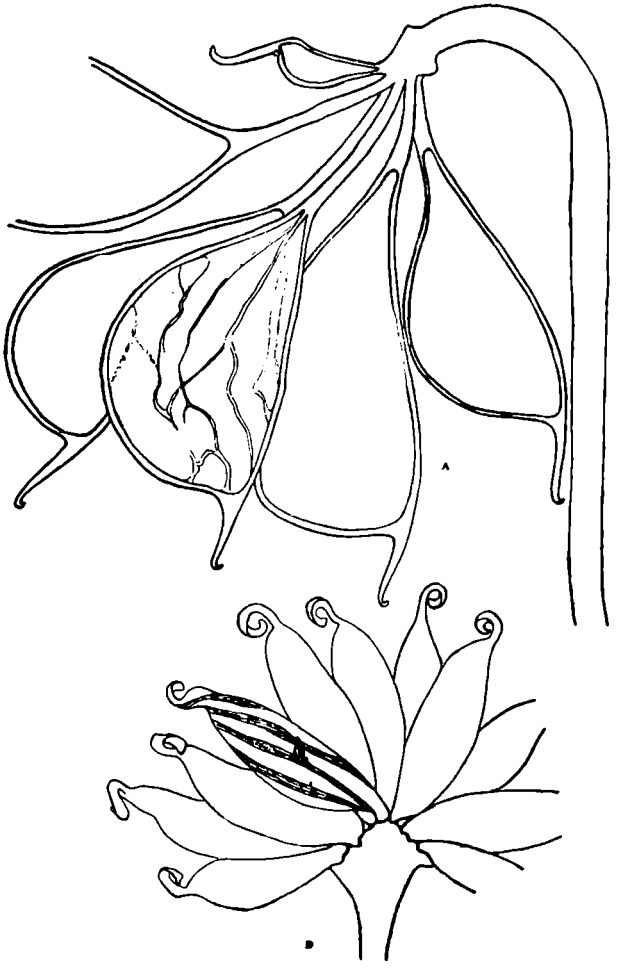

Fig. 1.
A. Fruits of *Thalictrum chelidonii* ×11.
B. Fruits of *T. rotundifolium* ×18.

the locality where it was collected, and all grew in small clumps of 3-4. I am inclined to take that this plant propogates vegetatively. "Vegetative propagation particularly by the aid of detached buds perhaps to atone for failure to set seed or produce flowers" is mentioned by Warming (1925 p.252) and he cites *Saxifraga cernua* L., *S. stellaris* L. var. *comosa*, *S. flagellaris* Willd. ex Sternb., *Polygonum viviparum* L. and viviparous grasses as examples, but these are European species.

Conclusion

In brief, it will be evident from what has been said that in East Nepal, we have a vegetation which is curiously mixed and predominated by eastern elements. Sir J. D. Hooker (1907) classes Central Nepal

with Sikkim. This expression has been emphasized by Burkill (1910) by his analysis of his collection and observation made along the same route that was covered by Wallich in 1821.

Burkill (p. 95) says "the hills of Nepal show a great poverty as compared with Sikkim in number of species present; but then we know so little of the Nepal hills, and there are doubtless so many plants yet to be found at 7,000 ft. and above, that we are hardly justified in drawing deductions".

My findings convince me of the poverty of species and I am inclined to regard this as a consequence of gregariousness. I am of the opinion that East Nepal along with Sikkim and Bhutan forms a homogenous botanical area, although the differing floras of the eastern and western Himalayas merge in the entire Nepal Himalayas.

The similarities in the vegetation of Eastern Nepal and Sikkim are not only the effects of monsoon and climatic changes as expressed by Burkill (*loc. cit.*) but may also be due to the geographical conditions on which of course climatic conditions depend. Mt. Everest and its satellites form a gigantic barrier for the dispersal and distribution of plant species along the chain. The western elements recorded by Burkill and by me are mostly species of the tropical and temperate zone. Only two species belong to the alpine and sub-alpine zone—they are *Oxygraphis polypetala* and *Braya alpina*. The longitudinal section of the great Himalayas (Fig. 2) is in support of my impression. The ranges that run north to south (NNE to SSW) in East Nepal stand as a natural barrier in the distribution of the species of *Rhododendron* (*see* Banerji 1954). Family *Vacciniaceae* is well represented in Eastern Himalayas and in East Nepal there are the same 5 species as mentioned by Smith (1913) and in addition to these, *Agapetes hookerii* (Cl.) Sleumer, also occurs. Further west to the Mt. Everest there is a gradual reduction of the species of *Rhododendron* and also in the representation of family *Vacciniaceae*.

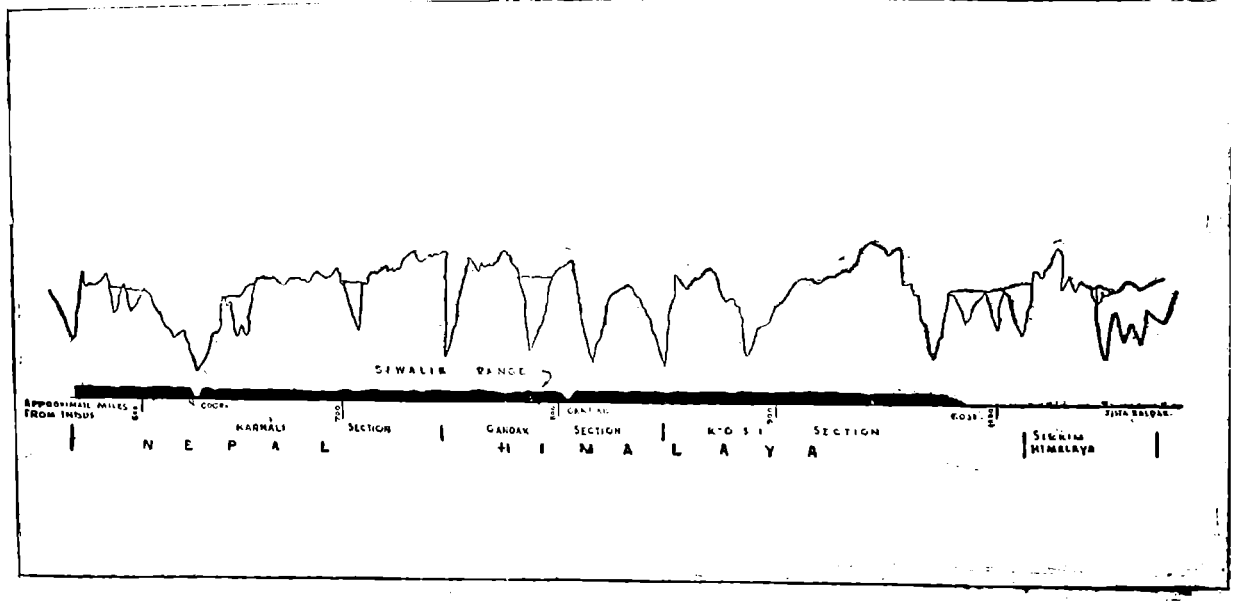

Fig. 2. Longitudinal section of The Great Himalaya from Nepal to Sikkim (after K. Mason 1934).

According to Pennell (1943) the distribution of the genus *Pedicularis* is equally interesting. There are 19 species that belong to Western Himalayas, only one passes to the east as far as Kumaon. There are 7 species that extend from Nepal westwards to Kumaon and further west. 6 species extend all along the length of the Himalaya. In Nepal and Sikkim are many other eastern species of the genus.

In West Nepal there is preponderance of Western Himalayan species as is evident from Fauna & Flora of Nepal Himalayas although some species of the Eastern Himalaya extend westward.

We have, thus, in Nepal the merging of the vegetation of East Himalaya and West Himalaya.

Enumeration

RANUNCULACEAE

Aconitum laciniatum Stapf in Ann. Roy. Bot. Gard. Calcutta 10: 168, 1905.

Roots tuberous, 2 or 3 tubers. Stem robust, erect, finely pubescent in the upper part. Leaves reniform, cordate-orbicular with a wide and shallow sinus, 5 pedati-partite. Inflorescence with a fine greyish pubescence. Carpels 3, rarely 4 or 5. Abundant in shade.

Nepali name : 'Murula'.

Kalinchok at 2750 m (B. 1025).

A. **spicatum** Stapf *ibid.* 10: 165, 1905.

A. ferox Wall. : FBI. 1: 28, 1872 p.p.

Stem erect, greyish pubescent. Leaves orbicular-cordate or reniform, 3-partite, shallow sinus at the base of lamina. Inflorescence tomentose. Carpels 5. Rare.

Namchebazar at 3815 m (B. 371).

The Sherpas add a few branches to the incense they burn during the winter months.

Anemone obtusiloba D. Don, Prodr. Fl. Nep. 194, 1825; FBI. 1: 8, 1872.

Tufted herb, softly hairy. Radical leaves tripartite. Flowers white, lower surface blue tinged. Achenes hairy. Frequent.

Tibetian name : 'Ranli-mendo'.

Patkaru to Saddle at 3215 m (B. 441); Khera to Mandanda at 3050 m (B. 655); Kalinchok at 3050 m (B. 632); Bhitrikhani at 2745 m (B. 698).

A. obtusiloba D. Don subsp. **omalocarpella** P. Brühl in Ann. Roy. Bot. Gard. Calcutta 5: 77, 1896.

Villose plants; leaves trisect, segments obovate, lobules serrate-crenate. Sepals 6-9 with a lead-coloured spot; carpels nearly flat with a few rigid hairs. Frequent.

Okhaldunga to Patale at 2745 m (B. 239).

According to Brühl, Scully's Nepal sheets are referable to this subspecies.

A. rivularis Buch.-Ham. ex DC. Syst. 1: 211, 1818; FBI. 1: 10, 1872.

Erect herb, silky pubescent. Radical leaves tripartite. Flowers white, lower surface blue tinged. Achenes glabrous. Common.

Tibetian name : 'Lasi-mendo'.

Chandragiri at 2440 m (B. 1812); Dingla to Bhojpur-Ghore bisa at 2440 m (B. 904).

A. vitifolia Buch.-Ham. ex DC. Syst. 1: 210, 1818; FBI. 1: 8, 1872.

Stem robust, white pubescent. Radical leaves 5-7-lobed. Flowers creamy white. Abundant in shade and moist places.

Namdu to Sikrigaon at 1832 m (B.1029); Junbesa to Phaplu at 1832 m (B. 1117).

Caltha palustris var. **himalayensis** Brühl ex Banerji, var. **nova**.

Herba erecta, petiolis 12-15 cm, lamina 3×2 cm; flores lutei.

This new variety is a much smaller erect plant with petioles 12–15 cm long and lamina 3×2 cm. The type of the variety was collected by Banerji at Hongaon in E. Nepal abundant in marshy places, at an altit. of 2440 m on 31 May, 1948; the type is preserved in Banerji Herbarium in Meerut College, Meerut under No. B. 523; isotype under same number in Herbarium, Indian Botanic Garden, Calcutta.

The official description of this new variety is being published elsewhere.

C. scaposa Hk. f. & Th. Fl. Ind. 1 : 40, 1855; FBI. 1:21, 1872.

Herb with rootstock densely fibrous, leaves obtuse. Flowers yellow. Abundant in marshy places.

Topke gola at 3975 m (B. 803).

Hooker in FBI gives the altitude as 15,000–17,000 ft (4575-5200 m), but my specimens come from a lower altitude and were abundant. The species has previously been reported from Chumbi and Phari

by Younghusband, Gould, Waddel and King's collector, also from Sikkim and Kumaon. It has not been reported from Nepal previously.

Clematis buchananiana DC. Syst. 1 : 140, 1818; FBI. 1:6, 1872.

Woody climber, coarsely hairy. Flowers light yellow or creamy. Rare.

Khandbari to Dharangaon at 1525 m (B. 463).

C. montana Buch.-Ham. ex DC. Syst. 1:164, 1818; FBI. 1:2, 1872.

Woody climber with leaves fascicled at the nodes. Flowers white or light yellow. Petals 2·5 cm long. Abundant.

Tibetian name : 'Bado-mendo'.

Chaubas to Pheda at 1985 m (B. 614); Those to Bitrikhani at 2290 m (B. 676).

C. montana Buch.-Ham. ex DC. var. **incisa** O. Ktz. : Brühl in Ann. Roy. Bot. Gard. 5 (2) : 73,1896.

Leaves small, leaflets membranous, lanceolate. Flowers and leaves crowded on shortened branchlets; pedicels usually longer than the leaves. Occasional.

Topke gola area at 3817 m (B. 850).

Delphinium denudatum Wall. ex Hk. f. & Th. Fl. Ind. 49, 1855; FBI. 1:25, 1872.

Erect nearly glabrous, branched. Radical leaves orbicular, segments narrow. Flowers blue; sepals spreading, spur straight. Common along sunny slopes.

Chandragiri at 1680 m (B. 89/2).

D. vestitum Wall. ex Royle, Ill. Bot. Himal. 55, 1835; FBI. 1:26, 1872.

Very hairy herb. Radical leaves orbicular. Flowers numerous dull blue sepals erect, spur curved. Common in shade.

Kalinchok at 3360 m (B. 1005).

Oxygraphis polypetala Hk. f. & Th. Fl. Ind. 1: 27, 1855; FBI. 1:21, 1872.

Small tufted herbs with flowers yellow. Abundant in open situations.

Rhingmo to Jubing at 2900 m (B. 280); Kalinchok at 3817 m (B. 627).

Ranunculus affinis R. Br. in Parry, 1st. Voy: App. 265, 1824; FBI. 1:18, 1872.

Herb with branched rootstock; radical leaves reniform, cauline leaves with narrow segments. Flowers yellow. Fairly common.

Topke gola area at 3054 m (B. 785), also at 3664 m (B. 811).

R. **diffusus** DC. Prodr. 1:38, 1824; FBI. 1:19, 1872.

Herb with decumbent stem, covered with soft spreading hairs. Flowers bright yellow. Abundant on moist soil.

Tinpipli to Nepalthoke along the mudflats of Rosi stream at 763 m (B. 102), Kathmandu valley at 1240 m (B. 45/2); Puyia to Jubing at 2595 m (B. 386); Khera at 2748 m (B. 666); Bhitrikhani at 1221 m (B. 697); Raksha to Ething at 2595 m (B. 711); Beyond Papung at 2748 m (B. 775); Topke gola area at 3054 m (B. 787); Kalinchok at 2748 m (B. 1018); Namdu to Sikrigaon at 1832 m (B. 1032).

Hooker in Fl. Brit. Ind. gives the altitudinal range as 6,000-10,000 ft (1832-3054 m), but my specimens (B. 102 and B. 697) are from lower altitudes.

R. hirtellus Royle, Ill. Bot. Himal. 53, 1835; FBI. 1:18, 1872.

Small erect herbs, 2-30 cm high, with few, bright yellow flowers. Three varieties of this plant are known so far; the varieties may be separated by the following key :

a. Robust herbs, up to 30 cm tall, densely hairy . . . . . *hirtellus*

a. Slender herbs, 2-6 cm tall :

b. Stems glabrous, 1·5-4 cm tall, calyx deeply purple . . . . . *glabricaulis*

b. Stems more or less hairy, never glabrous, 4-6 cm tall, calyx green . . . . *minor*

var. **minor** Sant. & Banerji in Proc. Nat. Inst. Sci. India 24 B: 137, 1958.

This variety in some respects approaches the typical variety, but differs mainly on account of its much smaller size, and by the petioles, which are densely hairy upwards in the new plant. The latter approaches also var. *glabricaulis* Hand.-Mazz. in general appearance, but differs by its hairiness and the green colour of the calyx, the var. *glabricaulis* being glabrous and having purple calyx.

The type of our new variety was collected by Banerji at Topke gola in E. Nepal, at an altit. of 3360 m on May 20, 1953; the type is preserved in Banerji Herb. in Meerut College, under the number *Banerji* 798; the isotype of the same variety is kept in Blatter Herbarium, Bombay, under the same number. The new variety seems to be widely distributed in the Eastern Himalayas; many sheets from Sikkim have been examined in the Calcutta and Dehra Dun herbaria showing the typical characters of the new variety.

Thalictrum chelidonii DC. Prodr. 1:11, 1824; FBI. 1:11, 1872.

Much branched herb. Leaflets orbicular-cordate. Flowers blue. Abundant.

Kalinchok at 3360 m (B. 1007).

T. rotundifolium DC. Syst. 1:185, 1818; et Prodr. 1:15, 1824; Wall. Pl. As. Rar. 3: t. 264, 1832; FBI. 1:13, 1872.

Stem erect about 25 cm tall; roots fibrous. Leaves simple, reniform, stipules free. Panicles few, flowers white.

Kathmandu valley at 1350 m (B. 74/2).

MAGNOLIACEAE

Magnolia campbellii Hk. f. & Th. Fl. Ind. 77, 1855; FBI. 1: 41, 1872.

A tall tree with dark coloured branches. Flowers white, sweet scented. Locally abundant.

Jubing to Puyia at 2595 m (B. 312).

This species has previously been reported from Sikkim and Bhutan.

Michelia kisopa Buch.-Ham. ex DC. Prodr. 1:79, 1824; FBI. 1:43, 1872.

A tall tree with young parts grey pubescent. Flowers pale yellow, mildly scented. Rare.

Nepali name : 'Champ'.

Kaituka reserve forest at 1985 m (B. 202).

Timber largely used for furniture in Kathmandu.

SCHISANDRACEAE

Schisandra[1] **grandiflora** Hk. f. & Th. Fl. Brit. Ind. 1: 44, 1872.

A glabrous climbing shrub with white flowers, often tinged pink. Sepals and petals waxy. Very striking sight. Abundant.

Dongen to Topke gola at 3054 m. (B. 780).

ANNONACEAE

Annona reticulata Linn. Sp. Pl. 537, 1753; FBI. 1:78, 1872.

A small tree, shrubby. Fruit largely eaten by the local people. Abundant at lower altitudes, particularly along the dry slopes. The species seems to have well established itself.

Tinpipli to Nepalthoke at 610 m (B. 103); noticed also at many places.

Desmos chinensis Lour. Fl. Coch. 1:352, 1790; Sinclair in Garden's Bull. Singapore 14: 266, t. 15, 1953-55.

Unona discolor Vahl, Symb. Bot. 2: 63, t. 36, 1791; FBI. 1: 59, 1872.

A spreading shrub with fragrant light yellow flowers. Rare. Only seen in the far eastern side of Nepal.

Phutuk to Namsaling at 610 m (B. 588).

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[1] *Schisandra* Michx. 1803 is conserved against *Stellandria* Brickell, 1803.

MENISPERMACEAE

Cocculus[1] **laurifolius** DC. Syst. 1: 520, 1818; FBI. 1:101, 1872; Diels in Pfreich. 46:239 t. 79 1910.

A small tree with coriaceous leaves. Flowers not seen. Drupes black and rugose. Very rare; few trees only seen. Kathmandu—Pashupati Nath area at 1250 m (B. 4).

Cissampelos pareira Linn. Sp. Pl. 1031, 1753; FBI. 1:103, 1872; Diels in Pfreich. 46:286, t. 91.A-K 1910.

A climber with long pendulous female racemes. A good sight when in flower when the back ground is rather dull. Very common all over.

Dingla to Khandbari at 610 m (B. 461); noticed at many places.

BERBERIDACEAE

Berberis angulosa Wall. ex Hk. f. & Th. Fl. Ind. 1:227, 1855; FBI. 1: 111, 1872.

A small shrub. Leaves fascicled, obovate, coriaceous. Flowers not seen. Occasional.

Tarangan to Lonakh at 4275 m (B. 351).

B. aristata DC. var. **aristata** Hk. f. & Th. Fl. Brit. Ind. 1:110, 1872.

Leaves obovate, spinulose serrate towards the tip. Flowers yellow. Very common.

Chandragiri at 2139 m (B. 16/2); Dingla to Bhojpur at 2748 m (B. 901 A).

B. aristata DC. var. **micrantha** Hk. f. & Th. loc. cit.

Leaves obovate-lanceolate, coriaceous, spinulose. Flowers yellow. Not very common. Leaves infected by a rust-aecidial stage of *Puccinia agropyrii* (as identified at I.A.R.I., Delhi).

Dingla to Bhojpur at 2748 m (B. 901 B).

B. asiatica Roxb. ex DC. Syst. 2:13, 1821; FBI. 1:110, 1872.

A stout much branched shrub with leaves orbicular or obovate, strongly reticulate beneath. Abundant.

Chandragiri at 2135 m (No number).

B. bhutanensis Ahrendt, Journ. Linn. Soc. 57(369) : 72, 1961, Journ. Bot. Lond. 79 (Supp.) 17, 1941.

B. wallichiana DC. var. *pallida* Hk. f. & Th. Fl. Brit. Ind. 1:111, 1872.

Shrub with leaves about 2 cm long, lanceolate, spinous. Not very common.

Patala to Phaplu at 2745 m (B. 247).

This has previously been reported from Bhutan only by *Griffith.*

B. concinna Hk. f. in Bot. Mag. t. 4744, 1853; FBI. 1:111, 1872.

A small shrub forming cushions. Spines mostly equalling the leaves. Flowers orange yellow Occasional.

Lonakh at 4275 m (B. 352); rare in Topke gola area.

Hooker in Fl. Brit. Ind. gives Sikkim as the locality, and *Smith* 3761 in Herb. Calc. is from Ghola Khola (South-East Sikkim), where it is reported to be occasional. Lonakh is exposed to strong cold wind and as such the species is found much more than in Topke gola area which is a cupshaped valley and more humid than Lonakh.

B. umbellata Wall. ex Hk. f. & Th. Fl. Ind. 224, 1855; FBI. 1:110, 1872.

An erect straggling shrub; leaves obovate, sparingly serrulate. Not very common.

Chandragiri at 2135 m (No number).

B. wallichiana DC. var. **atroviridis** Hk. f. & Th. Fl. Brit. Ind. 1 : 111, 1872.

Shrub with leaves 5 cm long, lanceolate. Abundant.

Kalinchok at 2440-3000 m (B. 679); also seen at many places—Jatapokhri, Topke gola area.

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[1] *Cocculus* DC. 1818 is conserved against *Cebatha* Forsk. 1775 and *Leaeba* Forsk. 1775.

Mahonia[1] **acanthifolia** Wall. ex G. Don, Gen. Syst. 1:118, 1831; Takeda in Notes. Roy. Bot. Gard. Edin. 6, T. 6, 1921.

Berberis nepalensis Spreng. : FBI. 1:109, 1872.

A robust shrub with unequally pinnate leaves. Abundant at certain places forming a very dense growth.

Nepali name : 'Lekh Chutra'.

Seen at many places but with no flowers.

LARDIZABALACEAE

Holboellia latifolia Wall. var. **angustifolia** Hk. f. & Th. Fl. Brit. Ind. 1: 108, 1872.

Scandent shrub with linear lanceolate 7-9 leaflets. Common.

Khera at 2745 m (B. 669); Papung at 2290 m (B. 771); Surkhenagi to Jorpati at 1830 m (B. 855).

PAPAVERACEAE

Meconopsis horridula Hk. f. & Th. var. **horridula** Prain in Journ. Asiat. Soc. Beng. 54, 2:313, 1895.

Erect herb 20 cm high, densely covered with stiff hairs. Leaves 8 cm long also densely covered with stiff hairs. Flowers blue purple. Only two specimens collected.

Nangpala at 5500 m (B. 360).

The distribution of this species is given as Sikkim.

M. nipalensis DC. Prodr. 1 : 121, 1824 (non FBI.).

An erect herb about 2 m tall. Leaves pinnatifid, densely covered with golden hairs. Flowers 5-6 cm in diam.; red-purple. Ovary densely covered with hairs. Rare.

Lamjura at 3665 m (B. 1063).

M. paniculata (D. Don) Prain in Journ. Asiat. Soc. Beng. 54, 2:316, 1895.

Papaver paniculatum D. Don Prodr. Fl. Nep. 197, 1825.

Meconopsis nipalensis Hk. f. Fl. Ind. 253, 1855; FBI. 1: 118, 1872 (non DC).

An erect herb, about 2 m tall; leaves densely covered with golden barbellate hairs. Flowers yellow. Common above 3360 m.

Kalinchok at 3800 m (B. 625); noticed also at Jatapokhri and Topke gola area.

Rootstock is eaten by herdsmen.

FUMARIACEAE

Corydalis[2] **casimiriana** Duthie & Prain in Journ. Asiat. Soc. Beng. 65(2) : 27, 1897.

Stem weak, much branched. Leaves long petioled, membraneous, flowers yellow, 1 cm long in lax racemes. Capsules about 1 cm long. Abundant.

Kalinchok at 3360 m (B. 1001); also seen at Simbhanjang at 2748 m.

C. juncea Wall. Tent. Fl. Nep. 54, t. 42, 1824-26; FBI. 1:123, 1872.

Juvenile specimens collected in a Rhododendron forest. Rare.

Bhitrikhani at 2750 m (B. 699).

C. leptocarpa Hk. f. & Th. Fl. Ind. 1:260, 1855; FBI. 1 : 122, 1872.

Herb with diffuse branches. Flowers dull purple. Abundant on moist soil, particularly in shade.

Saddle to Dingla at 3050 m (B. 447); Those to Khera at 2600 m (B. 643).

The distribution of this species as given in Fl. Brit. Ind. and from the sheets in Herb. Calcutta is Sikkim, Bhutan, Assam and Burma. The species is being reported from Nepal for the first time.

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[1] *Mahonia* Nutt. 1818 is conserved against *Odostemon* Raf. 1817.

[2] *Corydalis* Vent. 1803 is conserved against *Capnoides* Miller 1754.

Dicentra[1] **scandens** Walp. Rep. 1:118, 1842; FBI. 1:121, 1872.

Diclytra scandens D. Don Prodr. Fl. Nep. 198, 1825.

Dactylicapnos scandens (D. Don) Hutch. Kew Bull. 105, 1921.

A slender herb climbing by leaf-tendrils. Flowers light yellow. Rare in shady places.

Hatia to Hangaon at 2440 m (B. 521).

D. thalictrifolia Hk. f. & Th. Fl. Ind. 273, 1855; FBI. 1:121, 1872.

Dactylicapnos thalictrifolia Wall. Tent. Fl. Nep. 51, t. 89, 1828.

Stem slender and angled. Flowers not seen. Capsule fleshy. Rare.

Mura to Okhaldunga at 2135 m (B. 1077).

CRUCIFERAE

Braya alpina Sternb. & Hoppe in Denkscher. Regensb. 1(1): 66, 1815; FBI. 1: 155, 1872.

Herbs with stout long roots; leaves tufted. Flowers white or light yellow. Abundant.

Topke gola to Thaglabhangyang at 4580 m (B. 823); also at 4275 m (B. 833).

In FBI the distribution is given as Western Tibet, and the colour of the flowers is given as white or purple. This species has not been reported by Smith in Rec. bot. Surv. India 4:7, 1913.

Capsella[2] sp.

My sepecimen matches a sheet in Herb. Calcutta identified as *C. bursa-pastoris* Linn. but I doubt of the correctness of the identification of the latter. My specimen does not match with the alpine species of *Capsella*, e.g. *elliptica* and *thomsoni*. Smith & Cave in Rec. bot. Surv. India 4(5):176, 1911 mention *C. bursa-pastoris* Linn. for Lachen and Thango, at an altit. of 8-13,000 ft (2440 to 3970 m). Common.

Kalinchok at 3815 m (B. 626).

Cardamine flexuosa Wither, Bot. Arr. Brit. Pl. (ed. 3), 3 : 578, 1787.

C. hirsuta Linn. var. *sylvatica* (Link.) Hk. f. in Fl. Brit. Ind. 1: 138, 1872.

Stem decumbent; leaflets orbicular-ovate. Flowers white. Not very common.

Nepali name : 'Twelii'.

Patek to Tinjura at 2290 m (B. 884).

C. trifoliolata Hk. f. & Th. in Journ. Linn. Soc. 5:145, 1861; FBI. 1:138, 1872.

Small herb with flowers lilac. Occasional.

Hongaon to Poptila at 2440 m (B. 526).

The type is from Bhutan at 1680 m. My specimen comes from a higher altitude as given by Smith in Rec. bot. Surv. India 5(7): 351, 1913.

C. violacea Wall. ex Hk. f. & Th. in Journ. Linn. Soc. 5:144, 1861; FBI. 1:137, 1872.

Erysium violaceum D. Don, Prodr. Fl. Nep. 202, 1825.

Stem 1-1·5 m, brittle. Leaves with sagittate auricles. Flowers large, violet. Abundant in shady and moist places.

Hongaon to Poptila at 3054 m (B. 527); above Papung at 3054 m (B. 769).

Erysium hieraciifolium Linn. Cent. Pl. 1:18, 1755; FBI. 1:153, 1872.

Erect herbs, leaves oblong, sinuate toothed. Flowers yellow. Very common in cultivated fields.

Nepali name : 'Selpu'.

Those to Khera at 2440 m (B. 645).

E. pachycarpum Hk. f. & Th. in Journ. Linn. Soc. 5: 167, 1861; FBI. 1: 153, 1872.

Erect robust herb; leaves lanceolate, sinuate-toothed. Flowers bright yellow. Rare.

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[1] *Dicentra* Bernh. is conserved against *Diclytra* Borckh 1797 and *Dactylicapnos* Wall. 1826.

[2] *Capsella* Med. 1792 is conserved against *Bursa* Bochmer 1760 and *Marsypocarpus* Neck. 1790.

Phaplu to Rhingmo at 2900 m (B. 262).

Lepidium sativum Linn. Sp. Pl. 644, 1753; FBI. 1: 159, 1872.

A glabrous erect herb. Flowers in long racemes, small, white. Abundant.

Bhadgaon at 1375 m (B. 4/2).

Leaves sometimes used for flavouring.

Nasturtium[1] **montanum** Wall. ex Hk. f. & Th. in Journ. Linn. Soc. 5:139, 1861; FBI. 1:134, 1872.

A hairy annual. Flowers yellow. Rare.

Phidim to Moktara at 1375 m (B. 736).

N. officinale R. Br. in Ait. Hort. Kew. ed. 2, 4: 111, 1812; FBI. 1:133, 1872.

Stem creeping branched, leaves pinnate, leaflets sessile. Flowers white. Occasional in damp situations.

Kathmandu valley at 1350 m (B. 56/2).

Sisymbrium axillare Hk. f. & Th. in Journ. Linn. Soc. 5: 162, 1861.

Herb, small, diffuse. Flowers solitary in the axils of cauling leaves; white. Abundant.

Those to Bhitrikhani at 3054 m (B. 687 and B. 688).

Thlaspi cochlearoides Hk. f. & Th. in Journ. Linn. Soc. 5:177, 1861; FBI. 1:162, 1872.

Small decumbent herb. Flowers in short corymbs, white. Abundant.

Topke gola to Thaglabhangyang at 4580 m (B. 826 and B. 829).

CAPPARIDACEAE

Capparis olacifolia Hk. f. & Th. in Fl. Brit. Ind. 1:178, 1872.

Erect shrub, about 2 m tall. Leaves ovate-lanceolate, apex tapering. Flowers white, anthers blue. Occasional on dry slopes.

Tinpipli to Nepalthoke at 763 m (B. 104); Banepa to Dolaghat at 1068 m (B. 604).

VIOLACEAE

Viola canescens Wall. ex Roxb. Fl. Ind. 2: 450, 1832; Collet, Fl. Simlensis 40, 1921; Fyson, Fl. South Ind. Hill Stations 1:27, 1932.

V. serpens Wall. var. *canescens* (Wall.) Hk. f. & Th. in Fl. Brit. Ind. 1: 184, 1872.

Stem very short; stipules fringed. Flowers lilac with violet streaks. Occasional.

Chandragiri at 2443 m (No number); Topke gola area at 3054 m (B. 786).

V. distans Wall. in Trans. Med. Phys. Soc. Calcutta 7:227; FBI. 1:183, 1872.

Stem long and trailing. Leaves very variable, usually traingular and heart-shaped. Flowers blue.

Puyia to Jubing at 1680 m (B. 388); Those to Khera at 2595 m (B. 641).

V. hookeri Thomas ex Hook. f. Fl. Brit. Ind. 1: 183, 1872.

Stem short; leaves orbicular-reniform, stipules toothed. Flowers white. Rare.

Puyia to Jubing at 1680 m (B. 387).

V. manaslensis Maekawa in Acta Phytotax. Geobot. 15:173, 1954; at Fauna & Flora Nep. Himal. 1:181, 1955.

Plants 5-9 cm; stipules elliptic. Flowers deep yellow. Petals broad and imbricate; labellum rounded. Common.

Patkaru to Saddle at 3054 m (B. 437).

V. serpens Wall. in Roxb. Fl. Ind. 2: 449, 1832; FBI. 1 : 184, 1872.

Stem short but producing runners, leaves broadly ovate, deeply cordate; stipules entire. Flower lilac. Very common.

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[1] ***Nasturtium*** R. Br. 1812 is conserved against *Cardaminum* Moench. 1794 & *Baeumerta* Gaertn. 1800.

Chandragiri at 2440 m (B. 7/2).

BIXACEAE

Scolopia[1] **crenata** Closs. in Ann. Sc. Nat. (Ser. 4) 8: 247, 1857; FBI. 1:191, 1872.

Tree with young branches armed. Leaves oblong-lanceolate, crenate.

Nepalthoke to Mulkote at 760 m (B. 123).

FLACOURTIACEAE

Casearia glomerata Roxb. Hort. Beng. 33, 1814 et Fl. Ind. 2 : 419, 1832; FBI. 2: 591, 1879; Cowan, Tr. N. Beng. 15, 1929.

Shrub with leaves lanceolate or elliptic-lanceolate; glanddotted. Flowers greenish-yellow. Rare.

Jubing to Wapsakhani at 1375 m (B. 402); Tumling tar at 610 m (B. 897).

Homalium nepalense Benth. in Journ. Linn. Soc. 4:34, 1860; FBI. 2: 596, 1879.

Shrub with glabrous leaves. Panicles with divaricate branches minutely tomentose. Flowers pale white, small. Abundant.

Okhaldunga to Chayanum at 1220 m (B. 1098).

PITTOSPORACEAE

Pittosporum nepaulense (DC.) Rehd. & Wills. in Sargent, Pl. Wils. 3: 326, 1916; Gowda in Journ. Arn. Arb. 32: 330, 1951.

P. floribundum Wt. & Arn. Prodr. 154, 1834; FBI. 1: 199, 1872, p.p.

Tree with broadly lanceolate leaves. Inflorescence well branched, paniculate. Flowers light yellow, ovary pubescent. Abundant.

Pashupati Nath Temple area at 1250 m (B.2).

Flowers are crushed and paste applied to the forehead at Pashupati Nath Temple.

POLYGALACEAE

Polygala crotalarioides Buch.-Ham. ex DC. Prodr. 1: 327, 1824; FBI. 1: 201, 1872.

Herb, about 15 cm hairy; leaves oblong-obovate, pinkish. Flowers pink, in densely flowered racemes. Common on sandy soil in exposed places.

Phidim to Moktara at 1375 m (B. 738).

Scully 27 and 47, also from Nepal, are smaller in size from specimens from other parts of India

P. persicariaefolia DC. Prodr. 1: 326, 1824; FBI. 1: 202, 1872.

Pubescent. Stem erect; leaves linear or elliptic-lanceolate, sub-sessile. Flowers pink, in terminal racemes. Rare.

Okhaldunga to Chayanum at 1375 m (B. 1084).

P. sibirica Linn. Sp. Pl. 702, 1753; FBI. 1: 205, 1872.

Stem 30 cm pubescent. Leaves elliptic-lanceolate, margin slightly recurved. Flowers bluish. Occasional.

Kulikhani at 1375 m (No number).

P. triphylla Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 200, 1825; FBI. 1: 201, 1872.

Stem weak, nearly erect. Leaves spathulate, flowers deep pink in erect terminal racemes. Very common in grass.

Banepa to Dolaghat at 1065 m (B. 930).

Salomonia[2] **cantoniensis** Lour. Fl. Coch. 1: 14, 1790; FBI. 1 : 206, 1872.

Diffuse herb; stem winged. Leaves cordate-ovate, pale beneath. Spikes rather lax. Flowers blue. Occasional.

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[1] *Scolopia* Schreb. 1789 is conserved against *Aembilla* Adans. 1763.

[2] *Salomonia* Lour. 1790 is conserved against *Salomonia* Heist. ex Fabr. 1763.

Okhaldunga to Chayanum at 1375 m (B. 1088).

CARYOPHYLLACEAE

Arenaria polytrichoides Edgew. in Hook. f. Fl. Brit. Ind. 1 : 237, 1874.

Plants densely tufted becoming hemispherical, clothed with old leaves; young leaves bright green. Lonakh at 4580 m (No number).

A. serpyllifolia Linn. Sp. Pl. 423, 1753; FBI. 1 : 239, 1874.

Stem pubescent, dichotomously branched. Leaves rigid. Cymes many flowered. Abundant. Bhadgaon at 1375 m (No number).

Cerastium glomeratum Thuill. Fl. Par. (ed 2): 226, 1824.

C. vulgatum Linn. var. *glomeratum* (Thuill.) Edgew. in Hook. f. Fl. Brit. Ind. 1: 228, 1874.

Herb, densely spreading. Flowers white; petals as long as sepals. Common.

Bhadgaon at 1375 m (B. 50).

Juice used for headaches.

Drymaria cordata Willd. ex Roem. & Schult. Syst. 5: 406, 1822; FBI. 1: 244, 1874.

Herb much branched, diffuse. Flowers white; sepals free; petals equalling the sepals. Very common.

Okhaldunga to Chayanum at 1525 m (B. 1094); Kuwapani to Banepa at 1675 m (B. 1110).

Sagina procumbens Linn. Sp. Fl. 128, 1753; FBI. 1 : 243, 1874.

Stem tufted, branches rooting, bright green. Flowers very small, white. Common along the banks of streams, rocks and crevices.

Patale to Phaplu at 1985 m (B. 250); Mura to Okhaldunga at 1830 m (B. 1081); Junbesa to Phaplu at 1832 m (B. 1124).

Silene venosa (Gibb.) Ascher. Fl. Brandenb. 1: 86, 1864. *S. inflata* Sm.; FBI. 1: 218, 1874.

Erect herb about 1 m tall. Leaves ovate or obovate. Flowers white, drooping; calyx inflated. Occasional.

Kathmandu valley at 1350 m (B. 40/2).

Stellaria bulbosa Wulf. in Jacq. Coll. 3: 21, 1786-90; FBI. 1: 231, 1874.

Stem erect, tuberous; leaves elliptic-lanceolate.

Flowers white. Common.

Puyia to Ghate at 2440 m (B. 320).

S. media Cyrill. Char. Comm. 36, 1784; FBI. 1: 230, 1874.

A very common weed, stem much branched, with a line of hairs. Flowers white. Petals deeply bilobed.

Rhingmo to Jubing at 1680 m (B. 308); Kathmandu valley at 1350 m (B. 54/2).

S. sikkimensis Hook. f. in Fl. Brit. Ind. 1: 230, 1874.

Herb forming matted tufts. Stem laxly pubescent; leaves small, ovate or obovate-lanceolate. Flowers white; sepals with scarious margin. Rare.

Lamjura at 3664 m (B. 1058).

S. webbiana Edgew. in Hook. f. Fl. Brit. Ind. 1: 230, 1874.

Stem zigzag, and four angled. Leaves acicular, stiff. Flowers axillary, white. Occasional.

Rakshe to Ething at 2290 m (B. 713).

TAMARICACEAE

Tamarix dioica Roxb. Hort. Beng. 22, 1814 nomen; et Fl. Ind. 2: 101, 1824; FBI. 1: 249, 1874.

A small tree with drooping extremities of branches. Spike panicled. Flowers pink.

Arun banks between Bhojpur and Pakribas at 457 m (B. 913).

Seen on the banks of Arun river only.

Myricaria bracteata Royle, Ill. Bot. Himal. 214: t. 44, 1835.

M. germanica Desv. in Ann. Sc. Nat. (Ser. 1) 4: 349, 1825; FBI. 1: 250, 1874.

Bushy shrub; leaves linear-lanceolate. Racemes pink. Abundant along banks of Dud Kosi. Namchee to Dingbochee at 3970 m (B. 373).

HYPERICACEAE

Hypericum cernuum Roxb. Hort. Beng. 59, 1814 nomen; et Fl. Ind. 3: 400, 1832; FBI. 1: 253, 1874.

A glabrous shrub. Cymes 3-5-flowered. Flowers 5 cm in diameter, yellow when fully open. Common.

Chandragiri at 2135 m (No number).

H. elodeoides Choisy in DC. Prodr. 1: 552, 1824; FBI. 1: 255, 1874.

Stem terete, stoloniferous, generally unbranched. Leaves stem clasping. Bracts with stalked glands. Flowers about 2 cm in diam., yellow in terminal panicles, sepals and petals black-dotted. Abundant.

Chaubas to Risingo at 1985 m (B. 964).

H. hookerianum Wt. & Arn. var. **lineare** Banerji in Journ. Indian Bot. Soc. 31: 152, 1952.

Shrub. Leaves 4 cm long, 3/4 cm broad. Flowers golden yellow. Abundant in a scrub forest. Nepalthoke at 1,100 m (B. 95).

H. japonicum Thunb. Fl. Jap. 295, t. 31, 1784; FBI. 1: 256, 1874.

Herb, stem prostrate. Flowers 6 cm in diameter, yellow. Abundant.

Narkata to Mahadeophedi at 1375 m (B. 158); also seen at many places.

H. patulum Thunb. Fl. Jap. 259, 1784; FBI. 1: 254, 1874.

Shrub, 5 m pyramidal in shape, branches 2 ridged. Flowers 2.5 cm in diameter, yellow. Abundant.

Dhulikhel to Kuwapani at 1525 m (B. 72); Kathmandu valley at 1350 m (B. 92/2); Papung at 2440 m (B. 762); Chaubas to Risingo at 1985 m (B. 966).

GUTTIFERAE

Mesua ferrea Linn. Sp. Pl. 515, 1753; FBI. 1: 277, 1874.

A big tree often planted at resting places (Chautaras). Flowers terminal, solitary, white, sweet scented. Stamens yellow. Fruit conical.

Nepali name : 'Nag-Kesar'.

Dumohan at 1220 m (B. 700).

THEACEAE

Camellia caudata Wall. Pl. Asiat. Rar. 3: 36, 1830; FBI. 1: 293, 1874.

Shrub with buds silky. Leaves elliptic-oblong, caudate acuminate. Flowers about 2·5 cm in diam.; white, sepals silky; petals obovate. Occasional.

Kathmandu valley at 1350 m (B. 20/2).

C. kissi Wall. in Asiat. Res. 13 : 429, 1820.

C. drupifera This. Dyer in Hook. f. Fl. Brit. Ind. 1: 293, 1874 (non Lour. 1790).

Shrub with many slender branches; buds with loose scales. Flowers 3·5 cm in diameter, white, fragrant. Common.

Nepali name : 'Ban cheia'.

Okhaldunga to Reserve forest at 1980 m (B. 186).

Eurya acuminata DC. Mem. Ternstr. 26, 1822; et Prodr. 1: 525, 1824; FBI. 1: 285, 1874; Kobuski in Ann. Miss. Bot. Gard. 25: 321, 1938.

Small shrubby tree; leaves oblong-elliptic. Flowers few. Styles 3-5, united or free. Common.

Nepali name: 'Jhingini'.

Dhulikhel to Kuwapani at 1525 m (B. 59, 62); Bhitrikhani at 1832 m (B.691); Papung at 2440 m (B. 764).

Kobuski (loc. cit.) does not regard the varieties-*euprista* & *wallichiana* as separated by Thiselton Dyer in FBI. (loc. cit.). The plant is largely used as a fuel and for fodder, thus lopped specimens are most commonly met with.

E. cerasifolia (D. Don) Kobuski in Ann. Miss. Bot. Gard. 25: 326, 1938.

Diospyros cerasifolia D. Don, Prodr. Fl. Nep. 144, 1825.

Eurya symplocina Bl. Mus. Bot. Ludg. Bat. 2: 114, 1856; FBI. 1: 284, 1874.

E. wallichiana Planchon: FBI. 1: 285, 1874.

Small tree; leaves 10-13 cm long, oblong-elliptic; entire or serrulate above. Flowers crowded in fascicles. Styles united. Frequent.

Okhaldunga to Reserve forest at 1985 m (B.191); Dingla to Bhojpur at 2595 m (B.909).

Schima wallichii (DC.) Korth. Bijdr. Ternstr. in Temminsk. Verh. Nat. Gesch. Bot. 143, 1839-42; Blombergen in Reinwardtia 2 (1) : 133, 1952.

Gordonia wallichii DC. Prodr. 1: 528, 1824.

Schima wallichii Choisy: FBI. 1: 284, 1874.

A very large tree, leaves elliptic to lanceolate with margin completely entire or dentate-serrate; nerves soft-hairy below. Flowers white, fragrant. The commonest tree at about 12-1600 m.

Nepali name : 'Chilaune; Aul-chilaune'.

Dhulikhel to Kuwapani at 1530 m (B. 60); Wapsakhani to Bhulu at 1220 m (B. 407).

According to Bloembergen (loc. cit.), our Himalayan plants belong subsp. *wallichii* var. *wallichii*, while var. *khasiana* is found further east and at higher altitude.

SAURAUIACEAE

Saurauia napaulensis DC. in Mem. Soc. Phys. Genev. 1: 421, 1822; FBI. 1: 286, 1874.

Tree; leaves about 30 cm long, silvery beneath, serrate. Flowers pink. Fruits eaten by youngsters. Common.

Okhaldunga at 1985 m (B. 226).

STACHYURACEAE

Stachyurus himalaicus Hk. f. & Th. ex Benth. in Journ. Linn. Soc. 5: 55, 1861; FBI. 1: 288, 1874.

Shrub with straggling branches. Spikes 5-7 cm erect; berries subglobose. Occasional.

Hatia to Hongaon at 2440 m (B. 518).

DIPTEROCARPACEAE

Shorea robusta Gaertn. f. Fruct. 3: 48 t. 186, 1805; FBI. 1: 306, 1874.

Gregarious. Panicles and flowers pubescent. At many places plants have a stunted growth, particularly in the interior. Principal vegetation upto 1068 m.

Deorali to Narkata at 916 m (B. 147).

MALVACEAE

Sida veronicaefolia Lam. Ency. 1: 5, 1783.

S. humilis Cav. Dis. 5: 277, t. 134 F 2, 1788; FBI. 1: 322, 1874.

A trailing herb. Flowers light yellow axillary and solitary. Corolla not exceeding calyx. Common.

Banspeni to Patkaru at 1832 m (B. 433).

TILIACEAE

Grewia sapida Roxb. Hort. Beng. 42, 1814 nomen; et Fl. Ind. 2: 590, 1832; FBI. 1: 387, 1874.

Shrub. Stipules as long as the petioles. Flowers about 1 cm in diameter, yellow. Common.

Narkata to Mahadeophedi at 1375 m (B. 159).

Triumfetta pilosa Roth, Nov. Pl. Sp. 223, 1821; FBI. 1: 394,1874.

Herb, bristly, bristles bulbous. Lower leaves 3-lobed, upper generally ovate, stellate hairs on both surfaces. Flowers yellow; capsule covered with long hooker spines. Common.

Risingo to Pheda at 915 m (B. 973).

ELAEOCARPACEAE

Elaeocarpus sphaericus (Gaertn.) Schumann in Pfam. 3 (6): 5, 1895; Santapau in Rec. bot. Surv. India 16 (1): 32, 1953.

Ganitrus sphaerica Gaertn. Fruct, 2: 271, t. 139, 1791.

Elaeocarpus ganitrus Roxb. Hort. Beng. 42, 1814; FBI. 1: 400, 1874.

A medium sized tree. Flower buds elongate; flowers yellowish white. Drupes globose, stone tuberculated. Common in Chainpur district only.

Gairigaon to Chainpur at 1068 m (B. 472); Chainpur to Dingla at 765 m (B. 895).

LINACEAE

Reinwardtia trigyna Planch. in Hook. Lond. Journ. Bot. 7: 522, 1848; FBI. 1: 412, 1874.

A small glabrous shrub; leaves ovate-lanceolate. Flowers yellow, 2·5 cm in diam., axillary, solitary. Sepals lanceolate. Occasional.

Kathmandu valley at 1350 m (B. 52/2).

GERANIACEAE

Biophytum reinwardtii Walp. Rep. 1: 476, 1842; FBI. 1: 437, 1874.

Stem simple. Leaflets 10-20 pairs. Flowers orange yellow. Capsules equalling the sepals. Abundant.

Okhaldunga to Chayanum at 1525 m (B. 1090).

Geranium nepalense Sweet, Geran. 1: t. 12, 1820: FBI. 1: 430, 1874; Knuth in Pfreich. 53: 192, 1912.

Herb, slender and prostrate, much branched softly hairy. Flowers pink or purple, 1 cm in diameter. Petals slightly notched. Carpels hairy. Abundant.

Kathmandu at 1300 m (B. 30); Bhadgaon to Dhulikhel at 1375 m (B. 48); Khera to Phogata at 2440 m (B. 648); Dolaghat to Chaubas at 1525 m (B. 943).

Root-stock medicinal.

G. polyanthes Edgew. & Hk. f. in Fl. Brit. Ind. 1: 431, 1874; Knuth in Pfreich. 53: 136, 1912.

Herb bearing clusters of flowers. Umbels 3-8-flowered. Flowers dark purple. Carpels glabrous. Common.

Khera to Phogata at 2595 m (B. 653).

BALSAMINACEAE

Impatiens arguta Hk. f. & Th. in Journ. Linn. Soc. 4: 137, 1860; FBI. 1 : 470, 1874; Hk. f. in Rec. bot. Surv. India 4 : 19, 1905.

Stem erect. Leaves all alternate. Flowers white of medium size; sepals 4; lip spurred. Occasional.

Chaubas to Risingo at 1985 m (B. 965).

I. bicornuta Wall. ex Roxb. Fl. Ind. 2 : 460, 1832; FBI. 1 : 475, 1874; Hk. f. in Rec. bot. Surv. India 4 : 14, 1905.

Leaves alternate, upper often largest. Inflorescence erect raceme from upper leaf-axils. Flowers rose-purple. Sepals minute, orbicular, gland tipped. Lip sigmoidly incurved. Rare.

Data incomplete (No number).

Impatiens discolor DC. Prodr. 1 : 687, 1824; FBI. 1 : 471, 1874; Hk. f. in Rec. bot. Surv. India 4: 14, 1905.

Leaves all alternate. Inflorescence of spreading peduncled few flowered racemes. Flowers white with a violet tint. Sepals entire, margin eglandular. Occasional.

Chaubas to Risingo at 1985 m (B. 956).

I. falcifer Hk. f. Bot. Mag. t. 7923; et in Rec. bot. Surv. India 4 : 18, 1905.

I. serrata Benth. : FBI. 1 : 473, 1874 (p. p.).

Leaves all alternate, serrate. Inflorescence much shorter than the leaves. Flowers yellow; basal lobe of wings very small, distal much broader than long. Common.

Gola to Hatia at 1985 m (B. 511); Kalinchok at 3054 m (B. 1006); Bhandara to Sethya at 1832 m (B. 1048); Lamjura at 3054 m (B. 1056); Junbesa to Phaplu at 1832 m (B. 1119).

I. laevigata Wall. ex Hk. f. & Th. in Journ. Linn. Soc. 4 : 146, 1860; FBI. 1 : 473, 1874; Hk. f. in Rec. bot. Surv. India 4 : 30, 1905.

Glabrous shrub. Leaves alternate also opposite. Flowers large; bracts large, herbaceous. Sepals 4, large, orbicular.

Chaubas to Risingo at 1985 m (No number).

I. prainii Hk. f. in Rec. bot. Surv. India 4 : 14, 1905.

Leaves all alternate, linear-lanceolate. Inflorescence of spreading few flowered racemes. Flowers. rose-pink; sepals entire. Occasional.

Kathmandu valley at 1350 m (B. 55/2); Kuwapani to Banepa at 1680 m (B. 1107).

I. pulchra Hk. f. & Th. in Journ. Linn. Soc. 4 : 139, 1860; FBI. 1 : 459, 1874; Hk. f. in Rec. bot. Surv. India 4 : 12, 1905.

Stem stout; leaves alternate. Inflorescence axillary, flowers large. Sepals 2, cuspidate, spur slender.

Hongaon to Shivrang at 1985 m (B. 535).

Specimens collected at a higher altit. than given by Hooker f. in Rec. bot. Surv. India 4 : 18, 1905.

I. racemosa DC. Prodr. 1 : 688, 1824; Hk. f. in Rec. bot. Surv. India 4 : 16, 1905.

I. laxiflora Edgew. var. *khasiana* Hk. f. in Fl. Brit. Ind. 1 : 478, 1875.

Leaves alternate. Flowers small, yellow. Flower buds exclusive of spur globose. Abundant.

Num to Hedagna at 1375 m (B. 495); Chandragiri at 1670 m (B. 96/2); Pheda to Charikot at 1068 m (B. 984).

I. radiata Hk. f. in Fl. Brit. Ind. 1: 476, 1874; Hk. f. in Rec. bot. Surv. India 4 : 15, 1905.

Leaves alternate. Flowers small, yellow; flower buds globose, plane of mouth expanded flower horizontal. Common.

Chaubas to Risingo at 1985 m (B. 955).

I. scabrida DC. Prodr. 1 : 687, 1824; Hk. f. in Rec. bot. Surv. India 4 : 70, 1905 (non Wall).

I. scabrida DC. FBI. 1 : 472, 1874, p.p.

Inflorescence lateral of solitary axillary short 1-5 flowered peduncles. Flowers yellow. Sepals ovate, lip infundibular, spur 2-3 cm.

Kathmandu valley at 1350 m (B. 53/2).

I. sulcata Wall. in Roxb. Fl. Ind. 2: 485, 1832; FBI. 1 : 469, 1874; Hk. f. in Rec. bot. Surv. India 4:13, 1905.

Leaves opposite or pseudo-verticillate. Flowers of medium size, rose-purple. Bracts broad. Basal lobe of wing spurred. Lip saccate. Rare.

Kalinchok at 3055 m (B. 1014).

Impatiens uncipetala C. B. Clarke ex Hook. f. in Rec. bot. Surv. India 4 : 22, 1905.

I. scabrida Wall. : FBI. 1: 472, 1874. p.p.

Leaves all alternate. Inflorescence much shorter than the leaves. Flowers bright yellow. Basal lobe of wing spurred in the sinus. Rare.

Lamjura at 2440 m (B. 1113).

RUTACEAE

Boenninghausenia[1] **albiflora** Reichb. Conspect. 197, 1828; FBI. 1: 486, 1875. Engler in Pfam. ed. 2, 19A, 243, t. 103, B-F. 1931.

An erect herb, pubescent. Flowers nodding and pure white. Petals obtuse. Very common.

Patkaru to Saddle at 2440 m (B. 436).

Skimmia[2] **laureola** Sieb. & Zucc. ex Walp. Rep. 5 : 405, 1842-7; FBI. 1 : 499, 1875.

Shrub, strongly aromatic. Panicles densely flowered; flowers yellowish-white. Rare.

Rhingmo to Jubing at 2290 m (B. 289).

Xanthoxylum acanthopodium DC. Prodr. 1 : 727, 1824; FBI. 1 : 493, 1875.

Shrub, branches tomentose, unpleasant smell. Seeds and fruit not edible.

Papung at 2440 m (B. 763); Chandragiri at 2440 m (No number).

In Fl. Brit. Ind. under *X. acanthopodium* a var. *timbor* has been described by Hooker, and Wallich 7116 is quoted. A reference to Hamilton's collection from Chainpur hills is given. I am inclined to take the locality as Chainpur of East Nepal (87° 18'E & 27° 17'N) and not Chayanpoor hills in Behar 40 miles S. E. of Banaras.

X. hamiltonianum Wall. ex Hook. f. in Fl. Brit. Ind. 1 : 494, 1875.

A large climbing shrub. Stem covered with large conical spine leaflets 2-3 pairs; petioles terete very prickly. Abundant.

Dingla to Bhojpur at 2748 m (B. 906); also seen in Topke gola area.

Dry fruits and seeds used as a condiment by the sherpas.

SIMAROUBACEAE

Picrasma javanica Bl. Bijdr. 248. var. **nepalensis** (Benn.) Badhwar in Ind. Council. Agri. Res. Sci. Monogr. 17 (1) : 281, 1940.

P. javanica Bl. FBI. 1 : 520, 1875.

P. nepalensis Benn. Pl. Jav. Rat. 201, 1838; FBI. 1 : 520, 1875.

A small tree ; leaflets 7, sometimes 5, elliptic-lanceolate, caudate-acuminate. Flowers in axillary corymbosely branched panicles, dull-white. Occasional.

Nepali name : 'Taju'.

Dingla to Bhojpur at 2748 m (B. 907).

MELIACEAE

Cipadessa baccifera (Roth) Miq. in Ann. Mus. Ludg.-Bat. 4: 6, 1868-69.

C. fruticosa Bl. Bijdr. 162, 1825; FBI. 1: 545, 1875.

Small tree. Panicles with long peduncles. Flowers white; fruits scarlet. Common.

Nepali name : 'Pai-loti'.

Dhulikhel to Kuwapani at 1375 m (B. 85); Tinpipli to Nepalthoke at 1068 m (B. 92); Risingo to Pheda at 916 m (B. 971).

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[1] *Boenninghansenia* Reichb. 1837 is conserved against *Boenninghausenia* Spreng. 1826; and *Podostaurus* Jungh. 1845.

[2] *Sikkimia* Thunbg. 1783 is conserved against *Sikkimi* Adans. 1763.

Heynea trijuga Roxb. Hort. Beng. 83, 1814 nomen, et Cor. Pl. 3 : 56, t. 260, 1819; FBI. 1: 565, 1875.

Large tree. Leaves pinnate, leaflets 5-11. Flowers white. Common.

Dharanbazar to Dhankuta at 763 m (B. 872).

Oil used for burning.

Ammora decandra Hiern. in Hook. f. Fl. Brit. Ind. 1:562, 1875.

Tree with leaves compound pinnate, leaflets 10-12 pairs. Flowers red. Abundant.

Nepali name : 'Bandra'.

Kuwapani to Tinpipli at 1527 m (B. 86); Dingla to Khandbari at 450 m (B. 458).

AQUIFOLIACEAE

Ilex dipyrena Wall. ex Roxb. Fl. Ind. 1: 473, 1832; FBI. 1: 599, 1875.

An evergreen tree with leaves, elliptic-lanceolate, spinous-serrate, very coriaceous. Abundant.

Okhaldunga to Patale at 2595 m (B. 236); Phaplu to Rhingmo at 3054 m (B. 271).

I. fragilis Hk. f. in Fl. Brit. Ind. 1:602, 1875.

A small tree with brittle branches. Leaves elliptic or ovate, serrulate, deep green, membraneous. Fruit red. Abundant.

Lamjura at 3665 m (B. 1061).

CELASTRACEAE

Celastrus paniculatus Willd. subsp. **paniculatus** D. Hou in Ann. Miss. Bot. Gard. 42:229, 1955.

C. paniculatus Willd. Sp. Pl. 1:1125, 1787; FBI. 1:617, 1875.

Small tree; leaves suborbicular or broadly obovate. Flowers yellowish green.

Dharanbazar to Dhankuta at 916 m (B. 871).

Euonymus frigidus Wall. in Roxb. Fl. Ind. 2:409, 1832; FBI. 1:611, 1875.

Small tree with leaves oblong-lanceolate. Flowers very small.

Nepali name : 'Churi lahara'.

Patale to Rhingmo at 3054 m (B. 274); Papung to Topke gola at 3054 m (B. 779).

E. theaefolius Wall. ex Laws in Hk. f. Fl. Brit. Ind. 1:612, 1875.

Shrub; leaves oblong-lanceolate, coriaceous. Flowers reddish. Abundant.

Chunrikherka to Puyia at 2595 m (B. 383).

Gymnosporia rufa Laws in Hook. f. Fl. Brit. Ind. 1:620, 1875.

Small tree with leaves lanceolate. Flowers small, white. Rare.

Kaituka at 1985 m (B. 215).

RHAMNACEAE

Gouania leptostachya DC. Prodr. 2:40, 1825; FBI. 1:644, 1875.

G. nepalensis Wall.: FBI. 1:644, 1875.

Climbing shrub. Flowers in raceme. Abundant.

Nepali name : 'Batwasi'.

Khandbari to Goarigaon, at 1832 m (B. 466).

Sageretia oppositifolia Brong. in Ann. Sc. Nat. Ser. 1, 10:360, 1827; FBI. 1:641, 1875.

A straggling shrub, branches spinous, tomentose. Leaves ovate-lanceolate, about 7 pairs of veins. Flowers in axillary panicles. Occasional.

Kathmandu valley at 1350 m (B. 29/2).

Zizyphus incurva Roxb. Hort. Beng. 17, 1814 nomen; Fl. Ind. 1:614, 1832; FBI. 1:635, 1875.

A small tree. Leaves ovate-oblong, turning black on drying. Frequent.

Hedagna to Gola at 1832 m (B. 500); Phedim to Moktara at 1375 m (B. 734).

Zizyphus oxyphylla Edgew. in Trans. Linn. Soc. 20:43, 1846; FBI. 1: 634, 1875.
Small tree, whole plant glabrous. Flowers fascicled in the axil of leaves.
Dhulikhel to Kuwapani at 1527 m (B. 71).

Z. rugosa Lamk. Encycl. 3:319, 1789; FBI. 1:636, 1875.
Large shrub, prickles with a broad base. Flowers densely pubescent.
Katonje to Okhaldunga at 1068 m (B. 181).

AMPELIDACEAE

Tetrastigma bracteolatum Planch. in DC. Monogr. Phan. 5:428, 1887.
Vitis bracteolata Wall. in Roxb. Fl. Ind. 2:483, 1832; FBI. 1:654, 1875.
Climber; leaves trifoliate. Fruits said to be edible. Common.
Num to Hedagna at 1327 m (B. 488); Dingla to Bhojpur at 2595 m (B. 912).

T. serrulatum Planch. in DC. Monogr. Phan. 5:432, 1887.
Vitis capriolata D. Don: FBI. 1:658, 1875.
A large climber with leaves 5-foliate. Cymes axillary, umbellate. A very common.
Kathmandu valley at 1350 m (B. 46/2).

Leea edgeworthii Santapau in Rec. bot. Surv. India 16(1):54, 1953.
L. aspera Edgew.: FBI. 1: 665, 1875 (non Wall.).
Shrub, stem not winged. Leaves pinnate. Flowers white. Occasional.
Hedagna to Gola at 1679 m (B. 498).

L. indica (Burm.) Merrill in Phill. Jour. Sci. Bot. 14:245, 1919.
Staphylea indica Burm. Fl. Ind. 75, t. 24, f. 2, 1768.
Leea sambucina Willd. Sp. Pl. 1:1177, 1797; FBI. 1:666, 1875. p.p.
Glabrous shrub. Leaves small, crenate-serrate. Fruits blue. Rare.
Malta to Num at 1832 m (B. 485).

Vitis flexuosa Thunb. in Trans. Linn. Soc. 2:103, 1793; Planch. in DC. Mon. Phan. 5(2):347, 1887.
V. parvifolia Roxb. Hort. Beng. 18, 1814; et Fl. Ind. 1: 662, 1824; FBI. 1: 653, 1875.
Stem solid. Leaves deeply serrate; tendrils branched. Flowers small, green.
Charikot to Kabra at 1375 m (B. 637).

SAPINDACEAE

Cardiospermum halicacabum Linn. Sp. Pl. 366, 1753; FBI. 1:670, 1875. Radlkofer in Pfreich. 98B; 379, 1931.

Climbing glabrous herb. Flowers small, white in long stalked corymbs having a pair of coiled tendrils at the base. Capsule globose, 3 cornered. Common.

Deorali to Ghate on Tamba kosi, at 1220 m (B. 1103).

ACERACEAE

Acer acuminatum Wall. ex. D. Don, Prodr. Fl. Nep. 249, 1825; Pax in Pfreich. 8:15, 1902.
A. caudatum Wall. Pl. As. Rar. 2: 4, 28 t. 132, 1831; FBI. 1:695, 1875.
Large tree. Leaves 4 lobed, puberulent along the veins. Frequent.
Phaplu to Rhingmo at 2900 m (B. 268).

Acer campbellii Hk. f. & Th. ex Hiern, in Fl. Brit. Ind. 1: 696, 1875. Pax in Bot. Jahrb. 7:196, 1886; et Pfreich. 8:21, 1902.

Tall tree; leaves 5-7-lobed, glabrescent. Flowers white.

Nepali name : 'Kapasi'.

Two varieties can be recognised on the basis of the sheets in Herb. Calcutta and Herb. Dehra Dun and on information from Kew & Arnold Arboretum.

var. **campbellii** Hk. f. & Th. ex Hiern loc. cit.

Lamina foliorum truncata ed basim, marginibus serrulatis, glabris nerviis; inflorescentia densa.

Lectotypus *Hooker f.* 110 lectus ad Darjeeling ad 7-8000 ped. altit. servatus in herbario Kew.

Sheets examined—Anderson, 408, Sinchul, 8,000 ft, July 1862; Clarke, 26737B, Darjeeling 7,000 ft, 19 June, 1875; Lister (No number), Tongloo, May 1877; Gamble 8021, Darjeeling, 7,000 ft, April, 1880 (1 sheet in Dehra Dun Herbarium also); Clarke 35593, Jorepokree, Darjeeling 7,000 ft, June, 1884; King's collector, Sandakphu, June, 1887; Hooker, Sikkim, 7-10,000 ft; Griffith, 926, Darjeeling; Lace 2201, Takea, Darjeeling, 10 May, 1902, Cousin, 122, Suriel, 5500 ft, 29 May, 1914; Biswas 81 (No number) Sikkim; Banerji 774, Papung to Topke gola, Nepal 9,000 ft (2748 m) 27 May, 1953. The sheets in Herb. Dehra Dun are Laurie (No number) Darjeeling, (Herb. D. D. 85298); No name, no number, Sinchel, (Herb. Dehra Dun 39198); No name, no number, Kurseong. (Herb. D. D. 19247).

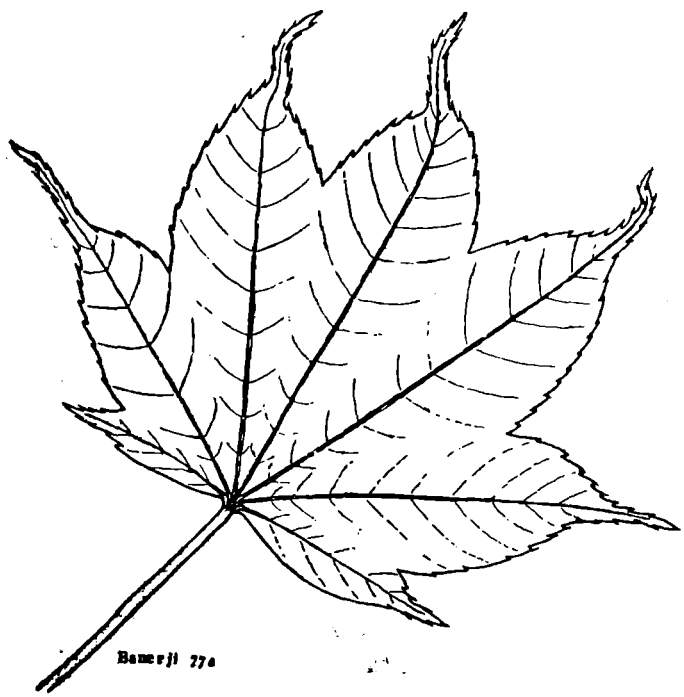

Fig. 3. *Acer campbellii* Hk. f. & Th. ex Heirn var. *campbellii* Leaf (Banerji 774) × ½

var. **serratifolia** var. **nov.**

Limina alte cordata ad basim, marginibus serratis, pubescentibus nerviis; inflorescentia elongata.

Typus *Lace* 2250, lectus ad Tonglo, in Sikkim ad 10,000 ped. altit. die 29 maii, anni 1902 et. positus in Herbario Hortus Indici Botanici ad Calcutta.

Other sheets examined—Dungbo (No number) Sikkim 22 May, 1876 (in Herb. D.D.); Pantling, No number) Lachen, Sikkim, May, 1885 (in Herb. Calcutta three sheets); Osmaston (No number)

Bikhabhanjan, Darjeeling, 10,000 ft, 20 Oct., 1903; Banerji 1064, Lamjura, Nepal at 12,000 ft (3665 m) 20 Sept., 1956.

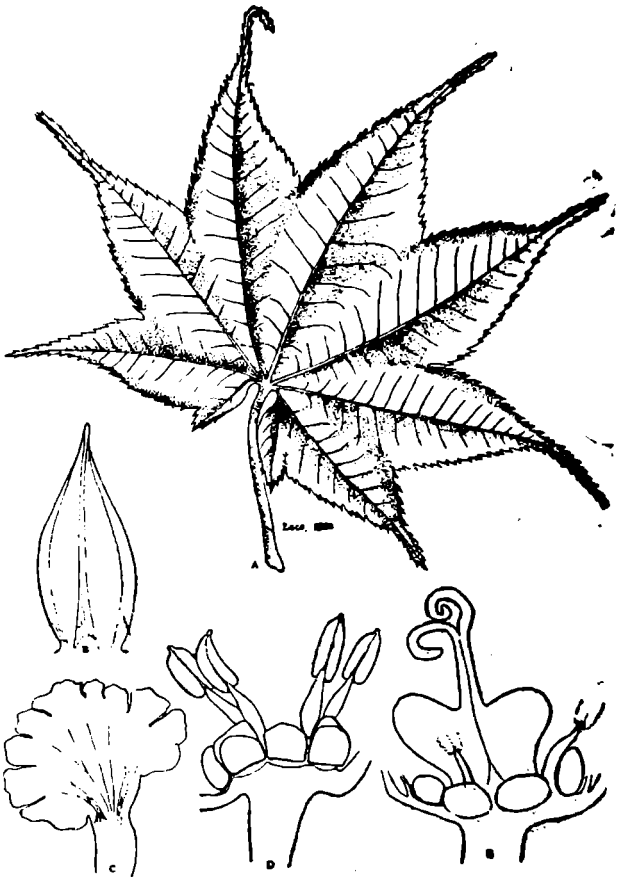

Fig. 4. *Acer campbellii* Hk. f. & Th. ex Heirn var. *serratifolia* var. *nov.*
A. Leaf (Lace 2250) × ½. B. Sepal. C. Petal.
D. Stamens. E. Gynaecium. B-E × 7½.

Acer laevigatum Wall. Pl. As. Rar. 2:3, 6. 104, 1831; FBI. 1:693, 1875; **Pax** in Pfreich. 8:32, 1902.

Large tree, leaves undivided, minutely serrate. Flowers white. Abundant.

Nepali name : 'Putli'.

Pashupati Nath Temple area, 1280 m (B. 2); Rhingmo to Jubing, at 3290 m (B. 287).

A. papilio King in Journ. Asiat. Soc. Beng. 55:115, 1896; Cowan, Tr. North Beng. 42. 1929.

A medium sized tree. Leaves palmate, 5-7 lobed, soft and often hanging downwards. Abundant.

Lamjura at 3665 m (B. 1065).

Pax in Pfreich. has taken this species as a synonym of *A. acuminatum* **Wall. But we are** inclined to treat it separate because of the 5-7 lobed leaves which are soft and hang downwards. The petioles are reddish in colour.

A. sikkimensis Miq. in Arch. Neerl. 2:471, 1867; FBI. 1: 694, 1875; Pax in Pfreich. 8:34, 1902.

Tall tree; leaves undivided, subcoriaceous. Occasional.

Nepali name : 'Lahara Kapasi'.

Puyia to Jubing at 2443 m (B. 395).

FBI gives the distribution as Sikkim, Bhutan and to Mishmi hills.

Acer stachyophyllum Hiern in Hook. f. Fl. Brit. Ind. 1:694, 1875; Pax in Pfreich. 8: 34, 1902.

Tree, medium sized. Leaves with apex drawn out; lower surface velvety. Abundant.

Puyia to Ghate at 2595 m (B. 321).

STAPHYLEACEAE

Turpinia fomifera DC. Prodr. 2:3, 1825; FBI. 1: 699, 1875.

Shrub. Leaflets ovate; stipules interpetiolar. Rare.

Gola to Hatia at 1985 m (B. 515).

SABIACEAE

Sabia campanulata Wall. in Roxb. Fl. Ind. 2: 311, 1832; FBI. 2: 1, 1876.

A climbing shrub. Flowers campanulate, light green. Common.

Phaplu to Rhingmo at 2900 m (B. 264); Topke gola at 3664 m (B. 808).

ANACARDIACEAE

Rhus parviflora Roxb. Hort. Beng. 22, 1814 nomen; et Fl. Ind. 2:100, 1832; FBI. 2:9, 1876.

Shrub, softly tomentose all over. Leaves 3 foliate. Flowers yellowish green in hairy terminal panicles. Drupes reddish brown. Very common; at places as pure formation.

Nepali name : 'Sati broo'.

Nepalthoke to Mukote at 763 m (B. 114); Banepa to Dolaghat at 916 m (B. 937).

R. javanica Linn. Sp. Pl. 265, 1753; Rehder in Journ. Arn. Arb. 7:197, 1926.

R. semialata Murr. in Comm. Gotting. 6:27, t. 3, 1784; FBI. 2:10, 1876.

Tree on old cultivations. Leaves pinnate, leaflets tomentose below. Flowers yellow-green. Occasional.

No data, no number.

Merrill in Journ. Arn. Arb. 9:3, 1928 places this plant in the genus *Brucea* as *Brucea javanica* (Linn.) Merrill, Bor in Man. Ind. For. Bot. 265, 1953 retains the plant in the genus *Rhus* but in our opinion wrongly as *R. semialata* Murr.

R. wallichii Hk. f. in Fl. Brit. Ind. 2:11, 1876.

A tree, softly brownish tomentum all over the parts. Leaflets 3-5 pairs. Juice slightly corrosive. Frequent.

Mailbote to Simsara at 1374 m (B. 574).

PAPILIONACEAE

Astragalus pycnorhizus Wall. ex Benth. in Royle, Ill. Bot. Himal. 199, 1835; FBI. 2:119, 1876.

Root fusiform. Stem thin and long. Flowers light pink. Abundant.

Pakteru to Saddle at 3216 m (B. 439); Topke gola area at 3970 m (B. 805).

Atylosia mollis Benth. in Miq. Pl. Jungh. 243, 1851; FBI. 2: 213, 1876.

Shrub densely tomentose. Stems long and twinning. Leaflets ovate, beneath grey downy. Flowers yellow. Occasional.

Okhaldunga to Chayanum at 1375 m (B. 1083).

Codariocalyx gyroides Hassk. in Flora 25(2):49, 1842; Schindler in Fedde Rep. 49:145, 1928.

Desmodium concinnum Baker in Hook. f. Fl. Brit. Ind. 2:170, 1876, non DC. 1825.

Erect shrub, pubescent. Leaflets ovate-oblong, finely hairy. Racemes long. flowers blue, 6 cm long. Pods curved lower margin deeply indented. Occasional.

Kathmandu valley at 1350 m (B. 72/2).

Crotolaria albida Heyne ex DC. Prodr. 2:126, 1825; FBI. 2:71, 1876.

A small prostrate undershrub. Leaves simple, sessile, lower surface white pubescent. Flowers pale yellow; petals equalling sepals. Common.

Dolaghat to Chaubas at 916 m (B. 938).

C. evolvuloides Wight ex Wt. & Arn. Prodr. 188, 1834; FBI. 2:68, 1876.

Stem usually ·5 m; much branched, finely silky. Leaves shortly stalked. Flowers yellow. Common.

Phaplu to Mura at 1832 m (B. 1068).

Desmodium[1] **dioicum** (Buch.-Ham.) DC. Prodr. 2: 338, 1825, Schindler in Fedde Rep. 49:142, 1928.

D. confertum DC : Baker in Hook. f. Fl. Brit. Ind. 2:167, 1876.

A small shrub. Flowers blue. Abundant along slopes.

Deorali to Ghate on Tamba kosi at 1220 m (B. 1104).

D. floribundum Sweet, Hort. Brit. 479, 1825; FBI. 2: 167, 1876. Schindler in Fedde Rep. 49: 274, 1928.

Erect shrub densely pubescent. Leaflets 3, ovate, acute. Flowers blue in densely crowded racemes. Bracts large. Common.

Chaubas to Risingo at 1985 m (B. 951).

D. gangeticum (L.) DC. Prodr. 2:327, 1825; FBI. 2:168, 1876; Kanjilal *et al.* Assam Fl. 2:55, 1938. Schindler in Fedde Rep. 49:1928.

Hedysarum gangeticum Linn. Sp. Pl. 746, 1753.

An erect undershrub. Leaves 1 foliate, oblong-ovate. Flowers small, 6 cm long, pink. Pods curved, lower margin deeply indented. Occasional.

Kathmandu valley at 1350 m (B. 37/2).

D. microphyllum DC. Prodr. 2:337, 1825; Schindler in Fedde Rep. 49:285, 1928.

D. parvifolium DC. Prodr. 2: 334, 1825; FBI. 2:174, 1876 (excl. syns.).

A small shrub with caespitose stem, leaflets ovate. Flowers purple; calyx densely hairy. Both margins of the pot deeply indented. Abundant.

Banepa to Dolaghat at 916 m (B. 935); Those to Bhandara at 2135 m (B. 1045); Lamjura at 3665 m (B. 1054).

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

D. gyrans DC. FBI. 2: 174, 1876.

Codariocalyx gyrans Hassk. in Flora 25 (2): 49, 1842, Schindler in Fedde Rep. 49 : 261, 1928.

Erect glabrous undershrub. Leaf unifoliate, leaflet oblong-lanceolate. Flowers pale yellow. Pods curved, lower margin slightly indented. Occasional.

Kathmandu valley at 1350 m (B. 77/2).

D. oxyphyllum Prain in Journ. Asiat. Soc. Beng. 66:392,1899; Schindler in Fedde Rep. 49: 294, 1928.

D. racemosum (Thunb.) DC. Prodr. 2:337, 1825 (non Baker in FBI. 2:167, 1876).

Small scandent shrub, glabrescent. Leaves 3 foliate, leaflets elliptic or lanceolate. Flowers light violet. Pods indented along the lower surface. Occasional.

Kathmandu valley at 1350 m (B. 42/2 also 57/2); Chaubas to Risingo at 1985 m (B. 950).

D. renifolium (L.) Schindler in Fedde Rep. 22:262, 1926.

Hedysarum renifolium Linn. Syst. Nat. (ed. 10) 2:1169, 1759.

H. reniforme Linn. Sp. Pl. 1051, 1763.

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[1] *Desmodium* Desv. 1813 is conserved against *Meibomia* Adans. 1763; and *Pleurolobus* J. St. Hil. 1812,

Desmodium reniforme DC. Prodr. 2:327, 1825; FBI. 2: 173, 1876.

Stem slender. Leaf 1-foliate. Racemes mostly terminal. Abundant.

Chainpur to Mialay at 1068 m (B. 558); Phedim to Moktara at 763 m (B. 732).

D. sequax Wall. Pl. Asiat. Rar. 46, t. 157, 1831; FBI. 2:169, 1876; Schindler in Fedde Rep. 49: 258, 1928.

Shrubby, branches covered with a grey tomentum. Raceme lax. Flowers pinkish. Occasional.

Hedagna to Gola at 1220 m (B. 508).

D. triflorum (L.) DC. Prodr. 2:334, 1825; FBI. 2: 173, 1876; Schindler in Fedde Rep. 49: 304, 1928.

Hedysarum triflorum Linn. Sp. Pl. 749, 1753.

A small shrub with prostrate stem. Leaflets obovate. Flowers bright blue. Common in open grassy situations.

Chaubas to Risingo at 1985 m (B. 962).

Eriosema chinense Vogel in Nov. Act. Nat. Cur. 19(1) : 31, 1843.

Stem generally 5 m tall, woody. Leaves 1-3 foliate. Flower rose-pink. Rare.

Dolaghat to Chaubas at 915 m (B. 939).

Indigofera dosua Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 244, 1825; FBI. 2 : 102, 1876.

Low shrub, branches covered with spreading brown pubescence. Leaves 2·5-7·5 cm. Flowers pink. Abundant.

Those to Bhitrikhani at 1832 m (B. 674).

I. **dosua** Buch.-Ham. var. **tomentosa** Baker in Hook. f. Fl. Brit. Ind. 2 : 102, 1876.

Branches covered with a dense silky brown tomentum. Leaves 15-23 cm long. Bract with a long cusp. Flowers pink. Common.

Jubing to Wapsakhani at 1220 m (B. 398).

This variety has been previously reported from Sikkim, Bhutan, Khasia & Silhet.

Lespedeza stenocarpa Maxim. in Acta. Hort. Petrop. 2 : 349, 1873; Prain in Journ. Asiat. Soc. Beng. 66 : 376, 1897; Collet, Fl. Sim. 128, 1905.

L. macrostyla Baker FBI. 2 : 144, 1876 p.p.

A shrub, about 1 m tall, densely pubescent. Leaflets obovate, upper surface nearly glabrous, under surface densely covered with white silky hairs. Flowers blue on fadding. Abundant.

Chandragiri at 1675 m (B. 87/2); Lamjura at 3054 m (B. 1055).

Lotus corniculatus Linn. Sp. Pl. 775, 1753; FBI. 2 : 91, 1876.

Herb, leaf with 5 leaflets. Flowers yellow, with crimson streaks. Occasional.

Kathmandu at 1375 m (No number).

Parochetus communis Buch.-Ham. ex D . Don, Prodr. Fl. Nep. 240, 1825; FBI. 2 : 86, 1876.

Prostrate herb, rooting at the nodes, hairy. Leaflets 3, or obcordate. Flowers light purple. Common in damp places.

Hatia to Hangaon at 2443 m (B. 522); Kalinchok at 2748 m (B. 1020); Junbesa to Phaplu at 1832 m (B. 1120).

Piptanthus nepalensis D. Don, in Sweet, Brit. Fl. Gard. t. 264, 1828; FBI. 2 : 62, 1876.

Shrub, 1-3 m tall. Flowers yellow. Grows gregarious. Common.

Rhingmo to Jubing at 2900 m (B. 281); Kalinchok at 3054 m (B. 634).

Thermopsis barbata Royle, Ill. Bot. Himal. 196, t. 32, 1835; FBI. 2 : 62, 1876.

Herbs, stem much branched. Leaves trifoliate. Flowers blue. Abundant.

Namchee to Tarangan at 4275 m (B. 339).

CAESALPINIACEAE

Bauhinia purpurea Linn. Sp. Pl. 375, 1753; FBI. 2 : 284, 1878.

Tree. Flowers lilac and fragrant. Common in Sal forests, also planted in the hamlets.

Mulkote to Khurkot at 670 m (B. 128).

B. vahlii Wt. & Arn. Prodr. 297, 1834; FBI. 2 : 279, 1878.

A gigantic climber. Leaves very large, lobes rounded. Common.

Deorali to Narkata at 916 m (B. 145).

Leaves largely used for making 'Ghooms' and also platters.

Cassia mimosoides Linn. Sp. Pl. 379, 1753; FBI. 2 : 266, 1878; de Wit in Webbia 11 : 283, 1955.

Glabrous herb. Leaflets 50-100. Flowers solitary, axillary, yellow. Stamens 4-5. Rare.

Risingo to Pheda at 1220 m (B. 970).

C. fistula Linn. Sp. Pl. 377, 1753; FBI. 2 : 261, 1878.

Tree. Flowers in lax pendulous racemes; yellow. Occasional.

Nepali name : 'Raj-brikh'.

Mulkote to Khurkot at 670 m (B. 125).

C. laevigata Willd. Enum. Hort. Berol. 441, 1809; Kanjilal et al. Fl. Assam. 2 : 132, 1938.

Shrub. Few flowered corymbose racemes; flowers yellow. Occasional.

Dhupu to Wana at 763 m (B. 539).

MIMOSACEAE[1]

Acacia catechu Willd. Sp. Pl. 4 : 1079, 1805-6; FBI. 2 : 295, 1878.

Middle sized tree, spines short and hooked, in pairs. Flowers deep yellow.

Nepalthoke to Mulkote at 763 m (B. 110).

Albizia lucida (Roxb.) Benth. in Hook. Lond. Journ. Bot. 3 : 86, 1844; FBI. 2 : 299, 1878.

Tree. Pinnae 1-2 pairs, rarely a third pair of leaflets; leaflets 2, 5-15 cm. Rare.

Nepali name : 'Potka siris'.

Dharanbazar to Dhankuta at 610 m (B. 873).

My specimens match the sheets of cultivated specimens deposited in Herb. Calcutta & Herb. Dehra Dun. My specimens were collected in a ravine with a dense vegetation, and there were a number of trees of good stature.

A. procera Benth. in Hook. Lond. Journ. Bot. 3 : 89, 1844; FBI. 2 : 299, 1878.

Tree. Pinnae 3-8 pairs; leaflets 6-10 pairs. Flower heads panicled. Abundant.

Nepali name : 'Seto siris'.

Dharanbazar to Dhankuta at 610 m (B. 874).

ROSACEAE

Agrimonia eupatorium Linn. Sp. Pl. 448, 1753; FBI. 2 : 361, 1878.

Erect hairy herbs. Leaves hairy, lower leaves with leaflets very unequal. Flowers small and yellow. Bracts 3 cleft, bracteoles 3 toothed. Frequent.

Kathmandu valley 1350 m (B. 30/2). Surkenagi to Jorpati at 1375 m (B. 854); Bhandara to Sethya at 1832 m (B. 1049).

Cotoneaster microphyllus Wall. ex Lindley var. **cochleatus** (Franch.) Rehd. & Wils. in Sarg. Pl. Wils. 1 : 176, 1912; Tse-Tsung Yo in Bull. Brit. Mus. (N.S.). 1 : 135, 1954.

C. microphyllus Wall. : FBI. 2 : 387, 1878.

A low woody shrub. Flowers pink. Fruits scarlet. Rare.

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[1] *Mimosa pudica* Linn. is very common all over below 1068 m.

Nepali name : 'Preebi'.

Patale to Phaplu at 2443 m (B. 249).

Cotoneaster thymaefolia Hort. ex Baker in Saunders, Refug. Bot. t. 50, 1868-73.

C. thymifolia Hort. FBI. 2 : 387, 1878.

A low woody shrub, almost prostrate. Abundant.

Those to Bhitrikhani at 2748 m (B. 689).

Duchesnea indica Focke in Pfam. 13(2) : 33, 1888.

Fragaria indica Andr. FBI. 2 : 343, 1878.

Herb with creeping stolons bracteoles 3 toothed. Flowers yellow. Common.

Angbung to Surkenagi at 1832 m (B. 916).

Eriobotrya dubia Dcne. in Nouv. Arch. Mus. Par. Ser. 1. 10 : 145, 1874; FBI. 2: 371, 1878; Cowan, Tr. North. Beng. 62, 1929.

Small tree; leaves shortly petioled, elliptic lanceolate, shining crenate upto the apex. Panicles 5-10 cm long; flowers white. Locally abundant.

Kathmandu valley, Sundrijal at 1350 m (B. 22/2).

Fragaria nubicola Lindley ex Lacaita in Journ. Linn. Soc. 43 : 467, 1916.

F. vesca Linn. var. *nubicola* Hk. f. in Fl. Brit. Ind. 2 : 344, 1878.

Herb, silvery. Bracteoles entire. Few flowered peduncles; flowers white. Abundant.

Mahadeophedi to Katonje at 1985 m (B. 164); Pheda to Charikot at 1975 m (B. 624); Kalinchok at 3054 m (B. 633); Khera to Mandanda at 3054 m (B. 637).

Micromeles griffithii Dcne. in Nouv. Arch. Mus. Par. Ser. 1 : 168, 1874.

Pyrus griffithii Hook. f. in Fl. Brit. Ind. 2 : 377, 1878.

Tree; young branches and leaves covered with a soft tomentum. Flowers in corymbs, white. Occasional.

Chunrikherka at 2748 m (B. 377).

Neillia thyrsiflora D. Don, Prodr. Fl. Nep. 228, 1825; Cowan, Tr. North Beng. 59, 1929.

Shrub with flowers light pink. Calyx with glandular hairs. Occasional.

Kathmandu valley at 1350 m (B. 76/2); Pheda to Charikot at 916 m (B. 977).

Potentilla ambigua Camb. in Jaquem. Voy. 4 : 51, t. 62, 1844; FBI. 2 : 348, 1878.

Stem very short. Leaflets 3; stipules leafy. Achenes smooth. Rare.

Topke gola to Saju pokhri at 4428 m (B. 838).

P. fragarioides Linn. Sp. Pl. 496, 1753; FBI. 2 : 350, 1878.

Herb about 5 cm. Leaflets 2-7. Flowers yellow. Common.

Khera to Mandanda at 2440 m (B. 647).

P. fruticosa Linn. Sp. Pl. 495, 1753 ; FBI. 2 : 347, 1878.

Small shrub. Leaflets 3-7 silvery, stipules large and membraneous. Flowers yellow.

Nangpa la at 3815 m (B. 363).

P. fulgens Wall. ex Hook. in Bot. Mag. t. 2700, 1826 ; FBI. 2 : 349, 1878.

Stem erect. Herb with robust. Leaflets many, deeply impressed nerves lower surface silvery tomentose. Flowers yellow. Petals equalling the sepals. Abundant.

Umling to Terathum at 3000 m (B. 563) ; Mura to Okhaldunga at 3054 m (B. 1071).

P. kleiniana Wt. & Arn. Prodr. 300, 1834 ; FBI. 2 : 359, 1878.

Stem prostrate. Leaves with 3 or 5 leaflets. Flowers small, yellow ; petals equalling the sepals. Common.

Paktaru to Saddle at 3216 m (B. 435) ; Mura to Okhaldunga at 3054 m (B. 1072) ; Lamjura at 2745 m (B. 1112).

P. microphylla D. Don var. **achilleaefolia** Hk. f. FBI. 2 : 353, 1878.

Dwarf and tufted. Leaves 2·5 to 5 cm. Flowers yellow. Abundant.

Topke gola area at 3360 m (B. 795); Topke gola to Saju pokhri at 4428 m (B. 839).

P. sibbaldi Hallier f. in Ser. Mus. Helv. 1 : 51, 1818 ; FBI. 2 : 345, 1878.

Stem covered by stiff hairs. Leaflets 3. Flowers yellow. Abundant.

Topke gola to Saju pokhri at 4428 m (B. 835).

All the sheets in Calcutta Herb. are from Tibet. There is no sheet from Eastern Himalayas.

Prinsepia utilis Royle, Ill. Bot. Himal. 206, t. 38, 1835 ; FBI. 2 : 323, 18.

Glabrous spiny shrub ; spines often leaf bearing. Leaves lanceolate, minutely serrate. Flowers white ; calyx without bracteoles. Abundant on dry slopes.

Phaplu to Mura at 2440 m (B. 1066).

Prunus cerasoides D. Don, Prodr. Fl. Nep. 230, 1825.

P. puddum Roxb. ex Wall. Pl. Asiat. Rar. 2 : 37, 1831 ; FBI. 2 : 314, 1878.

Large tree with brown bark. Flowers pink. Occasional.

Puyia to Ghate at 2443 m (B. 322); Simsara to Bhutak at 1375 m (B. 580); Topke gola area at 3817 m (B. 849).

P. cornuta Wall. nomen : Bor, Man. Ind. For. Bot. 65, 1953.

P. padus auct : FBI. 2 : 315, 1878 (non Linn.).

A large deciduous tree with brown scaly bark. Leaves oblong-obovate, sharply serrate ; some petioles with glands. Very common.

Okhaldunga to Patale at 2748 m (B. 242); Puyia to Ghate at 2595 m (B. 324).

P. nepalensis Ser. in DC. Prodr. 2 : 540, 1825 ; FBI. 2 : 316, 1878.

Deciduous tree ; leaves lanceolate or oblong-lanceolate, crenate-serrate, petioles without any glands.

Rhingmo to Jubing at 2443 m (B. 285).

Pyracantha crenulata (Roxb.) Roemer, Fam. Nat. Reg. Veg. Syn. 3 : 220, 1847.

Crataegus crenulata Roxb. Hort. Beng. 38, 1814 nomen ; FBI. 2 : 384, 1878.

Woody shrub with spines. Flowers white. Frequent.

Nepali name : 'Gangal'.

Khurkot to Ramechappe at 1430 m (B. 138).

Rosa macrophylla Lindl. Monogr. Ros. 35, t. 6, 1820 ; FBI. 2 : 366, 1878 ; Bor, Man. Ind. For. Bot. 65, 1950.

Erect, prickles slightly curved. Leaflets 7-11. Flowers solitary, 5 merous light red.

Tripureshsari at 1280 m (B. 11).

R. moschata Herrm. Diss. 5, 1762 ; FBI. 2 : 367, 1878 ; Bor, Man. Ind. For. Bot. 66, 1953.

Climber, prickles curved, flowers in compound corymbs ; tetramerous ; yellow. Common.

Nepali name : 'Kikone' or Kokone'.

Chandragiri at 1935 m (B. 5/2).

R. sericea Lindl. Monogr. Ros. 105, t. 12, 1820; FBI. 2: 367, 1878; Bor, Man. Ind. For. Bot. 66, 1953.

Scandent, prickles straight. Flowers solitary, 5 merous creamy yellow, peculiar fragrance. Common.

Okhaldunga to Patale at 2595 m (B. 237); Topke gola area at 3360 m (B. 793).

Rubus calycinus Wall. ex D. Don, Prodr. Fl. Nep. 235, 1825; FBI. 2: 327, 1878.

Herb with creeping stem, black when dry. Leaves simple. Flowers white ; petals shorter than the calyx lobes. Abundant.

Rhingmo to Jubing at 2290 m (B. 290); Chaubas to Pheda at 1832 m (B. 617); Khera to Mandanda at 2595 m (B. 650); Raksha to Ething at 1748 m (B. 710).

R. fockeanus Kurz in Journ. Asiat. Soc. Beng. 2: 206, 1875; FBI. 2: 334, 1878.

Small herb, stem procumbent sparingly pubescent. Leaflets not shining above. Flowers white. Abundant in shade.

Kalinchok at 2748 m (B. 1023).

R. foliolosus D. Don, Prodr. Fl. Nep. 256, 1825 ; FBI. 2: 340, 1878.

Prostrate shrub. Leaflets 3-5. Flowers pink. Occasional.

Kathmandu valley at 1350 m (B. 27).

This is one of the West-Himalayan species that extends to the east, and its eastward extension 5s is evidenced by the present collection is upto 85° 30′ E.

The sheets from N. W. Himalayas have leaves of a bigger size, generally with 3 leaflets, upper surface sparsely hairy, under surface hairy but not woolly and silvery, veins not deeply impressed, the apices of the leaflets acute, serration of the margin is uniform—*Lace* 1158(Herb. Calcutta) and *Lambert D. D.* 22663 (Herb. Dehra Dun). While specimens from Nepal have the leaves smaller in size, generally there are 5 leaflets, undersurface densely woolly and silvery, veins deeply impressed, apices of the leaflets are rounded and the margins are double-serrate. D. Don described the taxa from Wallich's collection and the sheets from Nepal that I have been able to examine are of *Wallich* 736 (Herb. Calcutta), *Scully* 8 (Herb. Calcutta) and *Banerji* 27 (Herb. Calcutta and Herb. Meerut College). There are two sheets in Herb. Dehra Dun, D. D. 29036 and D. D. 29037 which are Wallichian sheets but without number and ex herb. Musci. Brittanici. Precise localities of Wallich's and of Scully's specimens are not known and it is unlikely that my specimens come from the same plant from which Wallich and Scully collected their specimens.

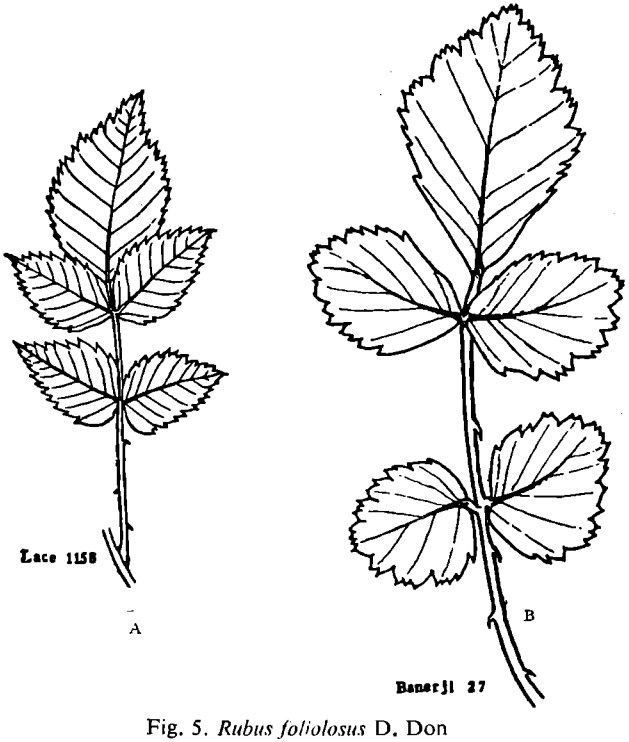

Fig. 5. *Rubus foliolosus* D. Don
A. Leaf of Kumaon specimen (Lace 1158) × ¾.
B. Leaf of Nepal specimen (Banerji 27) × 1½.

Rubus paniculatus Sm. in Rees, Cyclop. 30: 41, 1819-20; FBI. 2: 329, 1878.

Climber with long branches. Prickles few and small. Leaves simple, whitish beneath. Flowers white. Occasional.

Dhulikhel to Kuwapani at 1590 m (B. 64).

R. pedunculosus D. Don, Prodr. Fl. Nep. 234, 1825.

R. niveus Wall. var. *pedunculosus* (Don.) Hk. f. in Fl. Brit. Ind. 2 : 335, 1878.

Robust shrub. Flowers pink, solitary on slender pedicels. Frequent.

Puyia to Ghate at 2440 m (B. 325).

R. rosaefolius Sm. Pl. Ic. Ined. 2: t. 60, 1790; FBI. 2: 311, 1878.

Shrub. Leaves 1-3 pairs. Flowers solitary white. Occasional.

Khandbari to Dharangaon at 1527 m (B. 464).

Sibbaldia micropetala (D. Don) Hand.-Mazz. in Karst. u. Schenck. Vegbild. 22 R., H. 8, 6, 1932; Chatterjee in Notes Roy. Bot. Gard. Edin. 19 : 325, 1938.

Potentilla albifolia Wall. in Hook. f. FBI. 2: 347, 1878.

P. micropetala D. Don, Prodr. Fl. Nep. 231, 1825.

Stem branched ; leaflets 5-9 ; stipules large. Achenes deeply furrowed. Common.

Khera to Mandanda at 3054 m (B. 654).

Sorbus foliolosa (Wall.) Spach. Hist. Veg. Phen. 2: 96, 1834-48 ; Bor, Man. Ind. For. Bot. 67, 1953.

Pyrus foliolosa Wall. : FBI. 2: 376, 1878.

Small tree. Leaflets 10-15 pairs. Leaves and inflorescence covered with reddish tomentum. Abundant.

Lamjura at 3664 m (B. 1062).

Spirea bella Sm. in Bot. Mag. t. 2426, 1823 ; FBI. 2: 324, 1878.

Shrub. Leaves simple, irregularly toothed. Flowers pink in compound corymbs. Abundant.

Kathmandu at 1280 m (B. 21).

S. micrantha Hk. f. in Fl. Brit. Ind. 2: 325, 1878.

Flowers in long panicles ; pink. Common.

Hedagna to Gola at 2137 m (B. 503), Umling to Terathum at 2440 m (B. 564).

SAXIFRAGACEAE

Astilbe rivularis Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 211, 1825 ; FBI. 2: 389, 1878.

Erect hairy shrub, rootstock perennial. Leaves irregularly bi-pinnate. Flowers small, yellowish green, in terminal panicles. Rare.

Nepali name : 'Thulo okhto'.

Sikrigaon to Those at 1832 m (B. 1039).

Rootstock used as a medicine after child-birth.

Chrysoplenium griffithii Hk. f. & Th. in Journ. Linn. Soc. 2: 74, 1858 ; FBI. 2: 401, 1878.

Herb 10-15 cm ; leaves reniform-cordate. Flowers yellowish green. Rare. Seen growing under rocks.

Topke gola area at 4580 m (B. 828).

Sheets in Herb. Calcutta are from Sikkim (King, Cave) and Bhutan (Griffith).

C. lanuginosum Hk. f. & Th. *ibid.* 2: 74, 1858 ; FBI. 2: 401, 1878.

Herb 7-20 cm; pubescent. Leaves elliptic. Common under shade.

Nepali name : 'Haligo guloto'.

Phaplu to Rhingmo at 2900 m (B. 267).

Deutzia staminea R. Br. in Wall. Pl. Asiat. Rar. 2: 82, t. 191, 1831 ; FBI. 2: 407, 1878.

Shrub. Leaves tomentose beneath. Flowers white with a purple tinge. Abundant.

Nepali name : 'Baji'.

Chandragiri at 2135 m (B. 13/2); Jubing to Puyia at 1985 m (B. 311).

Dichroa febrifuga Lour. Fl. Cochinch. 1: 301, 1790; FBI. 2: 406, 1878.

Shrub with flowers blue. Abundant.

Nepali name : 'Basak'.

Chandragiri at 1985 m (B. 6/2); Khandbari to Malta at 1375 m (B. 483).

Parnassia nubicola Wall. ex Wight Ill. t. 21, 1840-50 ; FBI. 2: 402, 1878.

Glabrous herb, rootstock perennial. Leaves radical, long stalked, cordate. Scape erect with a single terminal white flower, petals entire or a lightly jaggy. Occasional.

Kalinchok at 3522 m (B. 990).

Ribes griffithii Hk. f. & Th. in Journ. Linn. Soc. 2: 88, 1858; FBI. 2: 411, 1878.

Erect shrub, 2·5 m tall. Leaves 5 lobed.

Phaplu to Rhingmo at 3054 m (B. 273); Papung to Topke gola at 3216 m (B. 789).

This species has been observed to be very abundant in the east, but between Phaplu and Rhingmo it was occasional.

Saxifraga brachypoda D. Don var. **fimbriata** (Wall.) Engl. et Irms. in Bot. Jahrb. 48: 591, 1912 & in Pfreich. 67: 137, 1916.

S. fimbriata Wall. ex. DC. Prodr. 4: 45, 1830; FBI. 2: 396, 1878.

Stem unbranched. Leaves lanceolate, shining. Flower yellow. Abundant.

Kalinchok at 3522 m (B. 986); Lamjura at 3522 m (B. 1115).

S. hookeri Engl. & Irms. in Bot. Jahrb. 48: 582, 1912 & in Pfreich. 67: 118, 1916.

S. corymbosa Hk. f. & Th. in Journ. Linn. Soc. 2: 70, 1857; FBI. 2: 393, 1878. (non Boiss· 1843).

Stem 7-13 cm cauline leaves sessile, oblong, entire and clasping the stem. Flowers small, yellow. Rare.

Kalinchok at 3216 m (B. 1127).

S. ligulata Wall. var. **ciliata** (Royle) C. B. Clarke in Hook. f. Fl. Brit. Ind. 2: 398, 1878.

Rootstock thick ; stem short. Leaf margin fringed with short stiff hairs. Flowers pink. Abundant.

Nepali name : 'Pakhan bhed'.

Reserve forest near Okhaldunga at 1985 m (B. 219).

The rootstock is dried and powdered, mixed with equal quantities of powdered rice and sugar and fried in Ghee. This mixture is given after child-birth to stop bleeding.

S. nutans Hk. f. & Th. in Journ. Linn. Soc. 2: 69, 1857; FBI. 2: 393, 1879, Engl. et Irms. in Pfreich. 67: 134, 1916.

Stem 12-20 cm; densely glandular. Radical leaves petioled, cauline sessile. Flowers yellow ; sepals with black glands. Common.

Kalinchok at 3522 m (B. 989).

S. purpurascens Hk. f. & Th. *ibid.* 2: 61, 1857 ; FBI. 2: 398, 1878.

Erect, rootstock stout. Leaves obovate, entire. Flowers pink, nodding. Abundant.

Nepali name : 'Pakhan Bhed'.

Topke gola to Thaglabhangyang at 4580 m (B. 830).

Saxifraga ramulosa Wall. ex Sternb. Saxifrag. Suppl. t. 26, 1822; FBI. 2: 395, 1878; Blatter, Beau. Fl. Kash. 1: 123, 1928.

Stem 5-15 cm branches terminating in a rosette of crowded leaves. Grows in small patches. Occasional.

Nangpa La at 4596 m (B. 365).

S. saginoides Hk. f. & Th. in Journ. Linn. Soc. 2: 68, 1857; FBI. 2: 392, 1878. Engl. et Irms. in Pfreich. 67 : 121, 1916.

Herbs, moss-like. Occasional.

Lonakh at 4580 m (B. 358).

S. strigosa Wall. ex Ser. in DC. Prodr. 4: 41, 1830; Sternb. Saxifrag. Suppl. 2: 14, t. 22, 1831 ; FBI. 2: 393, 1878.

Stem 10-20 cm rigid, plant strigose. Flowers white; sepals slightly united. Abundant.

Kalinchok at 3522 m (B. 988); Lamjura at 3522 m (B. 1116).

Tiarella polyphylla D. Don, Prodr. Fl. Nep. 210, 1825 ; FBI. 2: 399, 1878.

Erect herb, pubescent. Racemes terminal. Flowers white. Abundant in shady and moist places.

Phaplu to Rhingmo at 2900 m (B. 266); Khera to Mandanda at 2595 m (B. 651).

CRASSULACEAE

Sedum himalense D. Don, Prodr. Fl. Nep. 212, 1825; FBI. 2: 418, 1878.

Small herb, pubescent. Leaves lanceolate, slightly dentate towards the apex. Flowers purple. Common.

Topke gola area at 4580 m (No number).

Kalanchoe spathulata DC. Hist. Pl. Grass. t. 65, 1799-1829; FBI. 2 : 414, 1878.

Stem 1·5 m tall. Leaves 10-12 cm. Flowers yellow. Abundant.

Kartika to Mailbote at 1220 m (B. 573).

DROSERACEAE

Drosera peltata Sm. in Willd. Sp. Pl. 1 : 1546, 1797; in Exot. Bot. 1 : 79, t. 41, 1805 ; FBI. 2: 424, 1878; Diels in Pfreich. 26 : 110, 1906.

D. lunata Buch.-Ham. ex DC. Prodr. 1 : 319, 1824; Collet in Fl. Sim. 187. 1902.

Erect herb; leaves lunate, peltate. Flowers white in terminal racemes. Abundant in grassy slopes.

Nepali name : 'Pamga'.

Chandragiri at 1832 m (B. 78/2); Jorpati to Pheda at 1680 m (B. 858); Phaplu at 2595 m (No number).

COMBRETACEAE

Combretum[1] **flagrocarpum** C. B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 455, 1878.

A large shrub, young branches covered with brownish scales. Occasional.

Phutuk to Namsaling at 1375 m (B. 590).

Terminalia chebula Retz. Observ. 5 : 31, 1798; FBI. 2 : 446, 1878.

A very tall tree. Fruits ovoid, faintly angled, 2·5 cm in length. Common.

Chainpur to Mialay at 915 m (B. 551).

MYRTACEAE

Syzygium cumini (Linn.) Skeels in U. S. Dept. Agri. Bur. Pl. Ind. Bull. 2 : 248, 1912.

Myrtus cumini Linn. Sp. Pl.471, 1753.

[1] ***Combretum*** Linn. 1758 is conserved against ***Grislea*** Linn. 1753.

Eugenia jambolana Lam. Dict. 3 : 198, 1789; FBI. 2 : 499, 1878.

A tree with crooked trunk. Flowers pale yellow, sweet-scented. Abundant.

Nepali name : 'Jamu also Jamuna'.

Kuwapani to Tinpipli at 1375 m (B. 84); near Ghorlekherka at 1220 m (B. 915).

The fruits of Nepal specimens are small and less juicy.

Syzygium jambos (L.) Alston in Trim. Hand. Fl. Cey. 6 : 115, 1931.

Eugenia jambos Linn. Sp. Pl. 470, 1753 ; FBI. 2 : 474, 1878.

Tree. Flowers large, white. Planted. Informed by the local people that the fruits are small and insipid.

Dingla at 1525 m (B. 450).

MELASTOMACEAE

Melastoma normale D. Don, Prodr. Fl. Nep. 220, 1825; FBI. 2 : 524, 1879; Cowan, Tr. North Beng. 69, 1929.

Shrub. Leaves 7·5 cm to 12.5 cm ; lanceolate ; petiole about 1 cm long. Flowers mauve. Very common.

Mahadeophedi to Katonje at 1375 m (B. 163); Banepa to Dolaghat at 1068 m (B. 605); Phedim to Mokatra at 1220 m (B. 725).

Osbeckia chinensis Linn. Sp. Pl. 345, 1753; FBI. 2 : 515, 1879.

Stem about 1/2 m tall, with adpressed hairs. Leaves narrow, oblong. Flowers pink. Common.

Kathmandu valley at 1350 m (B. 80/2).

O. nepalensis Hk. Exot. Fl. t. 31, 1823; FBI. 2 : 521, 1879.

A small shrub with adpressed hairs. Leaves oblong-lanceolate, hairy on both surfaces. Flowers white, petals 4. Common.

Banepa to Dolaghat at 916 m (B. 931).

O. truncata D. Don ex Wt. & Arn. Prodr. 322, 1834; FBI. 2 : 514, 1879.

Stem 10-30 cm high, 4 angled. Leaves elliptic, turning black on drying. Flowers purple 12 cm in diam. Abundant in open grassy places.

Chilaune to Narkata at 1068 m (B. 1102).

Oxyspora paniculata DC. Prodr. 3 : 123, 1830; FBI. 2 : 525, 1879.

A very handsome shrub; leaves long petioled. Inflorescence large, lax, terminal; flowers red or pink. Abundant.

Kathmandu valley at 1350 m (B. 27/2); Pheda to Charikot at 916 m (B. 978).

Sonerila stricta Hk. in Bot. Mag. t. 4394, 1848; FBI. 2 : 520, 1879.

Stem 15-30 cm erect, covered with long spreading hairs. Leaves to 25 cm. Flowers purple. Abundant.

Okhaldunga to Chayanum at 1220 m (B. 1093).

LYTHRACEAE

Lagerstroemia parviflora Roxb. Pl. Cor. 1 : 47, t. 66, 1795 ; FBI. 2 : 575, 1879; Cowan, Tr. North Beng. 69, 1929.

Small tree with leaves rounded at the base. Flowers 1.5 cm in diameter, white. Common. At places in association with *Shorea robusta* and also in dry mixed deciduous forests.

Nepalthoke to Mulkote at 916 m (B. 115); Aisyalukherka to Banspani at 1068 m (B. 427); Khandbari to Goarigaon at 610 m (B. 468); Wana to Chainpur at 916 m (B. 543); Phedim to Moktara at 1068 m (B. 726).

L. speciosa (L.) Pers. Syn. Plant. 2 : 72, 1805-07; Bor, Man. Ind. For. Bot. 322, 1953.

Munchausia speciosa Linn. Mant. 2 : 243, 1771,

Lagerstroemia flosreginae Retz. Obsv. 5 : 25, 1789 ; FBI. 2 : 577, 1879 ; Cowan, Tr. North Beng. 70, 1929.

Tree with pink flowers. Planted.

Indian Embassy garden, Kathmandu at 1280 m (B. 22); also seen in some villages.

Rotala rotundifolia (Ham.) Koehne in Engler, Bot. Jahrb. 1 : 172, 1880.

Ammannia rotundifolia Ham. in D. Don, Prodr. Fl. Nep. 220, 1825; FBI. 2 : 566, 1879.

Herb, creeping extensively. Flowers rose pink.

Kathmandu to Bhadgaon at 1220 m (B. 35).

Woodfordia fruticosa (Linn.) Kurz in Journ. Asiat. Soc. Beng. 40 : 56, 1871; Cowan, Tr. North Beng. 70, 1929.

Lythrum fruticosum Linn. Sp. Pl. 641, 1762.

W. floribunda Salisb. Parad. Lond. t. 42, 1806 ; FBI. 2 : 573, 1879.

Shrub; leaves lanceolate-caudate, white beneath. Flowers red. Abundant.

Khulikhel to Kuwapani at 1527 m (B. 73).

Dry flowers yield a yellow dye.

SONNERATIACEAE

Duabanga grandiflora (Roxb. ex DC.) Walp. Rep. 2 : 114, 1843; Bor, Man. Ind. For. Bot. 223, 1953.

Lagerstroemia grandiflora Roxb. Hort. Beng. 38, 1814, nomen ; DC. Mem. Soc. Hist. Nat. Geneve 3 (2) : 84, 1826; Roxb. Fl. Ind. 2 : 503, 1832.

D. sonneratioides Buch.-Ham. in Trans. Linn. Soc. 17 : 178, 1835; FBI. 2 : 579, 1879; Cowan Tr. North Beng. 70, 1929.

A very tall tree ; grey bark peeling off in pieces. Leaves distichous, short petioled. Flowers big and white.

Nepali name : 'Lampati'.

Chainpur to Mialay at 916 m (B. 550).

In the ravine, where there were many trees of the species, there was a peculiar curd-like smell, which later I learnt was due to the flowers. Only seen in the far eastern side of the entire area, east of approximate 87° 20′ E.

CUCURBITACEAE

Bryonopsis laciniosa (L.) Naud. in Ann. Sc. Nat. (Ser. 5) 6 : 30, 1866; Cogn. in DC. Mon. Phan. 3 : 477, 1881.

Bryonia laciniosa Linn. Sp. Pl. 1013, 1753; FBI. 2 : 622, 1879.

Climber, scabrid. Leaves palmate. Flowers light yellow. Rare.

Khandbari to Gcarigaon at 610 m (B. 467).

Coccinia cordifolia (Linn.) Cogn. in DC. Mon. Phan. 3 : 529, 1881.

Bryonia cordifolia Linn. Sp. Pl. 1012, 1753.

C. indica Wt. & Arn. Prodr. 347, 1834.

Cephalandra indica Naud. FBI. 2 : 621, 1879.

Climber ; leaves 5-angled. Flowers white, campanulate. Common.

Khurkot to Ramechappe at 763 m (B. 133).

Edgaria darjeelingensis C. B. Clarke in Journ. Linn. Soc. 15 : 114, 1876 ; FBI. 2 : 632, 1879 ; Cogn. in Pfreich. 66 : 177, t. 41, 1916.

A large scandant herb; tendrils bifid. Leaves deeply cordate or cordate-ovate. Flowers yellow. Occasional.

Kalinchok at 2750 m (B. 1017).

Gomphogyne cissiformis Griff. Pl. Cantor. 26, t. 4, 1837; FBI. 2 : 632, 1879; Cogn. in Pfreich. 66 : 38, t. 12, 1916.

Climber with tendrils bifid; leaves pedate. Flowers small. Abundant.

Kabre to Those at 1220 m (B. 639).

This species has not been previously reported from Nepal. It has been collected in N. W. Himalayas (Jumna valley) by Madden, Strachey & Winter-bottom, Duthie, and in the Eastern Himalayas by Kurz, Hooker, Clarke and Gamble.

Gynostemma pedata Bl. Bijdr. 23, 1825 ; FBI. 2 : 633, 1879; Cogn. in DC. Mon. Phan. 3 : 913, 1881.

Climber with unbranched tendrils. Leaves pedate; leaflets 5-7. Flowers small. Abundant.

Simsara to Phutuk at 1220 m (B. 581).

The common cultivated cucumber found in E. Nepal has 5 placentas, and has been identified as *Cucumis sativus* Linn. var. *sikkimensis* Hk. f.

BEGONIACEAE

Begonia laciniata Roxb. Hort. Beng. 68, 1814 nomen; et Fl. Ind. 3 : 649, 1832; FBI. 2 : 645, 1879.

Herb. Rootstock creeping. Leaves cordate, unequal at the base. Flowers pink. Abundant in shade.

Malta to Num at 1527 m (B. 487).

UMBELLIFERAE

Bupleurum falcatum Linn. var. **gracillimum** (Klotzsch) Wolff in Pfreich. 43 : 132, 1910.

B. nigrocarpum Jacquem. ex C. B. Clarke in FBI. 2 : 676, 1879.

B. falcatum Linn. var. *nigrocarpum* (Jacquem.) C. B. Clarke loc. cit.

Herb with leaves sessile, usually curved. Umbels compound; flowers yellow. Partly ripe fruits purple, 3 vittate. Abundant.

Bhitrikhani at 1832 m (B. 693).

B. tenue Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 182, 1825; FBI. 2 : 677, 1879; Wolff in Pfreich. 43: 144, t. 16 G, 1910.

Herb ·5 m tall; leaves sessile, bristle tipped. Umbels on short lateral branches. Flowers white; fruit with furrows 1 vittate. Abundant.

Chandragiri at 1980 m (B. 43/2); Kathmandu valley at 1350 m (B. 95/2); Dolaghat to Chaubas at 1068 m (B. 940); Lamjura at 3664 m (B. 1052).

Cortia hookeri C. B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 702 , 1879.

Stemless; leaves glabrous, with ultimate segments linear.

Tarangan to Lonakh at 4580 m (B. 354).

This species has previously been reported from Sikkim only.

C. lindleyi DC. Prodr. 4 : 187, 1830.

C. lindleii DC. : FBI. 2 : 701, 1879.

Stem very small. Bracteoles pinnate compound.

Namchee to Tarangan at 3522 m (B. 330).

It is supposed to ward off the ghosts, as such the Sherpas tie the dried root around the child's neck who cries at night and does not sleep.

Eryngium foetidum Linn. Sp. Pl. 232, 1753; Kanjilal et al. Fl. Assam 2 : 340, 1938; Wolff in Pfreich. 61 : 203, 1913.

Erect perennial herb with leaves spinous toothed. Flowers white; bracts spinous. Aromatic. Abundant.

Nepali name : 'Dhaniya'.

Ilam at 1375 m (B. 701).

This is an introduced species. It has been reported from Burma where it has been collected at 1070 m; Manipur at 1830 m; Assam at 765 m and Jalpaiguri at 1830 m. The present specimen has been collected from Ilam (88°E) at 1375 m. It has not been so far reported from Bhutan or Sikkim. In the area where it has established itself it is proving a menace to the people because of the spiny leaf margin and apex.

Heracleum sublineare C.B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 713, 1879.

Stem about 1 m tall. Leaves bipinnate, pinnae lanceolate, serrate. Flowers white, outer large; petals pinkish at the base. Abundant.

Kalinchok at 3360 m (B. 1003).

Oenanthe thomsoni C. B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 697, 1879.

Deeply rooted plants with stem weak and diffuse. Leaves 4-5 pinnate, 15 cm long. Abundant.

Mailbote to Simsara at 1375 m (B. 575); Khera to Mandanda at 3054 m (B. 656).

Pimpinella acronemaefolia C. B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 686, 1879.

Acronema acronemifolium (Clarke) Wolff in Pfreich. 90 : 322, 1927.

Root tuberous. Leaves 2-3 pinnate, ultimate segments 3 lobed. Flowers white. Abundant along the banks of a stream.

Jorpati to Pheda at 1527 m (B. 859).

P. clarkeana Watt ex Banerji in J. Bombay nat. Hist. Soc. 50 : 88, 1951.

A small erect herb. Radicle leaves trifoliate. Flowers white; fruits slightly asymmetrical, furrows 2-3 vittate. Occasional.

Arun watershed at 3054 m (B. 446).

P. diversifolia DC. Prodr. 4 : 122, 1830; FBI. 2 : 688, 1879; Wolff in Pfreich. 90 : 269, 1927.

Pubescent, stem about 1 m tall. Leaflets variable. Flowers white. Fruits roughly pubescent. Rare.

Chandragiri at 1980 m (B. 48/2); Bhandara at 2440 m (B. 1129).

P. sikkimensis C.B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 685, 1879.

Herb, sparsely setulose, 1 m tall. Leaves large. Rays 6-14; flowers white. Common along streams. Kabre to Those at 1220 m (B. 638).

P. wallichii C.B. Clarke, *ibid.* 2 : 685, 1879.

Juvenile plants collected under *Rhododendron* shade. Abundant.

Bhitrikhani at 2290 m (B. 694).

Pleurospermum apiolens C.B. Clarke, *ibid.* 2 : 705, 1879.

Stem 8-20 cm high. Slightly aromatic. Leaves pinnate, pinnae pinnatifid with 3-7 lobes. Flowers white; ridges of the fruit winged; furrows 1 vittate. Rare.

Kalinchok at 3054 m (B. 1011).

Sanicula europea Linn. var. **elata** Wolff in Pfreich. 61 : 63, 1913.

S. europea Linn. FBI. 2: 670, 1879. p.p.

Erect herb 30-75 cm tall. Leaves palmately 3-5 partite. Umbels irregularly compound. Flowers white. Common.

Champua to Sandakphu at 3216 m (B. 863); Chandragiri at 1980 m (B. 62/2).

All sheets in Dehra Dun herbarium have been assigned to this variety by Wolff.

Selinum tenuifolium Wall. ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 2 : 700, 1879.

Stem about 60 cm tall. Leaves large, finely divided. Very aromatic. Common.

Chandragiri at 1980 m (B. 56/2); Kalinchok at 3054 m (B. 1013).

ARALIACEAE

Hedera nepalensis K. Koch, Hort. Dendrol. 284, 1853; Rehder in Journ. Arn. Arb. 4 : 250, 1923.

H. helix Roxb. Fl. Ind. 2 : 515, 1824; Fl. Brit. Ind. 2 : 739, 1879 (non Linn.).

Gigantic climber. Leaves elongate-ovate to elongate-lanceolate with tapering base. Common.

Chandragiri at 1832 m (No number).

ALANGIACEAE

Alangium[1] **begoniifolium** Baill. Hist. Pl. 6 : 270, 1877; Wangerin in Pfreich. 41 : 20, t. 1 A-G & t. 5, 1910.

Marlea begoniaefolia Roxb. Hort. Beng. 28, 1814 nomen; et Fl. Ind. 3 : 261, 1832; FBI. 2 : 743, 1879.

Tree with large angular leaves. Flowers in dichotomous cymes. Occasional.

Nepali name : 'Anu rukh'.

Bhullu to Chuwa at 1832 m (B. 418).

CAPRIFOLIACEAE

Leycesteria formosa Wall. in Roxb. Fl. Ind. 2 : 181, 1824; FBI. 3 : 16, 1880; Cowan, Tr. North Beng. 74, 1929.

Small shrub with fistular branches. Leaves ovate-lanceolate. Flowers purple or pink. Rare.

Hatia to Hangaon at 2135 m (B. 520); Dingla to Bhojpur at 2595 m (B. 911).

Lonicera glabrata Wall. in Roxb. Fl. Ind. 2 : 175, 1832; FBI. 3 : 10, 1880; Cowan, Tr. North Beng. 74, 1929.

Shrub; leaves cordate-oblong. Flowers white. Sweet scented. Common.

Near Chainpur at 1527 m (B. 898).

L. myrtillus Hk. f. & Th. var. **depressa** Rehder in Sargent, Trees & Shrubs 1902-13.

L. parvifolia Edgew. var. *myrtillus* C. B. Clarke, FBI. 3 : 13, 1880.

Small stiff shrub. Leaves small. Flowers pink. Rare.

Namchee to Dingbochee at 3970 m (B. 376).

Sambucus adnata Wall. ex DC. Prodr. 4 : 322, 1830 ; FBI. 3 : 3, 1880 ; Hutchinson in Kew Bull. 1909; 193, 1909.

Shrub 2-3 m with spreading branches. Corymbs large and compound. Flowers small, white. Common.

Kathmandu at 1980 m (B. 34); Puyia to Jubing at 1832 m (B. 394).

Some say that the young branches are used as a vegetable after boiling and draining off the water.

Viburnum cordifolium Wall. ex DC. Prodr. 4 : 327, 1830; FBI. 3 : 6, 1880; Cowan, Tr. North Beng. 74, 1929.

A large shrub. Leaves opposite, serrate. Flowering before leafing; flowers white, scented. Abundant.

Nepali name : 'Asara'.

Phaplu to Rhingmo at 3054 m (B. 277); Rhingmo to Jubing at 2900 m (B. 282).

V. erubescens Wall. Pl. Asiat. Rar. 2 : 29, t. 134, 1830 ; FBI. 3 : 7, 1880 ; Cowan, Tr. North Beng. 75, 1929.

A large shrub. Leaves ovate. Flowers pinkish white. Common.

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[1] *Alangium* Lam. 1783 is conserved against *Angolam* Adans. 1763; *Kara-Angolam* Adans. 1763; and *Angolamia* Scop. 1777.

Nepali name : 'Asara'.

Mahadeophedi to Katonje at 1985 m (B. 163); Khera to Those at 2748 m (B. 671); Patek-Tinjura forest at 2137 m (B. 877 & 879).

As mentioned by Hooker in FBI there is great variability in the leaves. The *petiole* is mostly short and thick, in some cases however may be thin and long. The *margin* is mostly serrate; in a few cases it has few distant spreading teeth, as in *Scully* 37 & *Banerji* 163. In most cases the *lower surface* is glabrous, in some the veins are pubescent or rusty brown tomentose. These differences have been observed on specimens collected at a given place at one and the same time.

Viburnum grandiflorum Wall. ex DC. Prodr. 4 : 329, 1830; Cowan, Tr. North Beng. 75, 1929.

V. nervosum D. Don : FBI. 3 : 8, 1880.

Straggling shrub. Flowers pink. Noticed to be the predominant shrub of the area.

Kalinchock at 3054 m (B. 635).

V. stellulatum Wall. var. **glabrescens** C. B. Clarke in Hook. f. Fl. Brit. Ind. 3: 4, 1880.

A large shrub. Leaves glabrescent except the nerves beneath. Corymbs terminal, with a few hairs. Flowers white; fruits reddish. Very common between 1375 m to 1985 m.

Dolaghat to Chaubas at 1375 m (B. 946); Chaubas to Risingo at 1985 m (B. 948).

RUBIACEAE

Adina cordifolia (Roxb.) Hk. f. ex Brandis, For. Fl. 263, t. 33, 1874 ; FBI. 3 : 24, 1880 ; Cowan, Tr. North Beng. 75, 1929.

Tree, with leaves orbicular-cordate, deciduous; petioles reddish; stipules orbicular. Flowers in heads, yellow. Common along the banks of Arun and other big streams.

Dingla to Khandbari at 610 m (B. 456).

Argostemma sarmentosum Wall. in Roxb. Fl. Ind. 2 : 324, 1832; FBI. 3 : 42, 1880.

Delicate herb. Leaves membraneous, opposite, unequal. Flowers white. Common.

Phutuk to Namsaling at 1527 m (B. 592).

Borreria[1] **stricta** (L. f.) Schum. in Pfam. 4(4): 143, 1891.

Spermacoce stricta Linn. f. Suppl. Pl. Syst. Veg. 120, 1781; FBI. 3 : 200, 1880.

Herb, 15-30 cm high; branched. Leaves lanceolate, sessile. Inflorescence dense axillary cluster; flowers minute, white. Abundant.

Okhaldunga to Chayanum at 1375 m (B. 1087).

Coffea bengalensis Roxb. Hort. Beng. 15, 1814 nomen et Fl. Ind. 1 : 540, 1832; FBI. 3 : 153, 1880 ; Cowan, Tr. North Beng. 78, 1929.

Shrub with compressed branches. Flowers white, fragrant. Common.

Nepalthoke to Mulkote at 610 m (B. 118).

Galium rotundifolium Linn. var. **javanicum** (Bl.) Hook. f. in Fl. Brit. Ind. 3 : 205, 1881.

Herb, perennial, very hairy, internodes short. Leaves sub-orbicular or obovate, apiculate. Flowers white, hairy. Common.

Okhaldunga to Reserve forest at 1085 m (B. 193).

G. mollugo Linn. subsp. **asperifolium** (Wall.) Kitamura in Fauna & Fl. Nep. Himal. 1 : 230, 1955.

G. asperifolium Wall. in Roxb. Fl. Ind. 1 : 381, 1820 ; Collett, Fl. Siml. 235, 1921.

G. mollugo Hook. f. in Fl. Brit. Ind. 3 : 207, 1881. p. p.

Stem densely covered with reflexed minute hairs. Leaves densely pilose beneath. Petals acuminate. Common.

Chunrikherka to Puyia at 2443 m (B. 384).

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[1] *Borreria* G. F. Mey. 1818 is conserved against *Tardavel* Adans. 1763; *Borrera* Ach. 1810.

Luculia gratissima Sweet, Brit. Fl. Card. t. 145, 1826; FBI. 3 : 36, 1880; Cowan, Tr. North Beng. 76, 1929.

Shrub. Corymbs many flowered, flowers pink, subsessile. Rare.

Reserve forest at 1985 m (B. 216).

Leaves are used for dying.

Hooker in FBI mentions of the capsules as very variable; the Nepal specimens examined by him had capsules ·8 cm to 1·2 cm. My specimens also have capsules of the same dimensions.

Mussaenda roxburghii Hk. f. in Fl. Brit. Ind. 3 : 87, 1880.

Shrub, branches villose. Leaves oblong-lanceolate, petioles long. Abundant.

Num to Hedagna at 1527 m (B. 489).

Ophiorrhiza harrisiana Heyne var. **rugosa** (Wall.) Hook. f. in Fl. Brit. Ind. 3 : 78, 1880.

Herb, older parts woody. Leaves 2·5 to 6 cm ovate-lanceolate, minute erect hairs. Flowers white. Common.

Papung to Topke gola at 2748 m (B. 778); another sheet with no data.

Pavetta indica Linn. Sp. Pl. 110, 1753; FBI. 3 : 150, 1880; Cowan, Tr. North Beng. 78, 1929.

Shrubby with leaves elliptic lanceolate or oblanceolate, stipules short and broad. Flowers white, faintly fragrant. Common.

Wapsakhani to Bhulu at 1220 m (B. 403); Taplejung to Libang at 1527 m (B. 750).

Randia fasciculata DC. Prodr. 4 : 386, 1830; FBI. 3 : 109, 1880; Cowan, Tr. North Beng. 77, 1929.

Spiny shrub. Leaves ovate-elliptic. Flowers white. Occasional.

Nepali name : 'Bosanti'.

Tinpipli to Nepalthoke at 763 m (B. 107); Banepa to Dolaghat at 1068 m (B. 603).

R. tetrasperma Benth. & Hook. f. ex Brandis at Stewart, For. Fl. 272, 1874. (non Roxb.)

A rigid shrub, branches ending in spines. Flowers white with a greenish tint, sweet smelling. Abundant.

Bhulu to Chhuwa at 1527 m (B. 416) ; Chaubas to Pheda at 1832 m (B. 611).

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

R. cordifolia Hook. f. in Fl. Brit. Ind. 3 : 202, 1880. (non Linn. nisi p. p.)

Herbaceous climber. Leaves scabrid, in whorls of 4, cordate-ovate. Flowers small red.

Nepali name : 'Manjit'.

Reserve forest at 1985 m (B. 212); Ething at 1832 m (B. 718).

Exported in large quantities to Tibet where it is used for dyeing.

Serissa foetida Lam. Illustr. 2 : 211, 1826 ; Bor & Raizada. Beau. Indian Cl. & Sh. 82, 1954.

Branched shrub. Leaves small, oblong or oblong-lanceolate, coriaceous, paler beneath. Flowers small, white, axillary or terminal. Abundant.

Pheda to Charikot at 2440 m (B. 975).

Wendlandia[1] **coriacea** DC. Prodr. 4 : 412, 1830 ; FBI. 3 : 39, 1880 ; Cowan, Tr. North Beng. 76, 1929 ; Parkinson & Raizada in Ind. For. 59 : 364, t. 20, f. 13, 1933.

Small tree or a large shrub. Leaves lanceolate ; stipules erect short and broad. Abundant.

Nepali name : 'Kai oon'.

Dhulikhel to Kuwapani at 1527 m (B. 76).

The specimens have been collected at a higher altitude than given in FBI.

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[1] *Wendlandia* Bartl. 1830 is conserved against *Wendlandia* Willd. 1799.

Wendlandia exserta (Roxb.) DC. Prodr. 4 : 411, 1830 ; FBI. 3 : 37, 1880 ; Cowan, Tr. North Beng. 76, 1929; Parkinson & Raizada in Ind. For. 59 : 357, t. 19, f. 5, 1933.

Shrubby, leaves ovate-lanceolate ; stipules recurved. Common.

Tinpipli to Nepalthoke at 1068 m (B. 93).

W. puberula DC. Prodr. 4 : 411, 1830 ; FBI. 3 : 37, 1880 ; Cowan, Tr. North Beng. 76, 1929; Parkinson & Raizada in Ind. For. 59 : 354, t. 19, f. 2, 1933.

Shrub. Leaves elliptic-lanceolate ; stipules erect pointed. Flowers blue, sweet smelling. Noticed to be attracting the largest number of butterflies. Rare.

Num to Hedagna at 1527 m (B. 491); Libang to Tankhu at 1375 m (B. 753).

VALERIANACEAE

Valeriana hardwickii Wall. ex Roxb. Fl. Ind. 1 : 166, 1820 ; FBI. 3 : 213, 1880.

Rootstock slightly thickened, fiberous. Leaves pinnate, leaflets lanceolate. Flowers in axillary compound corymbs, white. Occasional.

Chandragiri at 1985 m (B. 41/2); Chaubas to Risingo at 1985 m (B. 957).

V. jatamansi Jones in Asiat. Res. 2 : 416, 1790 & 4 : 451, 1795.

V. wallichii DC. Prodr. 4 : 640, 1830 & Mem. Valer. 15 t. 4, 1832 ; FBI. 3 ; 213, 1881.

Rootstock thick, covered with fibres. Radical leaves deeply heart-shaped, long petioled ; cauline smaller, entire or pinnate. Flowers white in terminal corymbs. Common.

Chandragiri at 1443 m (B. 10/2) ; Bhitrikhani at 2290 m (B. 695).

The decoction of the rootstock is given after childbirth.

DIPSACACEAE

Dipsacus inermis Wall. ex Roxb. Fl. Ind. 1 : 367, 1832 ; FBI. 3 : 217, 1880.

Stout erect herb, prickly. Leaves opposite, pinnatifid. Flower heads several, flowers yellowish-white. Abundant.

Chandragiri at 1985 m (B. 70/2); Kalinchok at 3360 m (B. 1004).

Triplostegia glandulifera Wall. ex DC. Prodr. 4 : 642, 1830 ; FBI. 3 : 215, 1880.

Erect herb, glandular. Leaves pinnatifid. Flowers very small, light pink. Common.

Kalinchok at 3054 m (B. 1009).

This genus is often placed in the Valerianaceae : following Hutchinson (Cl. Fl. Pl. 1 : 286, 1926), we have retained it in the present family.

COMPOSITAE

Ainsliaea pteropoda DC. Prodr. 7 : 14, 1856 ; FBI. 3 : 388, 1881.

Herb, tomentose, cottony. Leaves ovate or cordate, petiole winged. Heads lax, elongate panicled. Flowers white. Rare at Kalinchok.

Mahadeophedi to Katonja at 1375 m (B. 168), Chandragiri at 2137 m (B. 11/2); Kalinchok at 3360 m (B. 631).

Anaphalis contorta Hk. f. in Fl. Brit. Ind. 3 : 284, 1881.

Stem prostrate, branches woody below. Leaves cottony on both surfaces. Heads in dense corymbose clusters. Very common.

Mura to Okhaldunga at 3216 m (B. 1079).

Chandragiri at 1985 m (B. 94/2).

A. triplinervis C. B. Clarke, Comp. Ind. 105, 1876 ; FBI. 3 : 281, 1881.

A robust plant densely clothed with white wool. Leaves cobwebby above, amplexicaul. Occasional at 1985 m but very common at 3216 m.

Chandragiri at 1985 m (B. 93/2); Chaubas to Risingo at 1985 m (B. 958); Mura to Okhaldunga at 3216 m (B. 1080).

Aster tricephalus C. B. Clarke, *ibid.* 43, 1876 ; FBI. 3 : 250, 1881.

Stem erect, puberulous. Leaves obovate-spathulate, amplexicaul. Heads 1-3 ; florets blue. Achenes with red pappus. Occasional.

Banepa to Dolaghat at 1375 m (B. 606); Kalinchok at 3360 m (B. 1000).

Blumea[1] **hieracifolia** (D. Don) DC. in Wight, Contrib. 15, 1834 & Prodr. 5 : 442, 1836 ; FBI. 3 : 263, 1881 ; Merrill in Journ. Arn. Arb. 28 : 75, 1937.

Erigeron hieracifolium D. Don, Prodr. Fl. Nep. 172, 1825.

Herb, tomentose or woolly. Leaves elliptic or oblong, serrate. Heads fascicled. Common.

Goarigaon to Chainpur at 1068 m (B. 473).

Chrysanthellum indicum DC. Prodr. 5 : 631, 1836 ; FBI. 3 : 310, 1881.

Herb on shingly soil, prostrate. Leaves pinnatifid, slightly succulent. Flowers yellow. Occasional.

Kathmandu valley at 1350 m (B. 50/2); Banepa to Dolaghat at 1220 m (B. 929).

Conyza[2] **stricta** Willd. Sp. Pl. 1 (2) : 1922, 1798 ; FBI. 3 : 258, 1881.

Herb, corymbosely branched, pubescent. Leaves usually spathulate obovate, toothed but very variable. Heads minute. Abundant.

Katonje to Okhaldunga at 1068 m (B. 178); Kathmandu valley at 1350 m (B. 22/2).

Cremanthodium oblongatum C. B. Clarke, Comp. Ind. 168, 1876 ; FBI. 3 : 331, 1881 ; Good in Journ. Linn. Soc. 48 : 287, 1928.

A robust plant. Leaves 5-7 cm in diam.; with coarsely reticulate nerves. Heads yellow. Abundant.

Kalinchok at 3522 m (B. 995).

Eclipta[3] **prostrata** (L.) Linn. 2: 286, 1771; Santapau in J. Bombay nat. Hist. Soc. 54: 475, 1957.

Verbesina prostrata Linn. Sp. Pl. 902, 1753.

E. alba Hassk. Pl. Jav. Rar. 528, 1848 ; FBI. 3 : 304, 1881.

Pubescent herb. Leaves opposite, lanceolate. Florets white. Common.

Chainpur to Mialay at 1068 m (B. 556).

Erigeron bellidioides Benth. ex Clarke, Comp. Ind. 55, 1876 ; FBI. 3 : 256, 1881.

Herb, stem slender, grooved. Heads about 1 cm in diam. florets purple. Common.

Chaubas to Risingo at 1985 m (B. 952).

Eupatorium glandulosum H. B. & K. Nov. Gen. et Sp. 4 : 122, 1815-25; Raizada in Ind. For. 74: 389, 1948.

E. adenophorum Spr. Syst. 3: 402, 1826.

Shrubby, plants 1-2 m tall. Branches reddish. Leaves opposite, rhomboid-ovate, coarsely serrate. Florets white slightly fragrant. Very common between 1375 m and 1832 m.

Deorali to Narkata at 1374 m (B. 150); Okhaldunga at 1832 m (B. 1097).

Gerbera[4] **piloselloides** Cass. in Dict. Sc. Nat. 18: 461, 1816-1830; FBI. 3: 389, 1881.

Scapigerous herb. Leaves petioled, obovate-oblong; young leaves densely woolly. Scape 30-50 cm. Occasional.

Wapsakhani to Bhulu at 1527 m (B. 410); Taplejung to Libang at 1527 m (B. 748).

Gnaphalium luteoalbum Linn. var. **multiceps** (Wall.) Hk. f. in Fl. Brit. Ind. 3: 288, 1881.

Woolly herbs, many stems from the root. Leaves woolly on both surfaces. Heads golden-yellow. Common.

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[1] *Blumea* DC. 1833 is conserved against *Placus* Lour. 1790.

[2] *Conyza* Less. 1832 is conserved against *Conyza* Linn. 1753; *Marsea* Adans. 1763; *Gemmaria* Noronha 1790; *Eschenbacia* Moench. 1794; *Diomorphanthes* Cass. 1818 and *Laennecia* Cass. 1802.

[3] *Eclipta* Linn. 1771 is conserved against *Eupatoriophalacron* Adans. 1763.

[4] *Gerbera* Cass. 1817 is conserved against *Aphyllocaulon* Lag. 1811.

Khera to Mandanda at 3664 m (B. 658).

Collected at a higher altitude than given by Hooker (3054 m).

Guizotia[1] **abyssinica** Cass. in Dict. Sc. Nat. 59: 248, 1829; FBI. 3: 308, 1881.

Erect herb. Leaves semiamplexicaul, lanceolate-oblong. Heads 1 to 2·5 cm in diam.; ray florets yellow. Abundant old cultivation terraces.

Dolaghat to Chaubas at 1220 m (B. 609).

Gynura[2] **nepalensis** DC. Prodr. 6: 300, 1838; FBI. 3: 333, 1881.

Erect herb, woody below. Leaves obovate-oblong. Heads many, florets yellow. Abundant.

Khurkot to Ramechappe at 1375 m (B. 135).

Inula cappa (Ham.) DC. Prodr. 5: 469, 1836; FBI. 295, 1881.
Conyza cappa Ham. in D. Don, Prodr. Fl. Nep. 176, 1825.

Shrubby about 2 m tall. Leaves oblong-lanceolate, glabrescent above, densely woolly beneath. Heads about 1 cm in diam., numerous. Occasional.

Kathmandu valley at 1350 m (B. 23/2).

I. nervosa Wall. ex DC. Prodr. 5: 471, 1832; FBI. 3: 293, 1881.

Perennial pubescent, stem branched. Leaves subsessile. Heads mostly corymbose; florets light blue Abundant.

Those to Bhandara at 2135 m (B. 1044); Chandragiri at 1985 m (B. 100/2).

I. rubricaulis Benth. ex Clarke, Comp. Ind. 126, 1876; FBI. 3: 296, 1881; Cowan, Tr. North Beng. 80, 1929.

Shrubby. Leaves sessile, elliptic, lanceolate. Heads ·8 cm in diameter, 3-5 together; involucral bracts purplish. Occasional.

Chandragiri at 1832 m (B. 15/2).

Lactuca macrantha C. B. Clarke, Comp. Ind. 267, 1876; FBI. 3: 409, 1881.

Stem about 50 cm tall, stout. Leaves pinnatifid. Heads noding florets blue. Abundant in shade.

Kalinchok at 3360 m (B. 996).

Leontopodium alpinum Cass. in Dict. Sc. Nat. 30: 474, 1816-1830; FBI. 3: 279, 1881.

Flowering stem erect, densely woolly. Cauline leaves sessile or semiamplexicaul, linear-oblong. Involucral bracts erect, scarious, tip purple. Common.

Khera to Mandanda at 3664 m (B. 664).

L. fimbrilligerum Drummond in Kew Bull. 1910: 76, 1910; Smith & Cave in Rec. bot. Surv. India 4: 207, 1911.

Caespitose herb; radical leaves linear spathulate, cauline leaves sessile. Capitulum subconic; involucral scales fimbriate.

Nangpa La at 4886 m (B. 364).

This species is previously reported from Sikkim only, and can be readily distinguished from *L. alpinum* by the yellow involucral leaves and also by the fimbriate involucral scales.

Microglossa albescens Benth. ex C. B. Clarke, Comp. Ind. 59, 1876; FBI. 3: 257, 1881.

A stout erect herb. Leaves shortly petioled, hoary beneath. Heads 1 cm in diam., loosely clustered; florets blue; pappus red. Abundant.

Kalinchok at 3054 m (B. 1010).

Myriactis wallichii Less. ex DC. Prodr. 5: 309, 1836; FBI. 3: 247, 1881.

Erect herb, roughly hairy. Leaves ovate or lanceolate, coarsely toothed. Heads minute; ray florets white; disc florets yellow. Occasional.

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[1] *Guizotia* Cass. 1829 is conserved against *Werrinuwa* Heyne 1874.

[2] *Gynura* Cass. 1825 is conserved against *Crassocephalum* Moench. 1794.

Chandragiri at 1985 m (B. 43/2); Phaplu to Mura at 2440 m (B. 1070).

My specimens have been collected from a lower altitude than given in FBI. (loc. cit.)

Saussurea[1] **gossypiphora** D. Don in Mem. Wern. Soc. 3: 414, 1821; FBI. 3: 376, 1881.

Stem hollow, densely clothed with long white matted wool. Heads concealed; involucral bracts shining.

Nangpa La at 4580 m (B. 362).

S. tridactyla Sch.-Bip. ex Hook. f. Fl. Brit. Ind. 3: 377, 1881.

Root woody and plants densely leafy. Leaves densely covered with long white matted wool. Heads partly exposed. Occasional.

Tarangan to Lonakh at 4580 m (B. 356) and Lonakh at 4580 m (B. 357).

This species is previously known from Sikkim only.

Senecio alatus Wall. ex DC. Prodr. 5: 368, 1836; FBI. 3: 353, 1881.

Stem short or long, pubescent; leaves ovate, petioled winged. Heads many forming a terminal panicle. Flowers yellow. Common in shade.

Kalinchok at 3054 m (B. 1015).

S. diversifolius Wall. ex DC. Prodr. 6: 366, 1838; FBI. 3: 340, 1881.

Robust herb. Leaves lyrate-pinnatifid, base auricled.

Khera to Mandanda at 3664 m (B. 659).

S. graciliflorus DC. Prodr. 6: 365, 1838; FBI. 3: 338, 1881.

Stem about 1 m tall, grooved. Leaves membraneous, pinnately lobed. Heads numerous, drooping; florets yellow. Gregarious in sub-alpine zone.

Kalinchok at 3522 m (B. 991).

S. nudicaulis Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 179, 1825; FBI. 3: 340, 1881.

Plants sparsely pubescent. Leaves obovate or spathulate, crenate, white tomentum on both the surfaces. Heads ·8 cm in diam. Common.

Ramachappe to Deorali at 1527 m (B. 140); Jubing to Wapsakhani at 1220 m (B. 400).

Sphaeranthus indicus Linn. Sp. Pl. 927, 1753; FBI. 3: 275, 1881.

Herb with spreading branches, tomentose. Leaves obovate-oblong, serrate. Occasional.

Katonje to Okhaldunga at 916 m (B. 176).

Taraxacum[2] **officinale** Wigg. var. **parvulum** Hk. f. in Fl. Brit. Ind 3: 401, 1881.

Scapigerous milky herb. Leaves runcinate. Heads solitary on leafless scape; involucral bracts with white membraneous margins. Flowers all ligulate, yellow. Abundant.

Khera to Mandanda at 2595 m (B. 652).

Vernonia teres Wall. ex DC. Prodr. 5: 15, 1836; FBI. 3: 229, 1881.

Stem rigid, scabrid. Leaves obovate or obovate-lanceolate, scabrid on both surfaces. Florets all tubular, purple. Occasional in Pine forests.

Okhaldunga to Chayanum at 1068 m (B. 1082).

Youngia japonica (L.) DC. subsp. **genuina** (Hoehr.) Babe et Stebbins in Carnegie Inst. Wash. 484: 95, 1937.

Crepis japonica Benth. Fl. Hongk. 194, 1861; FBI. 3: 395, 1881.

Herb, glabrous. Leaves radical, obovate, sinuate-toothed. Flowering stem many, branched at the top. Abundant.

Narkata to Mahadeophadi at 1220 m (B. 153).

[1] *Saussurea* DC. 1810 is conserved against *Saussurea* Salisb. 1807; *Saussuria* Moench. 1794 ; and *Theodorea* Cass. 1827.

[2] *Taraxacum* Wiggers 1780 is conserved against *Taraxacum* Linn. 1757; and *Hedypnois* Scop. 1772 (non Schreb. 1791).

CAMPANULACEAE

Campanula argyrotricha Wall. ex DC. Prodr. 7 : 473, 1838; FBI. 3 : 441, 1881.

Stem procumbent, hairy. Leaves sessile, toothed or nearly entire, softly silvery hairy. Flowers blue, long stalked; corolla deeply lobed. Occasional.

Kathmandu valley at 1350 m (B. 75/2); Those to Bhandara at 1832 m (B. 1041); Bhandara at 2440 m (B. 1128).

C. colorata Wall. in Roxb. Fl. Ind. 2 : 98, 1824; FBI. 3 : 440, 1881; ambo pro parte.

Stem hairy or tomentose. Leaves lanceolate, sessile, crenate or toothed. Flowers many in panicles, pale lilac. Common.

Bhadgaon to Dhulikhel at 1527 m (B. 49 ; B. 57); Chaubas to Risingo at 1985 m (B. 963); Kuwapani to Banepa at 1590 m (B. 1111); Kathmandu valley at 1350 m (B. 63/2).

This seems to be *C. ramulosa* Wall. : Gamble Madras Fl. 740, 1921.

C. sylvatica Wall. in Roxb. Fl. Ind. 2 : 97, 1824; FBI. 3 : 439, 1881.

Erect herb ; leaves linear. Panicles few flowered. Flowers white, corolla shortly five-lobed. Common.

Banepa to Dolaghat at 1220 m (B. 602).

Campanumaea inflata C. B. Clarke in Hook. f. Fl. Brit. Ind. 3 : 436, 1881.

Stem slightly twinning. Leaves alternate or opposite, deeply cordate. Flowers light blue, evil smelling. Rare.

Chandragiri at 1985 m (B. 75/2); Those to Bhandara at 2443 m (B. 1047).

Cyananthus hookeri C. B. Clarke in Hook. f. Fl. Brit. Ind. 3 : 435, 1881.

Stem 8-10 cm high, many branches from one root. Leaves ovate, hirsute. Specimens collected in fruits. Calyx persistent, hirsute. Capsule ellipsoid. Rare.

Lamjura at 3664 m (B. 1057).

C. microphyllus Edgew. in Trans. Linn. Soc. 20 : 81, 1846.

C. linifolius Wall. ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 3 : 434, 1881.

C. linifolius Hk. f. & Th. in Journ. Linn. Soc. 2 : 20, 1858 p.p.

Herb, 2-30 cm, sparsely hairy. Leaves sessile; oblong, margin slightly recurved. Flowers blue. Abundant along slopes.

Kalinchok at 3522 m (B. 992).

C. lobatus Wall. ex Benth. in Royle, Ill. Bot. Himal. 309, t. 69, 1839; FBI. 3 : 433, 1881.

Deep rooted, prostrate; stem glabrous below, hairy above. Leaves with a short petiole, pilose. Flowers blue; corolla hairy at the threat. Very common along slopes.

Kalinchok at 3522 m (B. 994).

Lobelia succulenta Blume, Bijdrag. 728, 1825; Wimmer in Pfreich. 107(2) : 576, 1953.

L. affinis Wall. ex DC. Prodr. 7 : 360, 1838; FBI. 3 : 424. 1881.

Stem prostrate, much branched, pubescent. Leaves ovate, pilose on the nerves. Flowers pink. Common.

Okhaldunga to Chayanum at 1525 m (B. 1092); Kuwapani to Banepa 1680 m (B. 1109).

L. pyramidalis Wall. in Asiat. Res. 13 : 376, 1820; FBI. 3 : 426, 1881; Wimmer in Pfreich. 107 (2) : 646, 1953.

Stem robust, much branched, hollow. Leaves linear-lanceolate, upper leaves sessile. Flowers pinkish purple. Rare.

Chandragiri at 1985 m (B. 85/2); Namdu to Sikrigaon at 2440 m (B. 1033).

Peracarpa carnosa Hk. f. & Th. in Journ. Linn. Soc. 2 : 26, 1858; FBI. 3 : 437, 1881.

Succulent herb. Leaves alternate also opposite. Flowers small, axillary, purple or white. Abundant.

Raksha to Mthing at 2595 m (B. 712).

Pratia nummularia (Lam.) A. Br. et Aschers. Index Sem. Hort. Berol. 6, 1861; Wimmer in Pfreich. 106(1) : 112, 1956.

P. begonifolia Lindl. in Bot. Reg. t. 1373, 1830; FBI. 3 : 422, 1881.

Small creeping herb. Leaves cordate, ovate. Flowers axillary, corolla bilipped, green with pink spots. Occasional.

Jubing to Puyia at 1832 m (B. 309).

VACCINIACEAE

Agapetes incurvata (Griff.) Sleumer var. **hookeri** (C.B.Cl.) Airy Shaw

A. hookeri (Clarke) Sleumer in Bot. Jahrb. 70 : 106, 1939 ; Airy Shaw in Kew Bull. 1948 : 98, 1948; Raizada in Ind. For. 74 : 390, 1948.

Pentapterygium hookeri C. B. Clarke in Hook. f. Fl. Brit. Ind. 3 : 450, 1882.

Epiphytic. Leaves elliptic acute, crenate or serrate, hairy on the midrib beneath. Flowers fascicled; corolla yellow. Rare.

Patek-Tinjura forest at 2443 m (B. 888).

This species is previously known from Sikkim, Bhutan and Assam.

A. serpens (Wight) Sleumer

Pentapterygium serpens Klotsch. in Linnaea 24 : 47, 1851; FBI. 3 : 449, 1882.

Epiphytic, pendulous. Leaves subsessile with recurved margins. Flowers bright red; anthers without a spur. Common.

Mahadeophedi to Katonje at 1220 m (B. 162); Hedagna to Gola at 2135 m (B. 506); Pheda to Charikot at 1985 m (B. 623).

The distribution of this species is Sikkim and Bhutan.

Vaccinium dunalianum Wight in Calcutta Journ. Nat. Hist. 7 : 175, 1874; FBI. 3 : 453, 1882.

A large shrub; leaves subsessile, oblong, lanceolate, apex caudate-acuminate, 2·5 cm long. Flowers yellowish. Abundant.

Gola to Hatia at 1985 m (B. 512).

The distribution of this species is from Sikkim, Bhutan to Khasi.

V. nummularia Hk. f. & Th. ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 3 : 451, 1882.

A small rigid epiphyte, densely hirsute. Leaves 2·75 cm, subsessile, margin recurved. Flowers rose-pink. Rare.

Puyia & Jubing at 2442 m (B. 392).

The range of this species is from Sikkim to Bhutan.

V. retusum (Griff.) Hk. f. ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 3 : 451, 1882.

A small epiphyte, pubescent. Leaves subsessile, margin recurved. Flowers white. Common.

Rhingmo to Jubing at 2748 m (B. 238); Raksha to Ething at 2443 m (B. 706); Patek-Tinjura forest at 2443 m (B. 889).

V. serratum Wight in Calcutta Journ. Nat. Hist. 7 : 171, 1847; FBI. 3 : 452, 1882.

A big shrub with branches often thickened at the base. Occasional.

Saddle to Dingla at 1527 m (B. 448); Lebang to Tenkhu at 1068 m (B. 758).

ERICACEAE

Lyonia ovalifolia (Wall.) Drude in Engl. & Pr. Nat. Pfam. 4(1) : 44, 1889.

Andromedia elliptica Sieb. & Zucc. in Abh. Akad. Muench. 3(4) : 159, 1846.

Pieris ovalifolia D. Don, in Edin. Phil. Journ. 17 : 159, 1834; FBI. 3 : 460, 1882.

A shrub or tree with leaves ovate or elliptic. Racemes axillary. Flowers white. Abundant.

Nepali name : 'Angori'.

Okhaldunga to Reserve forest at 1832 m (B. 190); Goairigaon to Chainpur at 1068 m (B. 475); Phidim to Moktara at 1220 m (B. 722).

Lyonia formosa (D. Don) Hand-Mazz. Symb. Sinic. 7 : 790, 1936.

Pieris formosa D. Don, in Edin. Phil. Journ. 17 : 159, 1834; FBI. 3 : 461, 1882.

A small tree with leaves lanceolate, acuminate. Flowers white. Occasional.

Okhaldunga to Patale at 2595 m (B. 238); Topke gola area at 3054 m (B. 792); Pheda to Charikot at 2443 m (B. 976).

Cassiope fastigiata (Wall.) D. Don. in Edin. New Phill. Journ. 17 : 157, 1834; FBI. 3 : 459, 1882.

Andromodia fastigiata Wall. in Asiat. Res. 13 : 394, 1820.

Small fastigiate shrub. Leaves small, rigid, quadrifarious. Flowers light pink; corolla widely campanulate. Common.

Tarangan to Aryea at 4428 m (B. 346); Topke gola area at 3817 m (No number).

Gaultheria fragrantissima Wall. in Asiat. Res. 13 : 397, 1820; FBI. 3 : 457, 1882.

A big shrub. Leaves lanceolate to ovate, base rhomboid. Flower greenish yellow or yellowish white. Common.

Dhulikhel to Kuwapani at 1527 m (B. 68); Chandragiri at 2123 m (B. 172); Khera to Mandanda at 2748 m (B. 665).

G. pyrolaefolia Hk. f. ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 3: 457, 1882.

Shrub, suberect with leaves 3·75 cm by 1·8 to 2.5 cm narrow at the base, crenate, a few bristles on the surface. Flowers calyx becoming blue-black in fruit. Gregarious.

Topke gola area at 3664 m (B. 809).

The species is reported from Sikkim only by the collections of Smith, Cave and Gammie Hooker and Clarke.

G. trichophylla Royle Ill. Bot. Himal. 200, t. 63, 1839; FBI. 3: 457, 1882.

Small prostrate rigid shrub. Stem hirsute ; leaves sessile, indistinctly crenulate, long hairs on the margin. Flowers red or pink. Common.

Paktaru to Saddle at 2748 m (B. 438); Bhitrikhani at 2900 m (B. 685); Topke gola to Saju pokhri at 4428 m. (B. 837); Lamjura at 3665 m (B. 1051).

Rhododendron arboreum Sm. Exot. Bot. 1 : 9, t. 6, 1805 ; FBI. 3: 465, 1882 ; Stev. Sp. Rhod. (2) 14, 1930.

Trees. Leaves oblong-lanceolate to oblong-oblanceolate, narrowed to the apex, base cuneate undersurface indumentum white to fawn, cinnamon to rusty brown. Inflorescence large and compact, flowers deep scarlet, corolla tubular-campanulate.

Ramechappe to Deorali at 1527 m (B. 139); Okhaldunga to 1985 m (B. 225); Okhaldunga to Patala at 2595 m (B. 235); Those to Bhitrikhani at 2290 m (B. 681).

The two colour forms mentioned in Stev. Sp. Rhod. have also been collected.

1. *Rh. arboreum* f. *album* (Buch.-Ham. ex D. Don) Wall. in Pl. Asiat. Rar. 1831.

Flowers white with purple spots, open. Leaf undersurface cinnamon to pale brown.

Okhaldunga to Patala at 2695 m (B. 234).

2. *Rh. arboreum* f. *roseum* Sw. in Brit. Fl. Gard. 4: 339, 1839.

Flowers rich pink marked with numerous deeper coloured spots. Leaf undersurface pale-brown.

Namchebazar to Tarangan at 3817 m (B. 333); Thami at 3970 m (B. 368).

Rh. barbatum Wall. ex G. Don, Gen. Syst. 3: 844, 1834; FBI. 3: 468, 1882; Stev. Sp. Rhod. (2) 129, 1930.

Tree, branching from the base. Leaves elliptic-lanceolate, acute, base obtuse, semi-rounded or cordate. Young leaves with a loose woolly tomentum on the underside. Flowers deep crimson, with 5 nectaries at the base. Common.

Khera to Mandanda at 3522 m (B. 663).

Rhododendron campanulatum D. Don, in Mem. Wern. Soc. 3: 410, 1821; FBI. 3: 466, 1882; Stev. Sp. Rhod. (2) 176, 1930.

Big shrub with branches spreading. Leaves broadly elliptic or oval, obtuse, base obtuse or semi-cordate, undersurface covered with a rusty brown indumentum. Flowers white to purple with all intermediate shades. Corolla spotted within on the upperside. Commonest species.

Nepali name: 'Nilo chimal.'

Hongaon to Poptila at 3970 m (B. 532); Khera to Mandanda at 3664 m (B. 660).

Vast expenses are covered by this species above Namchebazar and in Kalinchok area.

Rh. campylocarpum Hk. f. in Rhod. Sikkim Himal. 33, 1849; FBI. 3: 467, 1882; Stev. Sp. Rhod. (2) 702, 1930.

Small bush 1·5-3 m tall. Leaves ovate to elliptic, apex rounded to broadly obtuse, base cordate to truncate, undersurface glaucous, epidermis waxy. Flowers pale or bright yellow. Corolla with or without blotches. Common.

Namchebazar area between 3564 to 3970 m (B. 335, 367 and 372); Topke gola area at 3664 m (B. 845).

The species is reported from East Nepal to Sikkim .

Rh. cinnabarinum Hk. f. in Rhod. Sikkim Himal. t. 8, 1849; FBI. 3: 474, 1882; Stev. Sp. Rhod. (2) 222, 1930.

Shrub with leaves obovate-elliptic to broadly oblanceolate, apex rounded to mucronate, base rounded, undersurface densely scaly and glaucous. Flowers cinnabar-red, corolla tubular, slightly widened at the top. Occasional.

Hongaon to Poptila at 3970 m (B. 531); Topke gola area at 3664 m (B. 846); Patek to Tinjura at 2900 m (B. 880).

This species is reported from Sikkim only.

Rh. dalhousiae Hk. f. Rhod. Sikkim Himal. t. 2, 1849; FBI. 3: 469, 1882; Stev. Sp. Rhod. (2) 492, 1930.

Epiphyte. Leaves obovate to oblanceolate, apex rounded or obtuse, base cuneate, undersurface glaucous and densely scaly. Flowers pale yellowish. Frequent.

Chuwa to Aisalukherka at 2290 m (B. 419); Papung at 3595 m (B. 773); Patek-Tinjura forest at 2137 m. (B. 878).

This species is reported from Sikkim and Bhutan.

Rh. fulgens Hk. f. Rhod. Sikkim Himal. t. 25, 1849; FBI. 3: 466, 1882; Stev. Sp. Rhod. (2) 178, 1930.

A shrub, much branched. Leaves oblong-oval to broadly obovate, apex rounded, base rounded or slightly cordate, undersurface with a dense twany woolly tomentum. Flowers deep blood-red, corolla fleshy. Frequent.

Hongaon to Poptila at 3970 m (B. 529). Also seen in Topke gola area.

Rh. hodgsonii Hk. f. Rhod. Sikkim Himal. 16, t. 15, 1849; FBI. 3: 464, 1882; Stev. Sp. Rhod. (2) 247, 1930.

A small tree, branching from the base. Leaves oblong-elliptic to broadly oblong-oblanceolate, apex obtuse to rounded, base obtuse to rounded, undersurface covered with a smooth grey or buff indumentum. Flowers dark magenta-purple. Common.

Poptila Pase at 3970 m (B. 530); Topke gola area at 3970 m (B. 844).

Rh. hypenanthum Balf. f. : Stev. Sp. Rhod. (2) 8, 1930.

Shrub with persistent winter bud-scales. Leaves narrowly obovate-elliptic, apex obtusely mucronate, base slightly cuneate, undersurface densely scaly. Flowers yellow.

Tarangan to Aryea at 3970 m (B. 344); Thami at 3970 m (B. 369); Hongaon to Poptila at 3359 m (B. 528); Topke gola area at 3664 m (B. 813).

The Eastern Himalayan species is *anthopogon* while the Western Himalayan species is *hypenanthum*. *Rh. anthopogon* is characterised by the presence of pink flowers, calyx finely ciliated, and the winter bud-scales are deciduous. The collections show the east-ward extension of the species. Sherriff however, found *Rh. hypenanthum* in South East Tibet in 1934 and later Sherriff and Ludlow collected the species from Central Bhutan in 1936. (Cowan 1938).

Rhododendron lepidotum Wall. ex. G. Don, Gard. Dict. 3: 845, 1834; FBI. 3: 471, 1882; Stev. Sp. Rhod. (2) 442, 1930.

A small shrub. Leaves narrowly oblanceolate, undersurface densely covered with more or less fleshy scales. Flower pale yellow or green yellow or pink. Abundant.

Namchebazar to Tarangan at 4581 m (B. 338); Poptila at 3359 m (No number); Khera to Mandanda at 3970 m (B. 662).

Rh. pendulum Hk. f. Rhod. Sikkim Himal. t. 13, 1849; FBI. 3: 469, 1882; Stev. Sp. Rhod. (2) 232, 1930.

Epiphytic shrub with young leaves densely woolly. Leaves elliptic or oblong-elliptic, mucronate, base obtuse, undersurface densely woolly-tomentose. Flowers white, tinged inside with yellow.

Topke gola area 3664 m (B. 812).

Reported from Sikkim—Hooker, Clarke and Prantling. In Calcutta Herb. there is a sheet without any name from Bhutan.

Rh. setosum D. Don in Trans. Wern. Soc. 3: 408, 1821; FBI. 3: 472, 1882; Stev. Sp. Rhod (2) 428, 1930.

Small shrub with branches densely setose. Leaves oblong-elliptic to ·8 cm to 1.2 cm by 6 mm, undersurface densely setose and scaly. Flowers purple or pink. Common.

Tarangan to Aryea at 3970 m (B. 343) also seen in Kalinchok area at 3817 m.

Rh. triflorum Hk. f. Rhod. Sikkim Himal. t. 19, 1849; FBI. 3: 474, 1882; Stev. Sp. Rhod. (2) 791, 1930.

Shrub about 2·5 m ; young branches with black glands. Leaves lanceolate or oblong, lanceolate, apex very acute, base obtuse or rounded, undersurface densely scaly. Flowers light yellow, fragrant. Rare.

Patale to Phaplu at 2440 m (B. 254).

The species is reported from Sikkim and Bhutan, and recently from Assam.

PRIMULACEAE

Androsace geraniifolia Watt in Journ. Linn. Soc. 20: 17, 1882; FBI. 3: 497, 1882.

Stoloniferous, covered with soft spreading hairs. Leaves long petioled, rounded-cordate, 7-lobed. Flowering scape much larger than the leaves.

Topke gola area at 3216 m (B. 788).

A. croftii Watt var. **scaposa** Sant. & Banerji in Proc. Nat. Inst. Sci. India 24B : 137, 1958.

Small, stoloniferous, densely rufous tomentose. Leaves reniform-rounded, lobulate; lobules generally 3-crenulate. Peduncles twice or thrice as long as the petioles. Flowers umbellate, purplish; calyx-lobes obtuse densely hairy. Occasional.

This new variety approaches in many respects the typical species as described by Watt, from which however it differs mainly on account of the length of the peduncles, which in the new variety are at least twice, often more than thrice as long as the leaf petioles.

Patale to Phaplu at 2700 m (B. 256); Jubing to Wapsakhani at 1579 m (B. 396); Those to Bhitrikhani at 2748 m (B. 686).

A. sarmentosa Wall. in Roxb. Fl. Ind. (2) 14, 1837; FBI. 3: 498, 1882; Blatter, Beau. Fl. Kash. 2: 27, 1928.

Plants villose or silky. Leaves forming rosettes, woolly. Flowering stem hairy, flowers pink.

Namchebazar to Tarangan at 4275 m (B. 340).

Androsace chamaejasme var. **uniflora** Hk. f. in Fl. Brit. Ind. 3: 499, 1882; Pax & Kunth in Pfreich. 22: 190, 1905; Smith in Rec. bot. Surv. India 4: 394, 1913; Blatter, Beau. Fl. Kash. 2: 29, 1928.

Stoloniferous ; leaves 5 mm by 2 mm forming rosettes, lance-shaped, ciliate on the margins.

Nangpa La at 4733 m (No number).

This species has been reported from Western Tibet, N. W. Himalayas and Sikkim; and not from Nepal. This collection show a continuous distribution of the species along the Himalaya.

Lysimachia alternifolia Wall. in Roxb. Fl. Ind. 2: 26, 1825; FBI. 3: 504, 1882; Pax & Kunth in Pfreich. 22: 272, 1905.

Herb, branched from the base, branches generally prostrate. Leaves alternate. Flowers yellow. Common.

Goairigaon to Chainpur at 1068 m (B. 474); Chainpur to Mialay at 1068 m (B. 555); Nangkhola to Taplejung at 1220 m (B. 745).

L. japonica Thunb. Fl. Jap. 83, 1784; FBI. 3: 505, 1882; Pax & Kunth in Pfreich. 22: 262, 1905.

Herb with branches terete, hairy. Leaves opposite. Flowers yellow. Common.

Goairigaon to Chainpur at 1068 m (B. 474 B); Papung to Topke gola at 2290 m (B. 772).

L. prolifera Klatt in Abh. Naturf. Ver. Hamb. 4(4) 30, t. 16, 1866; FBI. 3: 503, 1882; Pax & Kunth in Pfreich. 22: 275, 1905.

Small creeping herb. Leaves opposite also alternate. Flowers very light yellow or white. Common in shady and moist places.

Puyia to Jubing at 1679 m (B. 389).

Primula aequalis Craib in Notes Bot. Gard. Edin. 10: 205, 1918.

Plants with rootstock elongated. Leaves oblong oblanceolate to oblong-ovate. Inflorescence 9-12 cm tall. Flowers violet. Calyx-lobed oblong to oblongo-lanceolate. Common.

Topke gola area at 3522 m (B. 800), also at 3664 m (B. 807).

This species is reported previously from Sikkim only.

P. boothii Craib in Notes Bot. Gard. Edin. 6: 249, 1917.

Leaves long, petiolate, spathulate. Flowers purplish pink, with orange yellow eye, some flowers with farina on undersurface. Occasional in moist mossy soil.

Raksha to Ething at 2748 m (B. 708); Topke gola area at 3359 m (B. 797).

This species has been described from a material collected from Bhutan, and it has not been reported from any other locality in the Himalaya. However the species has been collected from Southern Tibet.

P. denticulata Sm. Exot. Bot. 2:109, t. 114, 1805; FBI. 3: 485, 1882.

Root-stock stout; leaves obovate-spathulate. Flowers pale purple, corolla lobes obcordate. Common.

Phaplu to Rhingmo at 2900 m (B. 260 & 261); Okhaldunga to Patala at 2900 m (B. 243); Kalinchok at 2664 m (B. 628).

P. glabra Klatt in Linnaea 37 : 500, 1871-73 ; FBI. 3 : 487, 1882.

Plants tufted on peaty soil. Leaves 1.25-2.5 cm long, obovate-spathulate. Flowers magenta, yellow eye. Occasional.

Topke gola to Thaglabhanjyang at 4428 m (B. 821).

This species was previously reported from Sikkim and Bhutan, but later added to the flora of Nepal. (Smith, 1931).

P. filipes Watt in Journ. Linn. Soc. 20: 5, 1882; FBI. 3: 485, 1882.

Root-stock elongated on mossy rocks, sparsely pubescent. Leaves orbicular-ovate, membraneous. Flowers pale blue; calyx lobes short and very broad, rounded.

Chandragiri at 2290 m (B. 1472); Kalinchok at 2443 m (No number).

This species has not been recorded by Burkill although it grows in profusion near the top of Chandragiri.

Primula listeri King in Hook. f. Fl. Brit. Ind. 3: 485, 1882.

Plants with rootstock elongate, pubescent. Leaves orbicular cordate, sinuate lobed. Flowers rose pink; calyx lobes shorts broad and acute.

Phaplu to Rhingmo at 3054 m (B. 275); Those to Khera at 2595 m (B. 649); Topke gola area at 3359 m (B. 794).

P. macrophylla D. Don Prodr. Fl. Nep. 80, 1825.

P. stuartii Wall. var. *purpurea* Watt. FBI. 3: 490, 1882.

Leaves oblanceolate, undersurface yellow mealy. Flowers purple, calyx lobes acute. Common.

Topke gola to Thaglabhanjyang at 4275 m (B. 818).

P. stuartii Wall. in Roxb. Fl. Ind. 2: 20, 1832; FBI. 3: 490, 1882.

Plants mealy. Leaves long, coriaceous, oblanceolate, crenulate or finely toothed. Flowers purple.

Topke gola to Thaglabhanjyang at 4275 m (B. 816).

P. wattii King ex Watt in Journ. Linn. Soc. 20: 10, 1882; FBI. 3: 672, 1882.

Plants glabrous, leaves oblong-lanceolate, narrowed into the petiole, crenate, softly hairy. Flowers violet, corolla lobes crenate.

Topke gola to Thaglabhanjyang at 4275 m (B. 817).

MYRSINACEAE

Ardisia[1] **floribunda** Wall. ex Roxb. Fl. Ind. 2: 272, 1824; Mez in Pfreich. 9: 107, 1902.

A. neriifolia Wall. FBI. 3: 522, 1882.

Large shrub with leaves obovate lanceolate. Flowers pink borne on erect branches. Common along the banks of streams.

Malta to Num at 1832 m (B. 484).

A. solanacea Roxb. Fl. Ind. 1: 580, 1832 et Pl. Cor. 1 : t. 27, 1795.

A. humilis C. B. Clarke in FBI. 3 : 529, 1882 (non Vahl).

Erect shrub with leaves obovate-oblong, coriaceous. Flowers pink. Common.

Puyia to Jubing at 1527 m (B. 393); Simsara to Phutuk at 1527 m (B. 578); Tinjura forest at 916 m (B. 891).

Maesa macrophylla Wall. in Roxb. Fl. Ind. 2 : 234, 1832; FBI. 3 : 510, 1882; Mez in Pfreich. 9 : 33, 1902.

A big shrub, branches pubescent. Leaves elliptic, serrate. Occasional.

Nepali name : 'Bhokata'.

Mulkote to Khurkote at 763 m (B. 127); Okhaldunga to Reserve forest at 1985 m (B. 187).

Myrsine semiserrata Wall. in Roxb. Fl. Ind. 2: 293, 1824; FBI. 3 : 511, 1882; Mez in Pfreich. 9: 339, 1902.

Small tree, with leaves lanceolate. Flowers small 2.5-3 mm in diameter, white, turning brown on drying. Occasional.

Nepali name : 'Jhingni'.

Patek to Tinjura forest at 2137 m (B. 876); Dingla to Bhojpur at 2748 m (B. 905).

SAPOTACEAE

Madhuca butyracea (Roxb.) Macbr. in Contrib. Gray Herb. n.s. 53 : 18, 1918; Bor, Man. Ind. For. Bot. 232, 1953.

Bassia butyracea Roxb. in Asiat. Res. 8: 477, 1805; FBI. 3: 546, 1882.

A tall tree 12 m tall. Leaves obovate or obovate-oblong, tomentose when young. Flowers not seen; fruit a berry, edible. Common.

[1] *Ardisia* Swartz. 1788 is conserved against *Kathouteka* Adans. 1763, *Vedela* Adans. 1763; *Icacorea* Aubl. 1775; and *Bladhia* Thunbg. 1781.

Nepali name : 'Chawri'.

Dhulikhel to Kuwapani at 1525 m (B. 70).

An oil is extracted from the seeds which is largely used for burning.

EBENACEAE

Diospyros peregrina Gurke in Pfam. 4(1): 164, 1891; Bor, Man. Ind. For. Bot. 45, 1953.

D. embryopteris Pers.; FBI. 3: 556, 1882.

A dense tree with glabrous branchlets, evergreen. Leaves oblong. Flowers slightly yellowish. Ripe fruits covered with a red tomentum.

Dingla at 1525 m (B. 910).

Only planted trees seen by me,but informed by the locals that there are wild specimens in the forest.

SYMPLOCACEAE

Symplocos caudata Wall. ex A. DC. Prodr. 8: 256, 1844; FBI. 3 : 577, 1882; Brand in Pfreich. 6: 42, 1901.

Shrub, sometimes 4 m tall; leaves lanceolate-caudate, chartaceous. Flowers light yellow; fruit ovoid cylindric. Common.

Nepali name : 'Aul-kharana'.

Raksha to Ething at 1525 m (B. 714); Papung at 2440 m (B. 765); Surkenagi to Jorpati at 2290 m (B. 852).

FBI gives the distribution of this species from Sikkim, Khasia to Chittagong.

S. dryophila C. B. Clarke in Hook. f. Fl. Brit. Ind. 3: 578, 1882; Brand in Pfreich. 6: 42, 1901.

Tree with glabrous branchlets. Leaves narrowly obovate-lanceolate, base cuneate. Flowers light yellow; fruits subglobose, smooth. Occasional.

Above Ething at 2595 m (B. 707, 719).

S. ramosissima Wall. ex A. DC. Prodr. 8: 257, 1844; FBI. 3: 577, 1882; Brand in Pfreich. 6: 53, 1901.

A small tree; leaves oblong-lanceolate, acuminate, serrulate. Flowers pale yellow; fruit ellipsoid. The most common species.

Nepali name : 'Kharane'.

Chaubas to Pheda at 1375 m (B. 616); Bhitrikhani at 1832 m. (B. 690); Patek-Tinfura forest at 2135 m (B. 875); Dingla to Ghorebisa at 2440 m (B. 908).

S. sumuntia Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 145, 1825; FBI. 3: 578, 1882; Brand in Pfreich. 6: 60, 1901.

A small tree with glabrous branchlets. Leaves oblong-lanceolate acuminate, crenulate. Fruit ovoid-cylindric, smooth. Occasional.

Rhingmo to Jubing at 2443 m (B. 284); also at 2290 m (B. 294); Kathmandu valley at 1350 m (B 59/2).

S. theifolia D. Don Prodr. Fl. Nep. 145, 1825; FBI. 3: 575, 1882; Brand in Pfreich. 6: 66, 1901.

A tall tree about 15 m; leaves oblong-lanceolate, faintly serrulate, coriaceous, nerves indistinct.

Phaplu to Rhingmo at 2900 m (B. 258); Makaibari to Kalinchok at 2290 m (B. 1026).

OLEACEAE

Fraxinus floribunda Wall. ex Roxb. Fl. Ind. 1: 150, 1820; FBI. 3: 605, 1882.

A large tree; leaves unequally pinnate, leaflets 3-4 pairs, acuminate, serrulate. Flowers greenish-white. Occasional.

Nepali name : 'Lakuria also Laraklee'.

Bhadgaon to Dhulikhel at 1375 m (B. 40).

Jasminum dispermum Wall. ex Roxb. Fl. Ind. 1: 99, 1820; FBI. 3: 602, 1882.

Scandent shrub; leaves opposite, 3-5 foliate. Flowers white, fragrant. Occasional.

No data, no number.

Jasminum humile Linn. var. **glabrum** (DC.) Kobuski in Journ. Arn. Arb. 20: 407, 1939.

Shrubs with leaflets 7-13, terminal leaflet quite caudate. Inflorescence few-flowered, flower yellow. Occasional.

Ramachapp to Deorali at 1525 m (B. 141); Chandragiri at 1830 m. (B. 83/2).

Ligustrum confusum Decne. in Nouv. Arch. Mus. 2(2) : 24, 1879; FBI. 3: 616, 1882.

Small tree with leaves elliptic-lanceolate. Flowers in clusters white; corolla-tube as long as the calyx. Occasional.

Kathmandu at 1220 m (B. 23).

The distribution of this species is from Sikkim, Bhutan to Khasia.

Osmanthus suavis King ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 3: 607, 1882.

Shrubby with leaves lanceolate, crenate, coriaceous.

Jubing to Puyia at 2748 m (B. 316).

FBI gives the distribution of this species in Sikkim and East Nepal-Tamur valley. My specimen 316 comes further west 86°40′ E.

APOCYNACEAE

Alstonia[1] **neriifolia** D. Don, Prodr. Fl. Nep. 131, 1825; FBI. 3: 642, 1882.

A shrub 2-3 m tall; leaves mostly opposite, also 3-4 in a whorl, lanceolate, acuminate. Flowers abundant.

Wapsakhani to Bhulu at 1525 m (B. 408).

FBI mentions of this species occurring in Nepal near the Sikkim frontier on dry rocks. The present collection shows of the west-ward extension of the species. (86°45′E).

Beaumontia grandiflora (Roxb.) Wall. Tent. Fl. Nep. t. 7, 1824; FBI. 3: 660, 1882.

Echites grandiflora Roxb. Pl. Cor. 3: 78, t. 281, 1819 (excl. fruit); et. Fl. Ind. 2: 14, 1832.

Large twinner, branches rusty pubescent. Flowers large, trumpet-shaped, white. Common.

Banepa to Dolaghat at 1068 m (B. 608).

Holarrhena antidysenterica Wall. ex A. DC. Prodr. 8: 413, 1844; FBI. 3: 644, 1882.

H. antidysenterica Wall. Cat. 1672, 1829.

Nerium antidysentericum Linn. Sp. Pl. 209, 1753 (nomen ambiguum).

Small tree with bark pale; leaves shortly petioled, elliptic-oblong. Flowers white in terminal or axillary cymes. Common.

Aisyalukherka to Banepani at 1525 m (B. 425); Chainpur to Mialay at 916 m (B. 552) also Dharanbazar to Dhankuta at 610 m (B. 867).

Rauvolfia serpentina (Linn.) Benth. ex Kurz For. Fl. Burm. 2: 171, 1877; FBI. 3: 632, 1882.

Ophioxylon serpentinum Linn. Sp. Pl. 1043, 1753.

A small shrub; leaves elliptic-lanceolate or obovate. Flowers white or slightly pinkish; drupes black.

Dharanbazar to Dhankuta at 916 m (B. 870).

Trachelospermum axillare Hk. f. in Fl. Brit. Ind. 3: 568, 1882; Rehder in Journ. Arn. Arb. 15: 310. 1934; Kanjilal et al Fl. Assam 3: 272, 1939.

A stout climbing shrub with leaves oblanceolate, or elliptic, apex acuminate or abruptly caudate-acuminate. Flowers said to be dull-purple; fruit long, curved, pubescent. Occasional.

Lebang to Tenkhu at 1058 m (B. 756).

FBI gives the distribution as Sikkim, only, but in later years it has been collected from Shillong (Assam), and in Herb. D.D. there are 3 sheets from Garhwal collected by Osmaston.—D. D. nos. 14255,

[1] *Alstonia* R. Br. 1809 is conserved against *Alstonia* Scop. 1777; *Alstonia* Mutis in L. f. Suppl. 1781; and *Pala* Juss. 1810.

20424 and 20425. Its range of distribution is from Sikkim and Hupeh (China) as given by Rehder (loc. cit.). With the present information the range is extended further west. Hooker (loc. cit.) gives the shape of the lamina as oblanceolate, obovate or elliptic-oblong; tip abruptly caudate-acuminate, 1·25 cm long. A closer examination of all the sheets in Herb. Calcutta and Herb. Dehra Dun reveals that the sheets can be sorted out into two sets. The flowering specimens have the leaves oblanceolate, apex caudate-acuminate and the lateral veins are few and far apart (Fig. 6 A). The fruiting specimens have the leaves elliptic or elliptic-oblong, apex is acuminate and gradually tapering and the lateral veins are many and close (Figs. 6 B, C & D).

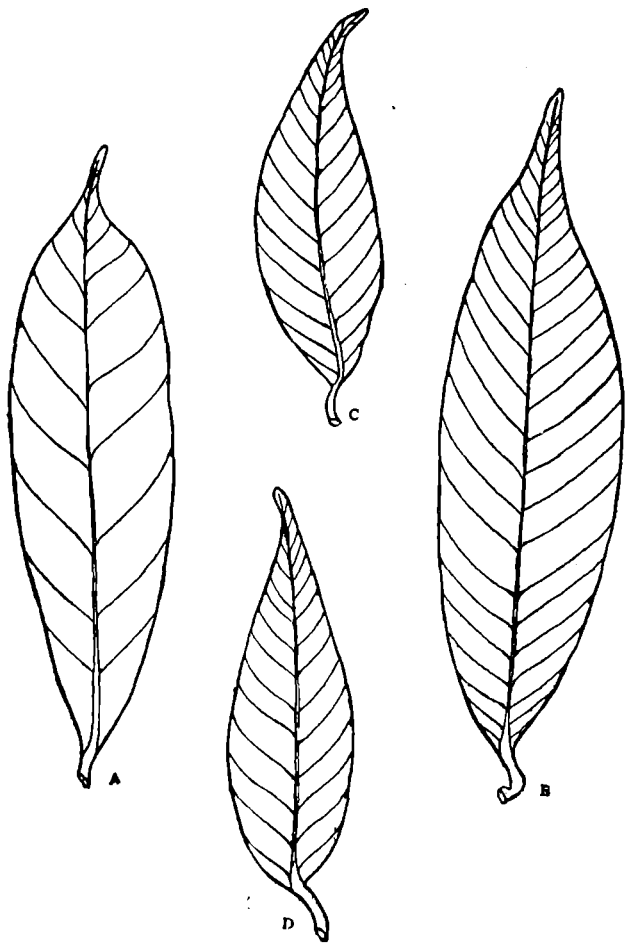

Fig. 6. *Trachelospermum axillare* Hk. f.
A. Leaf from a flowering specimen × ¾.
B to D. Leaves from fruiting specimens × ¾.

Specimens examined :

Flowering specimens : SIKKIM—Hooker (no data); King's collector; Gamble 3216 F, 9794; no name (no data) (six sheets in all).

Fruiting specimens : SIKKIM—King 2118; no name (no data).
LEBONG—Kurz (no data); Clarke 821B.
TISTA—Clarke 227.
NEPAL—Banerji 756. (twelve sheets in all).
GARHWAL—Osmaston, D.D. nos. 14255, 20424 & 20425.

Scarcity of material does not allow further analysis.

Trachebspermum lucidum (D. Don) K. Schum. in Pfam. 4(2): 173, 1895; Cowan, Tr. North Beng. 90, 1929.

Alstonia lucida D. Don Prodr. Fl. Nep. 231, 1825.

T. fragans Hk. f. in Fl. Brit. Ind. 3: 667, 1882; Kanjilal et al. Fl. Assam 3: 271, 1939.

A tall climber with leaves elliptic-lanceolate. Flowers white; follicles incurved and converging. Occasional.

Hatia to Hongoan at 2135 m (B. 519); Lebang to Tenkhu at 1068 m (B. 755).

Vallaris solanacea (Roth) O. Kuntze, Rev. Gen. 417, 1891.

Peltanthera solanacea Roth, Nov. Sp. Pl. 132, 1821.

V. heynei Spr. FBI. 3: 650, 1882.

Twinning shrub; leaves elliptic or oblong or linear-oblong. Flowers white, fragrant. Common.

Deorali to Narkata at 1068 m (B. 146); Dharanbazar to Dhankuta at 916 m (B. 869); Phedim to Moktara at 763 m (B. 731).

ASCLEPIADACEAE

Asclepias curassavica Linn. Sp. Pl. 215, 1753; FBI. 4: 18, 1883.

Erect herbs, with leaves mostly opposite but sometimes whorled also alternate. Flowers orange-red, corolla-lobes reflexed. Common.

Num to Hedagna at 1525 m (B. 490); Phedim to Moktara at 1375 m (B. 739).

Ceropegia longifolia Wall. Pl. Asiat. Rar. 1, 56, t. 73, 1830-32; FBI. 4: 68, 1883.

Stem twinning, with a line of pubescence, leaves linear-lanceolate. Flowers green, corolla with purple spots. Rare.

Umling to Terathum at 2595 m (B. 561).

Hoya lanceolata Wall. ex D. Don, Prodr. Fl. Nep. 130, 1825.

Epiphytic herb, branches long and pendulous. Leaves ovate-lanceolate, somewhat trapezoid. Flowers white. Common.

Hedagna to Gola at 2135 m (B. 502).

H. longifolia Wall. in Wight, Contrib. 36, 1834; FBI. 4: 56, 1883.

Epiphytic, branches long and pendulous. Leaves oblanceolate, very fleshy. Flowers white. Occasional.

Gola to Hatia at 1985 m (B. 514).

Marsdenia tenacissima (Roxb.) Moon. Cat. Pl. Cey. 21: 21, 1824; Wt. & Arn. in Wight, Contrib. 41, 1834; FBI. 4: 35, 1883.

Asclepias tenacissima Roxb. Cor. Pl. 3: 35, t. 240, 1819.

Twinner, stem stout, branches velvety. Leaves broadly ovate. Flowers yellowish. Occasional.

FBI gives the distribution of this species as Western Himalayas; while my specimens have been collected at 87°20′ E.

Telosma pallida (Roxb.) Craib in Kew Bull. 1911: 418, 1911.

Asclepias pallida Roxb. Fl. Ind. 2: 48, 1832.

Pergularia pallida Wt. & Arn. Contrib. 42, 1834; FBI. 4: 38, 1883.

A twinning undershrub. Leaves ovate-cordate. Flowers pale yellowish; follicles lanceolate, turgid. Abundant.

Khurkot to Ramechappe at 763 m (B. 132); Phedim to Moktara at 763 m (B. 730).

Tylophora rotundifolia Buch.-Ham. ex Wight, Contrib. 50, 1834; FBI. 4: 43, 1883.

Twinner, stem pubescent. Leaves orbicular or broadly ovate. Inflorescence a many flowered umbellate cyme. Calyx segments hirsute, coronal process not pointed at the apex. Occasional.

Terathum at 1220 m (B. 571).

Tylophora wallichii Hk. f. in Fl. Brit. Ind. 4: 45, 1883.

Twinner, stem stout, sparsely pubescent. Leaves oblong or ovate-oblong, thick, coriaceous. Inflorescence few flowered, umbellate cyme. Calyx segments pubescent, coronal processes absent. Occasional.

Dhupu to One at 763 m (B. 541).

GENTIANACEAE

Crawfurdia speciosa Wall. Tent. Fl. Nep. 64, t. 48, 1826; FBI. 4: 106, 1883.

Twinner, leaves opposite, base cuneate. Flowers blue. Common.

Kalinchok at 2748 m (B. 1019).

Gentiana albicalyx Burkill in Journ. Asiat. Soc. Beng. n.s. 2: 314, 1906.

Small herbs about 1 cm high. Leaves orbicular spathulate, margins white. Flowers densely aggregated, purplish. Occasional.

Kalinchok at 2664 m (B. 629).

This species is known from Tibet, Chumbi and Sikkim. The present collection shows the westward extention of the species.

G. ornata Wall. ex Griseb. Gentian. 27, 1845; FBI. 4: 116, 1883.

Root elongated, branches many and curved. Flowers blue; corolla funnel-shaped. Occasional.

Lamjura at 3665 m (B. 1059); Kalinchok at 3665 m (B. 1126).

G. pedicellata Wall. ex Griseb. Gentian. 273, 1845; Blatter Beau. Fl. Kash. 2: 41, 1928.

G. quadrifaria C. B. Clarke : FBI. 4: 111, 1883.

Stem numerous, 5-10 cm erect. Radical leaves rosulate, persistent, cauline leaves ovate, often squarrose. Flowers blue. Common.

Bhadgaon to Dhulikhel at 1375 m (B. 41).

Halenia[1] **elliptica** D. Don in Trans. Linn. Soc. 17: 529, FBI. 4: 130, 1883.

Erect glabrous herb, stem 4-angled, slightly winged. Flowers pale blue; corolla lobes produced downwards into a straight spur. Abundant.

Namdu to Sikrigaon at 2443 m (B. 1037).

Swertia alata Royle ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 4: 125, 1883.

Stem about ·5 m high, branches winged. Leaves ovate, acute. Calyx and corolla 4 lobed. Corolla greenish-yellow, purple dotted; one gland on each lobe, gland fringed. Occasional.

Kathmandu valley at 1350 m (B. 32/2 and 39/2).

S. angustifolia Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 127, 1825; FBI. 4: 125, 1883.

Stem ·5 to 1 m tall, branched narrowly winged. Leaves linear-lanceolate. Flowers yellow. Calyx and corolla 4-lobed, corolla with one gland on each lobe. Common.

Banepa to Dolaghat at 1375 m (B. 928); Chaubas to Risingo at 1985 m (B. 953).

S. angustifolia Buch.-Ham. var. **pulchella** (Buch.-Ham.) Burkill in Journ. Asiat. Soc. Beng. (n.s.) 2: 375, 1906.

S. pulchella Buch.-Ham. : FBI. 4: 125, 1883.

Plants about 30 cm tall. Sepals shorter than the petals. Abundant.

Chaubas to Risingo at 1985 m (B. 954); Junbesa to Phaplu at 1832 m (B. 1121).

S. angustifolia Buch.-Ham. var. **wallichiana** Burkill, ibid. 2 : 376, 1906.

Plants tall. Sepals linear-lanceolate exceeding the petals or equalling them, very conspicuous. Common.

Namdu to Sikrigaon at 1832 m (B. 1028); Chandragiri at 1985 m (B. 91/2).

[1] *Halenia* Borkh. 1796 is conserved against *Tetragonanthus* S. G. Gmel. 1769 pro. Synon.

Swertia dilatata C. B. Clarke in Hook. f. Fl. Brit. Ind. 4 : 122, 1883.

Stem about ·5 m tall. Leaves lanceolate, glabrous. Flowers blue. Calyx and corolla 5-lobed; corolla shorter than the calyx. Corolla with a complete ring at its base, one gland on each lobe. Abundant.

Kalinchok at 3360 m (B. 998).

S. nervosa Wall. ex Griseb. Gentian. 317, 1845 ; FBI. 4 : 125, 1883.

Stem ·5 to 1 m tall, 4 angled, slightly winged. Leaves elliptic-lanceolate. Flowers yellowish green. Calyx and corolla 4 lobed ; calyx lobes long and lanceolate corolla much shorter than the calyx. Corolla purple dotted, one gland on each lobe, large. Rare.

Pheda to Charikot at 1068 m (B. 980).

S. purpurascens Wall. ex C.B. Clarke in Hook. f. Fl. Brit. Ind. 4 : 121, 1883.

Stem ·5 to 1 m tall, branches spreading. Leaves oblong. Flowers purple ; calyx and corolla 5 lobed ; corolla bigger than calyx; corolla with a dark complete ring at its base ; one gland on each lobe. Common.

Pheda to Charikot at 1068 m (B. 979) ; Kalinchok at 2748 m (B. 1024).

BORAGINACEAE

Ehretia laevis Roxb. Pl. Cor. 1 : 42, t. 56, 1795 ; FBI. 4: 141, 1883; Kanjilal et al. Fl. Assam 3 : 333, 1939.

Tree about 10 m tall. Leaves ovate-elliptic or obovate, base unequally cuneate. Inflorescence appearing before leaf-renewal ; flowers white. Common.

Nepali name : 'Datingal'.

Nepalthoke to Mulkote at 763 m (B. 116).

E. wallichiana Hk. f. & Th. ex Gamble, List Darj. Tree 57, 1878 ; FBI. 4 : 143, 1883 ; Pfam. 4(3A) : 88, 1897 ; Kanjilal et al. Fl. Assam 3: 334, 1939.

A tree with leaves elliptic, acuminate. Flowers white, fragrant. Occasional.

Mulkote to Khrukote at 610 m (B. 129).

The distribution is from Sikkim, Bhutan and Assam. My specimens have been collected further west—86°E.

Hackelia glochidiata (A. DC.) A. Brand in Pfreich. 97 : 119, 1931.

Echinospermum glochidiatum A. DC. in DC. Prodr. 10 : 136, 1846.

Paracaryum glochidiatum Benth. FBI. 4: 161, 1883.

Hairy herb, hairs lax. Radical leaves cordate-ovate, cauline leaves distinctly petioled, orbicular to elliptic-lanceolate. Flowers blue. Occasional.

Chempua to Sandakphu at 3360 m (B. 866).

Heliotropium strigosum Willd. Sp. Pl. 1 : 743, 1798 ; FBI. 4 : 151, 1883.

Herb, pubescent. Leaves linear-lanceolate. Flowers white. Common.

Chainpur to Mialay at 1068 m (B. 548).

Trigonotia ovalifolia Benth. ex C. B. Clarke in Hook. f. Fl. Brit. Ind. 4 : 172, 1883.

Prostrate herb with leaves ovate, strigose on both surfaces. Flowers white. Abundant.

Chempua to Sandakphu at 13216 m (B. 865).

CONVOLVULACEAE

Argyreia wallichii Choisy, Convolv. Or. 39, 1834 ; DC. Prodr. 9 : 331, 1845 ; FBI. 4 : 187, 1883.

A large climber ; leaves large, ovate-cordate, wrinkled above. Flowers white, slight pinkish. Common.

Chainpur to Mialay at 1068 m (B. 549).

Ipomea eriocarpa R. Br. Prodr. 484, 1810 ; FBI. 4 : 254, 1883.

Hairy, twinner, Leaves lanceolate, deeply cordate. Flowers small, pink. Common.

Tamba Kosi ghat at 610 m (B. 1106).

Ipomea quamoclit Linn. Sp. Pl. 159, 1753 ; FBI. 4 : 199, 1883.

A slender glabrous twinner. Leaves pinnate, segments numerous linear. Flowers crimson. Abundant.

Banepa to Kolaghat at 916 m (B. 927).

Porana stenoloba Kurz in Trimen, Journ. Bot. 136, 1873 ; FBI. 4 : 221, 1883.

An extensive pubescent climber. Leaves shallowly cordate, minutely hairy. Flowers blue. Rare.

Mura to Okhaldunga at 2137 m (B. 1076).

SOLANACEAE

Mandragora caulescens C. B. Clarke in Hook. f. Fl. Brit. Ind. 4 : 242, 1883.

Perennial. Leaves narrowly obovate-oblong, sinuate. Flower large, purple, corolla campanulate and with reticulations.

Topke gola at 3970 m (B. 802); also seen in Namchebazar area but without flowers.

FBI gives the distribution of this species as Alpine Sikkim only.

Solanum indicum Linn. Sp. Pl. 187, 1753 ; FBI. 4 : 235, 1883.

A much branched undershrub, *ca* 1 m tall, very prickly. Leaves ovate-sinuate, woolly beneath, nerves prickly. Flowers light blue ; berry yellow. Common.

Baspani to Patkora at 1830 m (B. 432).

SCROPHULARIACEAE

Centranthera nepalensis D. Don, Prodr. Fl. Nep. 88, 1825; Pennell, Scroph. W. Himal. 93, 1943 ; Santapau in Journ. Bombay nat. Hist. Soc. 49 : 46, 1950.

C. hispida Br. FBI. 4 : 301, 1884.

Shrubby, hoary. Leaves linear-oblong. Flowers pink-purple. Occasional.

Namdu to Sikrigaon at 1220 m (B. 1030).

Hemiphragma heterophyllum Wall. in Trans. Linn. Soc. Lond. 13 : 611, 1822 ; FBI. 4 : 289, 1884 ; Pennell Scroph. W. Himal. 62, 1943.

A prostrate pubescent herb. Leaves orbicular cordate, membraneous, hairy on both surfaces. Flowers pink, sessile. Abundant.

Okhaldunga to Patala at 1748 m (B. 241); Kalinchok at 3360 m (B. 630).

Lindenbergia grandiflora (Buch.-Ham.) Benth. Scroph. Ind. 22, 1835 ; FBI. 4 : 261, 1884 ; Pennell Scroph. W. Himal. 24, 1943.

Stemodia grandiflora Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 89, 1825.

A half climbing rambling herb, softly hairy. Leaves pubescent on both surfaces. Flowers bright yellow. Rare.

Pheda to Charikot at 1975 m (B. 982).

L. indica (L.) O. Kuntze Rev. Gen. Pl. 462, 1891 ; Santapau in Journ. Bombay nat. Hist. Soc. 49 : 45, 1950.

L. urticaefolia Lehm. : FBI. 4 : 262, 1884.

Stem 10-20 cm high, branched, tufted, hairy. Leaves broadly ovate crenate-serrate, villose on both the surfaces. Flowers yellow. Occasional.

Kathmandu valley at 1350 m (B. 65/2) ; Okhaldunga to Chayanum at 1375 m (B. 1095).

L. ruderalis Voigt, Hort. Suburb. Calcutta 501, 1845 ; Kanjilal et al. Fl. Assam 3 : 378, 1939 ; Pennell Scroph. W. Himal. 25, 1943.

Annual pubescent herb with aromatic odour. Leaves ovate. Flowers blue. Occasional.

Bhitrikhani at 1220 m (B. 696); Okhaldunga to Chayanum at 1375 m (B. 1096).

Lindernia anagallis (Burm.) Pennell in Journ. Arn. Arb. 24 : 252, 1943, et Scroph. W. Himal. 31, 1943 ; Mukerjee in Journ. Indian Bot. Soc. 24 : 133, 1945; Santapau in Journ. Bombay nat. Hist. Soc. 49 : 39, 1950.

Ruellia anagallis Burm. Fl. Ind. 135, 1768.

Bonnaya veronicaefolia Spr. Syst. 1 : 41, 1828 ; FBI. 4 : 285, 1884.

Stem creeping, branches long and slender. Leaves oblong-lanceolate. Flowers light blue Occasional.

Banspani to Patkaru at 1832 m (B. 431); Namsaling to Gorkha at 1220 m (B. 594); Junbesa to Phaplu at 1220 m (B. 1125).

L. ruelloides (Colsm.) Mukerjee in Journ. Indian Bot. Soc. 24: 133, 1945; Santapau in Journ. Bombay nat. Hist. Soc. 49: 39, 1950.

Gratiola ruelloides Colsm. Prodr. Desc. Gratiol. 12, 1793.

Bonnaya reptans Spr. FBI. 4: 285, 1884.

Prostrate creeping herb. Leaves in distant pairs. Flowers light purple. Occasional.

Okhaldunga to Chayanum at 1527 m (B. 1091).

Melasma arvense (Benth.) Pennell Scroph. W. Himal. 92, 1943.

Glyssostylis arvensis Benth. Scroph. Ind. 49, 1835.

Alectra indica Benth. in DC. Prodr. 10: 339, 1846; FBI. 4: 297, 1884.

Erect rigid herb, scabrid. Leaves sessile, ovate-lanceolate. Flowers yellow, bracts longer than the flowers. Rare.

Pheda to Charikot at 1070 m (B. 985).

Mimulus tenellus Bunge, Enum. Pl. Chin. Bor. 40, 1833.

M. nepalensis Benth. Scroph. Ind. 22, 1835; FBI. 4: 258, 1884.

Prostrate herb, with leaves ovate. Flowers axillary, solitary, yellow; calyx 5 toothed, corolla bilipped. Abundant along streams and torrents.

Malibote to Simsara at 1220 m (B. 576); Namsaling to Gorkha at 1220 m (B. 597).

Pedicularis bifida (Buch.-Ham.) Pennell, Scroph. W. Himal. 144, 1943.

Rhinanthus bifidus Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 94, 1825.

P. carnosa Wall. Fl. Asiat. Rar. 2: 44, t. 154, 1831; FBI. 4: 313, 1884.

Herbs roughly pubescent. Leaves alternate, oblong, crenate. Flowers pink-purple. Occasional.

Sikrigaon to Those at 1832 m (B. 1038).

P. furfuracea Wall. ex Benth. Scroph. Ind. 52, 1835; FBI. 4: 316, 1884; Prain in Ann. Roy. Bot. Gard. Calc. 3: 147, t. 16, 1891.

Stem *ca* 1/2 m branched with two lines of hairs. Leaves pinnatisect. Flowers pale pink; calyx tubular, split on one side, corolla tip recurved. Occasional.

Hongaon to Poptila at 2440 m (B. 525).

P. gracilis Wall. ex Benth. Scroph. Ind. 52, 1835; FBI. 4: 307, 1884; Pennell Scroph. W. Himal. 131 1943.

Stem much branched with 4 lines of hairs. Leaves whorled, pinnatifid. Flowers pink-purple; calyx irregularly toothed; corolla tip straight. Common.

Kalinchok at 3522 m (B. 987); Namdu to Sikrigaon at 2443 m (B. 1035); Lamjura at 3054 m (B. 1114); Junbesa to Phaplu at 2135 m (B. 1122).

P. longiflora Rudolph in Mem. Acad. Petersb. 4 : 345. t. 3, 1811; Blatter, Beau. Fl. Kash. 2: 100, 1928.

P. tubiflora Fisch. FBI. 4: 314. 1884.

Stem 3-20 cm tall, hairless; radical leaves many, pinnately cut. Flowers rose-pink; bracts leafy; corolla tube 4-5.5 cm long. Occasional.

Kalinchok at 3360 m (B. 1002).

Pedicularis regeliana Prain in Ann. Roy. Bot. Gard. Calc. 3: 191, 1890.

Small, stem rhizomatous. Leaves pinnatisect, segments 4-7 pairs. Flowers axillary long pedicellate, purple. Posterior corolla lobe 3-lobed, lobes rounded. Rare.

Lamjura at 3665 m (B. 1053).

We have critically examined our specimen and have found that it is not *P. pseudoregeliana* Tsoong although this taxa is described on material collected from Nepal [Bull. Brit. Muse. (nat. Hist.) Bot. 2: 11, 1955].

Sibthorpia pinnata Benth. in Hook. f. Fl. Brit. Ind. 4: 288, 1884.

Creeping herb, hairy. Leaves alternate, pinnatifid. Flowers axillary, small, white. Common.

Raksha to Ething at 2750 m (B. 709).

FBI gives Nepal only but later collections have been made from Sikkim by Lister, Gamble, Clarke and King.

Striga euphrasioides (Vahl) Benth. in Comp. Bot. Mag. 1: 364, 1836; FBI. 4: 299, 1884; Pennell Scroph. W. Himal. 97, 1943.

Buchnera euphrasioides Vahl Symb. Bot. 3: 81, 1794.

Scabrid herb. Leaves linear. Flowers white and distant. Common.

Okhaldunga to Chayanum at 1527 m (B. 1086).

Veronica cana Wall. ex Benth. Scroph. Ind. 45, 1835; FBI. 4: 295, 1884; Pennell Scroph. W. Himal. 87, 1943.

Herb, stem slender, pubescent. Leaves ovate or ovate-cordate in distant pairs. Flowers blue. Abundant.

Umling to Terathum at 2900 m (B. 567); Papung at 3054 m (B. 770).

Pennell (loc.cit.) expresses that this species 'must really be from lower Southern foot-hills in Nepal'. My specimens do not come from the foot-hills but from the middle Himalaya.

OROBANCHACEAE

Aeginetia indica Linn. Sp. Pl. 632, 1753; FBI. 4: 320, 1884.

Parasitic; scapes several, 15-30 cm tall with a few scales at the base. Flowers solitary, corolla. Common on the roots of Agave.

Dolaghat to Chaubas at 1068 m (B. 947).

Boschniackia himalaica Hk. f. & Th. in Fl. Brit. Ind. 4: 327, 1884.

Leafless herbs, stem 15-30 cm tall, erect, scally. Flowers in dense spike, pale yellow. Common in Rhododendron forests.

Namchebazar to Tarangan at 3970 m (B. 331); also seen in the Rhododendron forests in Topke gola areas.

This parasite is reported from Garhwal and Kumaon in the west and Sikkim in the east. The present record fills the gap.

LENTIBULARIACEAE

Utricularia bifida Linn. Sp. pl. 18, 1753; FBI. 4: 332, 1884.

Small herbs, scape 5-10 cm erect. Flowers solitary, yellow; lower lip of corolla ·5 cm spur curved. Occasional in rice fields.

Risingo to Pheda at 1220 m (B. 969).

GESNERIACEAE

Aeschynanthus ramosissima Wall. Pl. Asiat. Rar. 1: 55, t. 71, 1830-32; FBI. 4: 339, 1884.

Epiphyte, glabrous, with leaves broadly lanceolate. Pedicels clustered, flower red; corolla on 2.5 cm long. Occasional.

Reserve forest. Okhaldunga at 2135 m (B. 205); Saddle to Dingla at 1525 m (B. 449).

Chirita urticaefolia Buch.-Ham. in D. Don, Prodr. Fl. Nep. 90, 1825; FBI. 4: 358, 1884.

Stem 20-40 cm high; upper part hairy. Leaves opposite, unequal. Flowers purple; corolla funnel-shaped. Rare but in Sunderijal area (Kathmandu) it is abundant in moist shady places.

Kathmandu valley at 1350 m (B. 25/2); Chandragiri at 1832 m (B. 99/2); Namdu to Sikrigaon at 1832 m (B. 1031).

My specimens show variations of the calyx-lobed, which may be triangular-lanceolate or linear-lanceolate.

Didissandra[1] **lanuginosa** C. B. Clarke in DC. Mon. Phan. 5: 66, 1883; FBI. 4: 355, 1884 (p.p.); Craib in Notes Roy. Bot. Gard. Edin. 11: 255, 1918-19.

Stemless herb with leaves ovate, crenate, upper surface wrinkled, lower densely hairy. Flower pale-purple. Abundant.

Num to Hedagna at 1525 m (B. 492).

My material from East Nepal shows the eastward extension as Craib (loc. cit.) gives the distribution as North Western Himalayas—Kumaon, Bashahr, Ushan Valley.

Didissandra sp. (affinis *sericeae* Craib in Notes Roy. Bot. Gard. Edin. 11: 248, 1919).

My specimen B. 673 has leaves oblong to lanceolate-ovate and are sericeous above, flowers were purple. It has been collected from open dry situations on rocks, between Khera and Those at 2443 m altit.

Didymocarpus[2] **oblonga** Wall. Pl. Asiat. Rar. 2: 34, t. 140, 1830-32, FBI. 4: 347, 1884.

Stem 5-10 cm high, villose-pubescent. Leaves 4 at the apex, oblong or elliptic. Flowers small, dark purple. Occasional.

Khandbari to Malta at 1525 m (B. 480): Topke gola at 3054 m (B. 782).

A close examination of the sheets in Calc. Herb. show that Wall. 783 and Hooker's sheet (No number) match each other, while the other sheets—Smith & Cave 914 and 2954, Younghusband (No number), King's collector (No number) and Prain's sheet match my specimens B. 480 & B. 782.

D. podocarpa C. B. Clarke in DC. Mon. Phan. 5: 76, 1833; FBI. 4: 347, 1884.

Stem 5-16 cm high, light grey pubescence. Leaves 4 at the apex, ovate or elliptic. Peduncles pinkish, flower large, purple. Occasional.

Ething at 2440 m (B. 720).

All the sheets deposited in Herb. Calc. are from East Himalayas and B. 720 has been collected from 87°50′ E. 27°5′N.

Rhynchoglossum obliquum Bl. Bijd. 741, 1825; FBI. 4: 367, 1884.

A succulent herb, usually ·5 m tall. Leaves alternate, unequal sided. Flowers generally blue, rarely white; corolla tube cylindric, contracted at the mouth. Occasional.

Pheda to Charikot at 1220 m (B. 968).

ACANTHACEAE

Aechmanthera tomentosa Nees var. **wallichii** C. B. Clarke in Hook. f. Fl. Brit. Ind. 4: 428, 1884.

Small shrub, stem and leaves glabrate, sparsely hairy. Flowers blue. Occasional.

Pheda to Charikot at 916 m (B. 983).

Barleria cristata Linn. Sp. Pl. 636, 1753; FBI. 4: 488, 1884.

An erect undershrub. Leaves oblong or elliptic, yellow-hairy. Bracteoles linear-lanceolate, toothed. Flowers purple-blue; outer sepals spinescent. Occasional.

Kathmandu valley at 1350 m (B. 73/2).

Dicliptera[3] **roxburghiana** Nees in Wall. Pl. Asiat. Rar. 3: 110, 1832: FBI. 4:553, 1885.

Herb nearly glabrous with leaves elliptic. Flowers axillary clusters, pink, spotted. Occasional.

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[1] *Didissandra* C. B. Clarke 1883 is conserved against *Ellobum* Bl. 1826.

[2] *Didymocarpus* Wall. 1819 is conserved against *Rottlera* Vahl 1805.

[3] *Dicliptera* Juss. 1807 is conserved against *Diapendium* Ch. Koen. 1805.

Okhaldunga to Reserve forest at 2135 m (B. 195).

Echinanthus attenuatus Nees in Wall. Pl. Asiat. Rar. 3: 90, 1831; FBI. 4: 414, 1884.

Erect herb, generally ·5 m tall; pubescent upwards. Leaves broadly elliptic. Flowers dark purple. Common in pine forests.

Chilaune to Narkata at 1068 m (B. 1101); Kuwapani to Banepa at 1375 m (B. 1108).

Strobilanthes atropurpureus Nees in Wall. Pl. Asiat. Rar. 3: 86, 1831; FBI. 4: 472, 1884.

Stem 15-30 cm tall; pubescent; older parts viscid, 4-angled. Flowers blue; corolla tube light blue or even white, curved and broadly dilated. Rare.

Junbesa to Phaplu at 1832 m (B. 1118).

Bremekamp (1944) p. 270 leaves this plant as belonging to an uncertain genus.

Tarphochlamys affinis (Griff.) Brem. in Ned. Akad. van Wet. Verh. (2) 41: 157, 1944.

Adenosma affinis Griff. Notulae 4: 133, 1854.

Strobilanthes acrocephala T. Anders. in Journ. Linn. Soc. 9: 473, 1867, FBI. 4: 454, 1884.

Shrubby; stem hirsute. Leaves ovate, crenate, hirsute. Flowers light purple. Abundant.

Those to Bhandara at 1832 m (B. 1043).

This species is known from Assam only.

Bremekamp in his revision of the *Strobilanthinae* has split the old complex group of *Strobilanthes* into a number of different genera; in his view the genus *Strobilanthes* Bl. *sensu stricto* does not occur in India or in Nepal.

VERBENACEAE

Callicarpa arborea Roxb. Fl. Ind. 1: 390, 1832; FBI. 4: 567, 1885.

Tree with a thick trunk. Leaves ovate to oblong, tomentose beneath. Flower pale-purple. Common.

Dingla to Khandbari at 610 m (B. 459).

Clerodendrum viscosum Vent. Jard. Malm. t. 25, 1803; Santapau in Rec. bot. Surv. India 14: 240, 1953.

Cl. infortunatum auct., non Gaertn.; FBI. 4: 594, 1885.

Shrub about 1 m tall, gregarious, white villose upwards. Flower white. Abundant.

Dingla to Khandbari at 610 m (B. 455).

Cl. serratum (L.) Moon, Cat. 46, 382, 1824; FBI. 4: 592, 1885.

A large shrub with leaves obovate-oblong, serrate. Flowers blue; fruits black. Occasional.

Phedim to Moktara at 1220 m (B. 737).

Cl. japonicum (Thunb.) Sweet, Hort. Brit. 322, 1826; Meeuse in Blumea 5 : 77, 1942.

Volkameria japonica Thunb. Fl. Jap. 255, 1784.

Clerodendrum squamatum Vahl Symb. Bot. 2: 74, 1791; FBI. 4: 593, 1885.

Shrub 1-2 m tall, minutely hairy. Leaves ovate, 15-35 cm in diam. Panicles large, red; flowers scarlet. Occasional.

Moktara to Angbung at 610 m (B. 740).

Phryma leptostachya Linn. Sp. Pl. 601, 1753; FBI. 4: 562, 1885; Kanjilal et al. Fl. Assam 3 : 496, 1939.

A small erect herb. Leaves ovate or ovate-lanceolate, acuminate, dentate-crenate, membranous. Flowers pale-pink, alternately arranged on long slender racemes. Frequent.

Kathmandu valley at 1350 m (B. 33/2).

Phyla nodiflora (L.) Greene in Pittonia 4 : 46, 1899; Santapau in Rec. bot. Surv. India 14 : 237, 1953.

Verbena nodiflora Linn. Sp. Pl. 20, 1753.

Lippia nodiflora Rich. Fl. Bor. Amer. 2:15, 1803; FBI. 4 : 563, 1885.

Creeping herb, rooting at the nodes. Leaves cuneate-spathulate. Peduncles axillary, rarely opposite; flowers pink, minute. Common.

Tinpipli to Nepalthoke at 763 m (B. 99).

Premna barbata Wall. ex Schauer in DC. Prodr. 9 : 636, 1845; FBI. 4: 579, 1885.

Large shrub with leaves oblong or ovate, minutely pubescent beneath. Flowers white. Occasional.

Bhulu to Chhuwa at 916 m (B. 414); Aisyalukherka to Banspani at 916 m (B. 424).

P. interrupta Wall. ex Schauer in DC. Prodr. 9: 633, 1847; FBI. 4: 572, 1885; Merrill in Journ. Arn. Arb. 19:65, 1938.

Small tree *ca* 15 m tall. Leaves sub-sessile, ovate. Spikes densely villose. Flowers white. Frequent.

Khandbari to Malta at 1525 m. (B. 479).

Verbena officinalis Linn. Sp. Pl. 6, 1753; FBI. 4 : 565, 1885.

An erect glabrous herb. Leaves pinnatifid, upper leaves sessile, 3-partite. Flowers small, lilac. Occasional.

Phaplu to Mura at 2443 m (B. 1069).

Vitex negundo Linn. Sp. Pl. 638, 1753; FBI. 4 : 583, 1885.

Shrub, densely grey pubescent. Leaves palmate, leaflets 3-5, lanceolate, lower surface grey pubescent. Flowers blue or purple. Abundant.

Mura to Dhupa at 916 m (B. 536).

LABIATAE

Ajuga lobata D. Don, Prodr. Fl. Nep. 108, 1825; FBI. 4:702, 1885; Mukerjee in Rec. bot. Surv. India 14:224, 1940.

Stoloniferous herb; with leaves broadly oblong-ovate, sinuately lobed. Flowers lilac or violet. Common.

Okhaldunga to Patala at 2595 m (B. 233); Those to Khera at 2748 m (B. 644).

A. microsperma Wall var. **thomsonii** Hk. f. Fl. Brit. Ind. 4 : 704, 1885; Mukerjee in Rec. bot. Surv. India 14:226, 1940.

Stem flaccid, prostrate, rooting at the nodes. Leaves ovate-oblong or obovate, sinuate, crenate base decurrent to the petiole. Flowers blue; calyx teeth rounded. Rare.

Reserve forest, Okhaldunga at 1832 m (B. 218).

This variety has been reported only from Sikkim.

Calamintha umbrosa Fisch. & Mey. Ind. Sem. Hort. Petrop. 6:6, 1846; FBI. 4:650, 1885; Mukerjee in Rec. bot. Surv. India 14:1; 98:1940.

A small procumbent herb, laxly hairy. Leaves ovate, serrate. Flowers in axillary whorls, purplish. Occasional.

Kathmandu valley at 1350 m (B. 97/2).

Pheda to Charikot at 1830 m (B. 620); Bhitrikhani at 1830 m (B. 692); Mura to Okhaldunga at 2130 m (B. 1078).

Colebrookea oppositifolia Sm. Exot. Bot. 2:111, t. 115, 1805; FBI. 4:642, 1885; Mukerjee in Rec. bot. Surv. India 14:84, 1940.

A large shrub on 2-3 m tall; branches grooved, softly tomentose. Leaves oblong-lanceolate. Flowers white. Common.

Dhulikhel to Kuwapani at 1375 m (B. 81).

Coleus forskohlii (Willd.) Briq. in Engl. & Prantl. Pflanzenfam 4(3):359, 1897; Haines Bot. Bih. & Orissa 735, 1922; Mukerjee in Rec. bot. Surv. India 14:53, 1940.

C. barbatus Benth. FBI. 4:625, 1885.

Herb 30-60 cm high. Leaves ovate or obovate, densely pubescent on both surfaces. Flowers blue. Occasional.

Risingo to Pheda at 916 m (B. 972).

Colquhounia coccinea Wall. var. **vestita** Prain : Mukerjee in Rec. bot. Surv. India 14: 155, 1940.

Erect or semi-scandent about 1·5 m tall; dense white tomentum. Flowers orange yellow. Abundant at 2440 m.

Kalinchok at 2595 m (B. 1022); Mura to Okhaldunga at 2290 m (B. 1075).

Elsholtzia blanda Benth. in Wall. Pl. Asiat. Rar. 1:19, 1830; FBI. 4:643, 1885; Mukerjee in Rec. bot. Surv. India 14:1, 1940.

Undershrub, puberulous. Leaves elliptic-lanceolate. Flower white, sweet smelling. Occasional.

Hedagna to Gola at 1220 m (B. 510); Moktara to Angbung at 610 m (B. 742); Namdu to Sikrigaon at 2440 m (B. 1034).

E. fruticosa (D. Don) Rehder, Plant. Wib. 3:381,1916.

E. polystachya Benth. Lab. Gen. et Sp. 161, 1832-36; FBI. 4:643, 1885; Mukerjee in Rec. bot. Surv. India 14:89, 1940.

Bushy plants, branches hoary tomentose. Leaves lanceolate or elliptic-lanceolate. Flowers light yellow. Fragrant. Common.

Kalinchok at 3054 m (B. 1016).

E. strobilifera Benth. Lab. Gen. et Sp. 163, 1832-36; FBI. 4 : 645, 1885; Mukerjee in Rec. bot. Surv. India 14 : 92, 1940.

Herbs small; leaves ovate, sparsely hairy on both surfaces. Flowers pinkish. Occasional.

Lamjura at 3664 m (B. 1060).

Geniosporum coloratum (D. Don) Briq. in Pfam. 4:367, 1897; Mukerjee in Rec. bot. Surv. India 14: 32, 1940.

Plectranthus coloratus D. Don, Prodr. Fl. Nep. 116, 1825.

G. strobiliferum Wall. ; FBI. 4 : 610, 1885.

Erect herbs 60-100 cm high, puberulous. Flowers white ; corolla with purple veins.

No data, no number.

Melissa flava Benth. in Wall. Pl. Asiat. Rar. 1:65, 1830; FBI. 4: 652, 1885; Mukerjee in Rec. bot. Surv. India 14 : 100, 1940.

Erect herb, pubescent. Leaves ovate or lanceolate, crenate. Flowers yellow, lip extended. Occasional.

Chandragiri at 2440 m (B. 9/2).

Ocimum basilicum Linn. Sp. Pl. 597, 1753; FBI. 4:608, 1885; Mukerjee in Rec. bot. Surv. India 14: 18, 1940.

Herb, woody below. Leaves ovate-lanceolate. Flowers white. Abundant.

Tinpipli to Nepalthoke at 916 m (B. 97).

Orthosiphon incurvus Benth. in Wall. Pl. Asiat. Rar. 2:15, 1830; FBI. 4 : 614, 1885; Mukerjee in Rec. bot. Surv. India 14, 1 : 24, 1940.

Shrub, tomentose ; leaves ovate or ovate-lanceolate. Flower blue. Occasional.

Jubing to Wapsakhani at 1680 m (B. 397).

Plectranthus[1] **mollis** (Ait) Spr. Syst. 2:690, 1825; Santapau in Rec. bot. Surv. India 16(1): 243, 195. *Ocimum molle* Ait. Hort. Kew. 2:322, 1789.

P. incanus Link, Enum. Hort. Berol. 2:120, 1821-22; FBI. 4:621, 1885; Mukerjee in Rec. bot. Surv. India 14:47, 1940.

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1 *Plectranthus* L'Her. 1785 is conserved against *Germanea* Lam. 1786.

Herb *ca* 30-50 cm tall. Leaves ovate-cordate, crenate. Flowers light blue; corolla tube slightly decurved. Occasional.

Nangkhola to Taplejung at 1220 m (B. 744).

Plectranthus striatus Benth. var. **graciliflorus** (Hk.f.) Mukerjee in Rec. bot. Surv. India 14:43, 1940.

Small herb, pubescent. Leaves scabrid above, turning red-brown on drying. Flowers purple, sweet smelling. Occasional.

Chandragiri at 1832 m (B. 38/2); Namdu to Sikrigaon at 1832 m (B. 1036); Okhaldunga to Chayanum at 1525 m (B. 1085).

Satureja biflora (Hamilt.) Briq. in Engl. & Prantl. Nat. Pfam. 4/3a, 299, 1897.

Micromaria biflora Benth. Lab. Gen. et Sp. 379, 1832-36; FBI. 4:1885; Mukerjee in Rec. bot. Surv. India 14: 96, 1940.

Small herb with tufted stiff branches. Leaves sessile, ovate or oblong. Flower pink or purplish. Common in grassy slopes and meadows above 1985 m.

Chaubas to Risingo at 1985 m (B. 961); another sheet with no data.

S. longicaulis (D. Don) Briq. in Engl. & Prantl. Nat. Pfam. 4/3a:302, 1897.

Calamintha longicaulis Benth. in DC. Prodr. 12:234, 1848; FBI. 4:651, 1885; Mukerjee in Rec. bot. Surv. India 14: 99, 1940.

Erect herb, woody below, softly hairy. Leaves ovate-lanceolate faintly crenate. Flowers violet. Occasional.

Reserve forest, Okhaldunga at 2135 m (B. 195).

Scutellaria discolor Coleb. in Wall. Pl. Asiat. Rar. 1:36, 1830; FBI. 4 : 667, 1885; Mukerjee in Rec. bot. Surv. India 14 : 146, 1940.

Creeping rootstock bearing erect branches. Leaves broadly elliptic. Flower pale blue. Occasional.

Num to Hedagna at 1375 m (B. 497); Banepa to Dolaghat at 916 m (B. 932); another sheet with no data.

S. repens Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 110, 1825; FBI. 4:669, 1885; Mukerjee in Rec. bot. Surv. India 14:140, 1940.

Prostrate herb, pubescent; leaves ovate, crenate serrate. Flowers yellow; corolla tube recurved. Occasional.

Kabre to Those at 1220 m (B. 640).

Stachys melissaefolia Benth. Lab. Gen. et Sp. 535, 1832-36; Mukerjee in Rec.bot. Surv. India 14:188, 1940.

Slender erect herb, tomentose. Leaves sessile, ovate or oblong. Flowers pink. Occasional.

Kalinchok at 3054 m (B. 1012).

PLANTAGINACEAE

Plantago major Linn. Sp. Pl. 112, 1753; FBI. 4 : 705, 1885.

Perennial, rootstock stout. Leaves all radical, oblong or oblong-ovate. Spike *ca* 8 cm tall, flowers small crowded, white. Common.

Rhingmo to Jubing at 1680 m (B. 299).

CHENOPODIACEAE

Chenopodium ambrosioides Linn. Sp. Pl. 219, 1753; FBI. 5: 4, 1886.

Erect herb, puberulous; leaves oblong or lanceolate, sinuate. Flower small in long spikes. Common.

Rhingmo at Jubing at 1680 m (B. 300).

PHYTOLACCACEAE

Phytolacca acinosa Roxb. Fl. Ind. 2 : 458, 1832; FBI. 5: 12, 1886.

Small shrub *ca* 1 m tall, succulent. Leaves elliptic-ovate, slightly succulent. Flower with no petals; sepals slightly yellowish.

Rhingmo to Jubing at 2135 m (B. 297).

The leaves are cooked and eaten.

POLYGONACEAE

Polygonum affine D. Don, Prodr. Fl. Nep. 70, 1825; FBI. 5 : 33, 1886; Steward, Polyg. East Asia 28, 1930.

Densely tufted, rootstock woody, upper portions of branches clothed with old stipules. Leaves elliptic lanceolate, margin recurved. Flower rosy-pink on erect racemes. Common.

Lonakh, above 4275 m (B. 353).

FBI gives the distribution of this species from Kashmir to Kumaon, and Western Tibet but the type locality is Nepal.

P. nepalense Meisn. Monogr. 84, t. 9, f. 2, 1826; Steward, Polyg. East Asia 74, 1930.

P. alatum Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 72, 1825; FBI. 5: 41, 1886.

Erect-herb, rarely procumbent, sparsely hairy. Leaves ovate deltoid-ovate, petiole broad winged. Occasional.

Mahadeophedi to Katonje at 1375 m (B. 167).

P. barbatum Linn. Sp. Pl. 362, 1753; FBI. 5 : 37, 1886; Steward, Polyg. East Asia 52, 1930.

A stout erect herb; leaves lanceolate, stipules strigose cilia longer than the tube. Racemes erect; flower white. Common.

Tinpipli to Nepalthoke at 763 m (B. 101).

P. capitatum Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 73, 1825; FBI. 5 : 44, 1886. Steward, Polyg. East Asia 78, 1930.

Rootstock twisted and woody. Leaves crowded, elliptic, petiole biauriculate. Heads dense flowered; flowers pink. Occasional.

Bhadgaon to Dhulikhel at 1375 m (B. 45).

P. glabrum Willd. Sp. Pl. 2 : 447, 1799; FBI. 5 : 34, 1886; Steward, Polyg. East Asia 43, 1930.

Erect herb, reddish, with leaves lanceolate, stipules membraneous. Flower light-pink in erect racemes. Occasional.

Mulkote to Khurkot at 610 m (B. 130).

P. paniculatum Bl. Bijd. 533, 1825; FBI. 5 : 49, 1886; Steward, Polyg. East Asia 105, 1930.

Tall scandent shrub, branches flexuous. Leaves elliptic-ovate or eliptic-lanceolate. Flowers white in large thyreoid panicles. Abundant at 2440 m.

Gola to Hatia at 1985 m (B. 516); Khera to Mandanda at 2440 m (B. 646); Kalinchok at 3360 m (B. 1008); Those to Bhandara at 2440 m (B. 1056).

P. plebejum R. Br. Prodr. 420, 1810; FBI. 5 : 27, 1886; Steward, Polyg. East Asia 24, 1930.

Prostrate herb, branches grooved. Leaves linear or linear-oblong. Flowers greenish in axillary clusters. Abundant.

Nepalthoke to Mulkote at 763 m (B. 108).

P. caespitosum Bl. Bijdr. 532, 1825; Steward, Polyg. East Asia 59, 1930.

P. posumbu Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 71, 1825; FBI. 5 : 38, 1886.

Very slender creeping herb. Leaves elliptic-lanceolate, sparsely hairy. Flower very small in erect racemes. Common.

Narkata to Mahadeophedi at 1220 m (B. 154).

P. viscosum Buch.-Ham. ex D. Don, Prodr. Fl. Nep. 71, 1825; FBI. 5 : 36, 1886; Steward, Polyg. East Asia 42, 1930.

Stem *ca* 1/2 m tall, branches covered with spreading stiff hairs and glands. Leaves acute, stipules hirsute. Flower bright red. Abundant.

Narkata to Mahadeophedi at 1220 m (B. 152).

Polygonum viviparum Linn. Sp. Pl. 36, 1753; FBI. 5 : 31, 1886; Steward, Polyg. East Asia 33, 1930.

Root-stock woody, stem 8-22 cm; slender. Leaves coriaceous. Spikes erect, solitary; flowers pink. Abundant in open grassy slopes.

Kalinchok at 3522 m (B. 993).

ARISTOLOCHIACEAE

Aristolochia griffithii Hk. f. & Th. ex Duch. in DC. Prodr. 15(1) : 437, 1866; FBI. 5 : 77, 1886.

A tall climber, branches villose tipped. Leaves broadly ovate or orbicular cordate, densely tomentose beneath. Flowers axillary; perianth pubescent, limb and tube yellow with red spots, throat deep red. Rare.

Raksha to Ething at 2440 m (B. 705).

This species was previously known from Sikkim and Bhutan by the collections of Hooker and Griffith, Prantling. The present collection shows its westward extension.

PIPERACEAE

Piper peepuloides Roxb. Fl. Ind. 1 : 159, 1820; FBI. 5 : 83, 1886.

Woody climber with long branches. Leaves elliptic-lanceolate, membraneous. Spikes globose. Occasional.

Rhingmo to Jubing at 1525 m (B. 306).

Peperomia pellucida (L.) H. B. & K. Nov. Gen. & Sp. 1 : 64, 1815; Gamble, Fl. Madras 1209, 1925; Trelease & Yuncker, Piperaceae 466, 1940; Santapau in Rec. bot. Surv. India 16 : 257, 1953.

Piper pellucidum Linn. Sp. Pl. 30, 1753.

A rather delicate erect branched herbs. Leaves opposite and alternate, broadly ovate-deltoid. Spikes terminal, axillary or leaf opposed; loosely flowered. Rare.

Deorali to Ghate at 916 m (B. 1105).

This species is a native of S. America which has run wild and is a common weed in Bombay and Madras (Santapau & Gamble loc. cit.), Bihar and Saharanpur.

P. reflexa (Linn. f.) A. Dietr. Sp. Pl. 1 : 180, 1831-33; FBI. 5 : 99, 1886; Gamble, Fl. Madras 1209, 1925; Trelease & Yuncker, Piperaceae 505, 1950.

Piper reflexum Linn. f. Supp. Pl. 91, 1781.

Herb, densely branched, rooting at the nodes; internodes on drying angular-grooved. Leaves 4, whorled sub-orbicular. Spike terminal, *ca* 1.5 cm long, densely flowered. Common.

Bhadgaon to Dhulikhel at 1525 m (B. 54).

SAURURACEAE

Houttuynia cordata Thunb. Fl. Jap. 234, t. 26, 1784; FBI. 5 : 78, 1886.

Root-stock creeping. Leaves ovate-cordate. Spikes leaf-opposed also terminal; involucre of 4 petaloid bracts, white or yellow. Abundant locally.

Chainpur to Milay at 1220 m (B. 560); Taplejung to Libang at 1525 m (B. 747).

LAURACEAE

Cinnamomum impressinervum Meissn. in DC. Prodr. 15(1) ; 21, 1862; FBI. 5 : 129, 1886.

Tree with leaves elliptic-lanceolate, 3-nerved, nerves deeply impressed. Fruiting calyx cupular Abundant.

Dongen to Topke gola at 3050 m (No number).

This species has been reported from Sikkim only.

C. obtusifolium Nees in Wall. Pl. Asiat. Rar. 2 : 73, 1831; FBI. 5 : 128, 1886; Kanjilal et al. Assam Fl. 4 : 56, 1940.

A large tree; leaves elliptic-oblong, 3-nerved, nerves not impressed. Fruiting calyx small and slightly spread out. Occasional.

Num to Hedagna at 1525 m (B. 493).

Cinnamomum parthenoxylon Meissn. in DC. Prodr. 15(1) : 26, 1867; FBI. 5 : 135, 1886; Kanjilal et al. Assam Fl. 4 : 60, 1940.

A large tree; leaves variable, ovate, lanceolate or broadly elliptic lateral nerves 4-6 on either side, axils glandular punctate. Fruiting perianth funnel shaped. Occasional.

Papung at 2440 m (B. 766).

This species is known from Assam and has not been recorded from Bhutan or Sikkim. The present collection from 87°37′ E shows the westward extension of the species.

Lindera[1] **pulcherrima** (Wall.) Hook. var. **attenuata** Allen. Journ. Arn. Arb. 22 : 21, 1941.

A tree, buds silky. Leaves lanceolate 8 cm long and 2·5-3 cm wide, nerves 3, very attenuated apex, thinly coriaceous, glaucous below.

Khera at 2750 m (B. 670).

This variety is based on material collected from South Western China. The true *Lindera pulcherrima* of Wallich based on Wall. 2567-A from Nepal has leaves oblong-lanceolate 10-15 cm long and 2–4·5 cm wide. Much material deposited in the Indian herbaria should be regarded as var. *attenuata*.

Litsea[2] **lanugionosa** Nees, Syst. Laurin. 634, 1836; FBI. 5 : 178, 1886; Kanjilal et al. Fl. Assam 4 : 90, 1940.

A small tree, leaves elliptic-lanceolate or oblanceolate, nerves 3, young leaves softly tomentose on the under surface. Fruit ovoid-oblong.

Pashupatinath area at 1300 m (B. 1).

L. polyantha Juss. in Ann. Mus. Par. 6 : 211, 1805; FBI. 5 : 162, 1886; Kanjilal et at. Fl. Assam 4 : 83, 1940.

A tall tree, young branches tomentose. Leaves oblanceolate or elliptic-oblong, coriaceous lateral nerves 6-10 on either side. Fruit ovoid. Occasional.

Narkata to Mahadeophedi at 1220 m (B. 151).

Neolitsea zeylanica (Nees) Merr. in Philipp. Journ. Sci. 1, Supp. 57, 1906; Kanjilal et al. Fl. Assam 4: 92, 1940.

Litsea zeylanica C. & T. Nees: FBI. 5 : 178, 1886.

A small tree leaves elliptic or elliptic-lanceolate, lateral nerves 2-4 on either side, nerves impressed. Occasional.

Rhingmo to Jubing at 2290 m (B. 293); Phaplu to Mura at 2440 m (B. 1067).

This species is reported from Bhutan, Assam and Khasia. The present collection shows the westward extension of the species.

THYMELEACEAE

Daphne papyracea Wall. ex Steud. Nom. (ed. 2) 1 : 483, 1841.

D. cannabina Wall. : FBI. 5: 193, 1886.

A shrub *ca* 2 m tall, leafy at the tips. Leaves oblanceolate or linear-lanceolate. Flowers light purple, fragrant. Abundant.

Okhaldunga to Reserve forest at 1985 m (B. 189).

The bark is made into strong paper which is largely used in Nepal and exported to Tibet.

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[1] *Lindera* Thunb. 1783 is conserved against *Lindera* Adans. 1763; and *Benzoin* Fabr. 1763.

[2] *Litsea* Lam. 1791 is conserved against *Malapoenna* Adans. 1763; *Glabraria* Linn. 1771; and *Tomex* Thunbg. 1783.

Wikstroemia[1] **canescens** Meissn. in Denkschr. Regensb. Bot. Gesellesch. 3: 288, 1841; FBI. 5 : 195, 1886.

Shrub about 75 cm tall, silky pubescent. Leaves alternate oblong-lanceolate. Flowers yellow interminal panicles. Very common west of Manga deorali—86° 0'N-27° 40'E.

Chandragiri at 1985 m (B. 82/2); Chaubas to Risingo at 1985 m (B. 949).

ELAEAGNACEAE

Elaeagnus conferta Roxb. Fl. Ind. 1 : 440, 1820; Servettaz, Monogr. Elaeagn. 90, 1909.

E. latifolia auct. : FBI. 5 : 202, 1886 (non Linn.).

A big shrub; leaves ovate-elliptic, silvery peltate scales beneath. Fruit oblong, fleshy, 8 ribbed, reddish-yellow. Frequent.

Kathmandu at 1300 m (B. 29). Frequently seen in forests.

E. latifolia Linn. is found in Ceylon and differs from the Indian species in the shape and size of the perianth tube.

LORANTHACEAE

Helixanthera ligustrina (Wall.) Dans. in Bull. Jard. Buitenz. Ser. III : 317, 1929; Kanjilal et al. Fl. Assam 4: 121, 1940.

Loranthus ligustrina Wall. in Roxb. Fl. Ind. 2 : 219, 1824; FBI. 5: 207, 1886.

Parasite shrub, branches terete, stout. Leaves opposite, upper alternate, elliptic-lanceolate. Flowers in axillary racemes, red, 4-merous. Common.

Tripureshwari at 1300 m (B. 10).

Loranthus scurrula Linn. Sp. Pl. (2) 1: 472, 1762; FBI. 5: 208, 1886.

Scurrula parasitica Linn. Sp. Pl. 110, 1753; Danser in Bull. Jard. Bot. Buitenz. Ser. III, 11: 445, 1931, passim; Kanjilal et al. Fl. Assam 4: 124, 1940.

A large parasite, young parts tomentose-white. Leaves elliptic-oblong, mealy on both surfaces when young. Flowers in dense axillary fascicles, bracteate, 4-merous, red. Fruit pyriform. Occasional.

Chainpur to Dingla at 610 m (B. 896).

Macrosolen cochinchinensis (Lour.) Van Tiegh. in Bull. Soc. bot. France 41: 122, 1894; Kanjilal et al. Fl. Assam 4: 127, 1940.

Loranthus cochinchinensis Lour. Fl. Cochinch. 1 : 195, 1790.

L. globosus Roxb. : FBI. 5 : 220, 1886.

Branches stout, terete. Leaves opposite, rarely alternate. Flowers clustered in axillary racemes, bracteate, orange-red, 6-merous.

Dhulikhel to Bhadgaon at 1525 m (B. 51); Tinjura forest at 916 m (B. 892).

Taxillus umbellifer (Schult.) Danser in Bull. Jard. bot. Buitenz. Ser. III, 11: 445, 1931.

Loranthus umbellifer Schultz. Syst. 7(1): 97, 1829; FBI. 5: 211, 1886.

Scurrula umbellifera (Schultz.) G. Don, Gen. Syst. 3 : 421, 1831-37.

A stout parasite, young parts rusty-pubescent. Leaves opposite or alternate, elliptic-oblong. Flowers bracteate, 4-merous, red. Occasional.

Chaubas to Pheda at 1985 m (B. 613).

Danser in all his work concerning the Loranthaceae always worked on the understanding that "the only genus bearing rightly the name *Loranthus* is now a days called *Psittacanthus* and is restricted to tropical America" (Danser, New Syst. Loranth. and Nomencl. page 65). This opinion is somewhat upset by the fact that in the latest edition (1956) of the Int. Code of Bot. Nomencl. *Loranthus scurrula* Linn. Sp. Pl. (2), 472, 1762, is made the type of the genus *Loranthus* against *Loranthus* Linn. and *Scurrula* Linn. of the first edition of the same work. In consequence we have reverted to the original *Loranthus scurrula* for the name of the plant.

[1] *Wikstroemia* Enell 1833 is conserved against *Capura* Linn. 1771.

Viscum album Linn. Sp. Pl. 2 : 1023, 1753; FBI. 5: 223, 1886; Rao in Journ. Indian Bot. Soc. 36(2):118, 1957.

Parasitic shrub, branches dichotomous. Leaves obovate-lanceolate or obovate. Inflorescence pedunculate cyme. Female flowers much smaller than male flowers. Fruit globose or roundish elliptic. Occasional.

Katonje to Okhaldunga at 1068 m (B. 180).

SANTALACEAE

Osyris wightiana Wall. ex Wight, Icon. t. 1853, 1852; Santapau in Rec. bot. Surv. India 16: 269, 1953.

O. arborea Wall. : FBI. 5: 232, 1886.

Shrub with leaves elliptic-lanceolate or orbicular, coriaceous. Fruit a drupe, yellow. Abundant.

Dhulikhel to Kuwapani at 1375 m (B. 80); Reserve forest, Okhaldunga at 1832 m (B. 220); Kathmandu valley at 1350 m (B. 24/2).

Pyrularia edulis A. DC. Prodr. 14 : 628, 1857; FBI. 5 : 230, 1886.

A thorny shrub with leaves elliptic-oblong, coriaceous, shining above. Occasional.

Ramechape to Deorali at 1525 m (B. 144).

EUPHORBIACEAE

Antidesma bunius (Linn.) Spr. Syst. 1 : 826, 1825; FBI. 5: 358, 1886; Pax and Hoffman in Pfreich. 81: 160, 1922; Kanjilal et al. Fl. Assam 4 : 166, 1940.

Stilago bunius Linn. Mant. 1 : 122, 1767.

Small evergreen tree, young parts hairy. Leaves oblong to lanceolate, coriaceous. Flowers in spikes; male flowers sessile, stamens 3. Occasional.

Khandbari to Dharangaon at 1220 m (B. 462).

A. **diandrum** (Roxb.) Roth, Nov. Plant. Sp. 369, 1821; FBI. 5: 361, 1886; Pax & Hoffman in Pfreich. 81: 143, 1922; Kanjilal et al. Fl. Assam 4: 167, 1940.

Stilago diandra Roxb. Pl. Coram. 2 : t. 166, 1798.

A small tree, young parts pubescent. Leaves oblong to lanceolate, sub-coriaceous, leaves turn bright red before falling. Flowers in lax racemes. Male flowers pedicellate, stamens 2. Rare.

Chainpur at 1375 m (B. 544).

Emblica officinalis Gaertn. Fruct. 2 : 122, 1791; Kanjilal et al. Fl. Assam 4: 159, 1940.

Phyllanthus emblica Linn. : FBI. 5 : 289, 1886.

A small tree, branchlets feathery with distichous leaves. Leaves simple, small. Flowers light yellow in axillary clusters. Abundant.

Khurkot to Ramechape at 1375 m (B. 137).

E. **hirta** Linn. Sp. Pl. 454, 1753; Santapau in Bull. bot. Soc. Beng. 8 : 15, 1954.

E. pilulifera auct. an Linn. ? : FBI. 5 : 251, 1886.

Prostrate or erect herb with leaves unequalisided. Common on red soil.

Aisyalukherka to Banspani at 1068 m (B. 428).

Flueggiopsis glauca (Wall.) A. Das in Kanjilal et al. Fl. Assam 4 : 158, 1940.

Phyllanthus glaucus Wall. : FBI. 5 : 288, 1886.

A shrub with slender branchlets. Leaves elliptic or oblong. Flowers yellowish; male flowers with calyx segments 5-6; stamens 5. Rare.

Jubing to Puyia at 2748 m (B. 318).

Jatropha curcas Linn. Sp. Pl. 1006, 1753; FBI. 5: 383, 1887; Pax in Pfreich. 42: 77, 1910.

A large shrub with leaves sub-orbicular. Flowers greenish yellow. Common.

Aisyalukherka to Banspani at 1375 m (B. 423).

The latex is said to be used for wounds.

Kirganelia reticulata (Poir.) Baill. Etud. Gen. Euph. 613, 1858; Kanjilal et al. Fl. Assam 4: 158, 1940.

Phyllanthus reticulatus Poir. Encyc. 5: 298, 1904-23; FBI. 5: 288, 1887.

Small straggling shrub. Leaves ovate-oblong, distichous. Stamens 5 in two series, 3 inner longer and connate.

Wapsakhani to Bhulu at 1525 m (B. 409); Lebang at 1375 m (B. 751).

Macaranga pustulata King ex Hook. f. Fl. Brit. Ind. 5: 445, 1887; Pax & Hoffman in Pfreich. 63: 338, 1914; Kanjilal et al. Fl. Assam 4: 219, 1940; Bor, Man. Ind. For. Bot. 181, 1953.

Small tree tips rusty pubescent. Leaves not peltate, 3–7 nerved, two glands near the base on either side of the petiole. Capsules with persistent recurved stigmas. Abundant.

Dhopu at 1068 m (B. 537).

Mallotus philippensis Muell.-Arg. in Linnea 34 : 196, 1865; FBI. 5: 442, 1887 ; Pax & Hoffman in Pfreich. 63: 184, 1914; Kanjilal et al. Fl. Assam 4: 216, 1940 (as philippinensis).

Small tree with young branches rusty. Leaves ovate-oblong. Inflorescence reddish, male flowers clustered, female solitary. Common.

Mulkote to Khurkote at 610 m (B. 126); also seen between Dhankuta and Dharanbazar.

Melanthesa turbinata (Koen. ex Roxb.) Wight, Icon. 5(2): 26, t. 1897, 1852; Santapau in Rec. bot. Surv. India 16: 276, 1953.

Phyllanthus turbinatus Koen. ex Roxb. Hort. Beng. 104, 1814.

Breynia[1] *patens* Benth. : FBI. 5: 329, 1886.

A shrub 1–2 m high. Leaves distichous. Flowers pendulous; clayx much enlarged and reddish grey in fruits. Common.

Bhemphedi to Sisagarhi at 1068 m (B. 73/2).

Ostodes paniculata Bl. Bijdr. 620, 1825; FBI. 5: 400, 1887; Kanjilal et al. Fl. Assam 4: 197, 1940.

A tree with young branches pubescent. Leaves ovate, coriaceous, triple nerved at the base. Flowers rosy-white in panicles. Common.

Narkata to Mahadeophedi at 1300 m (B. 155); Simsara to Phutuk at 1220 m (B. 579); Dharan to Dhankuta at 1220 m (B. 868).

FBI gives the distribution of the species from Sikkim, Bhutan to Silhet.

Sapium insigne (Royle) Benth. ex Hook. f. Fl. Brit. Ind. 5: 471, 1887; Pax & Hoffman in Pfreich. 52: 241, f. 45, 1912.

Falconeria insignis Royle, Illustr. Bot. Himal. 354, t. 84 a, t. 98 f. 2, 1839.

Tree, deciduous leaved; leaves elliptic. Female spike greatly thickened in fruiting state. Common.

Dhulikhel to Kuwapani at 1552 m (B. 61); also seen at other places.

Securinega[2] **virosa** (Roxb. ex Willd.) Pax & Hoffman in Pfreich. (ed. 2) 190: 60, 1931; Santapau in Rec. bot. Surv. India 16: 275, 1953.

Fluggea microcarpa Bl. : FBI. 5: 328, 1886.

F. virosa Baill.: Kanjilal et al. Fl. Assam 4: 160, 1940.

Shrub with straggling branches. Leaves elliptic-ovate. Male flowers in clusters. Fruits globose of different sizes. Occasional.

Phedim to Moktara at 763 m (B. 729).

BUXACEAE

Sarcococca pruniformis Lindl. Bot. Reg. t. 1012, 1829-47; FBI. 5: 266, 1887; Kanjilal et al. Fl. Assam 4: 134, 1940.

Small shrub with branches green. Leaves elliptic or elliptic-lanceolate.

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[1] Harold St. John has proposed the conservation of *Breynia* J. R. & G. Foster 1776. (See Taxon 6: 198, 1957).

[2] *Securinega* Comm. ex Juss. 1789 is conserved against *Acidoton* P. Br. 1891.

Katonge to Okhaldunga at 1068 m (B. 177).

DAPHNIPHYLLACEAE

Daphniphyllum himalayense Muell.-Arg. in DC. Prodr. 16, 1: 4, 1869; FBI. 5: 354, 1886; Rosenthal in Pfreich. 68 (177A): 6, 1919; Kanjilal et al. Fl. Assam 4: 170, 1940.

Tree with leaves oblanceolate or oblong-lanceolate, lateral nerves 8–13 on either side of midrib, coriaceous. Fruit ellipsoid, tuberculate. Abundant.

Chempua to Sandakphu at 2900 m (B. 862).

This plant has a superficial resemblance to members of Lauraceae.

URTICACEAE

Boehmeria platyphylla D. Don var. **rotundifolia** Wedd. Monogr. Urt. 1856; FBI. 5: 579, 1887.

Shrubby with leaves broadly elliptic, hispid. Spikes longer than the leaves, branches. Common.

Khandbari to Malta at 1375 m (B. 482); Chainpur to Dingla at 1525 m (B. 900).

Cudrania[1] **javanensis** Trel. in Ann. Sc. Nat. (Ser. 3) 7: 123, 1847; FBI. 5: 538, 1887; Kanjilal et al. Fl. Assam 4: 270, 1940.

Straggling shrub, spinous. Leaves oblong-elliptic. Flower-heads greenish yellow. Occasional.

Nepalthoke to Mulkote at 680 m (B. 121).

Debregeasia hypoleuca Wedd. Monogr. Urt. 463, t. 15, 1856; FBI. 5: 591, 1887; Kanjilal et al. Fl. Assam 4: 295, 1940.

Large shrub, branches covered with white woolly hairs. Leaves oblong-lanceolate, white.

Rhingmo to Jubing at 1680 m (B. 301).

Elatostema[2] **dissectum** Wedd. in Arch. Mus. Par. 9: 314, 1885; et Monog. Urt. 314, 1856; FBI. 5: 568, 1888.

Herb with a short creeping base. Leaves oblique, oblanceolate. Male receptacles long pedunc-led. Occasional.

Hedagna to Gola at 2135 m (B. 504).

Lecanthus peduncularis (Wall.) Wedd. in DC. Prodr. 16: 164, 1896, pro parte; Merrill. Enum. 2: 77, 1923-26; Santapau in Rec. bot. Surv. India 16: 287, 1953.

L. wightii Wedd. in Ann. Sc. Nat. Ser. 4(1) : 187, 1854; FBI. 5: 559, 1888.

Succulent herb, stem 30–60 cm tall, robust. Leaves opposite, unequal. Receptacle 2–4 cm in diam., stalks 22-30 cm long. Common in moist places.

Risingo to Pheda at 1068 m (B. 974).

Pilea smilacifolia Wedd. in Ann. Sc. Nat. (Ser. 4) 1: 186, 1854; FBI. 5: 553, 1888. Kanjilal et al. Fl. Assam 4: 283, 1940.

Small shrub, woody below. Leaves elliptic-lanceolate, membraneous. Occasional.

Patek-Tinjura forest at 2440 m (B. 890).

This species has previously been known from Sikkim, Assam and Burma.

P. tenuifolia Wedd. in Arch. Mus. Par. 8 : 202, 1855; FBI. 5 : 552, 1888.

Herb with leaves obliquely cordate. Cymes densely flowered, peduncles longer than the petioles. Abundant in marshy places.

Hedagna to Gola at 2137 m (B. 505).

FBI gives the distribution in Sikkim Himalayas only.

P. umbrosa Wedd. in Ann. Sc. Nat. (Ser. 4) 1 : 187, 1854 ; FBI. 5 : 556, 1888; Kanjilal et al. Fl. Assam 4 : 283, 1940.

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[1] *Cudrania* Trecl. 1847 is conserved against *Vanieria* Lour. 1790.

[2] *Elatostema* J. R. & G. Forst. 1776 amend Wedd. 1856 is conserved against *Langeveldia* Gaud. 1826.

Tall, robust herb, pubescent. Leaves elliptic-ovate. Cymes pedunculate, peduncles 5–7 cm long. Occasional at moist places.

Num to Hedagna at 1375 m (B. 494); Chandragiri at 1680 m (B-84/2).

Pouzolzia zeylanica (Linn.) Benn. Pl. Jav. Rar. 67, 1838; Santapau in Rec. bot. Surv. India 16:288, 1953.

P. indica Gaud. in Freyc. Voy. Bot. 503, 1824-42; FBI. 5 : 581, 1888.

Erect herb, hoary pubescent or hirsute. Leaves ovate-lanceolate, membraneous. Flowers in axillary clusters. Occasional.

Kathmandu valley at 1350 m (B. 49/2).

P. viminea Wedd. in DC. Prodr. 16(1) ; 228, 1869; FBI . 5 : 581, 1888.

An erect shrub with leaves alternate, toothed. Flowers in small dense clusters. Male perianth 4-partite. Rare.

Those to Bhandara at 1932 m (B. 1042).

MORACEAE

Ficus cunia Buch.-Ham. ex Roxb. Fl. Ind. 3 : 561, 1832; FBI. 5 : 523, 1888; King in Ann. Roy. Bot. Gard. Calc. 1 : 101, t. 126, 1888.

A low tree with leaves elliptic to oblong-lanceolate, undersurface pubescent, very unequal bases. Fruit red.

Kuwapani to Tinpipli at 1068 m (B. 91).

F. geniculata Kurz, For. Fl. Burma 2: 447, 1877, et in Journ. Asiat. Soc. Beng. 42(2) ; 105, 1873; FBI. 5 : 516, 1888; King in Ann. Roy. Bot. Gard. Calc. 1 : 64. t. 80, 1888.

A large spreading tree. Leaves elliptic, sub-coriaceous, petioles long. Fruit small.

Mulkote to Khurkote at 670 m (B. 131).

F. foveolata Wall. ex Miquel in Ann. Mus. Bot. Lugd. Bat. 3 : 294, 1867; FBI. 5 : 528, 1888; King in Ann. Roy. Bot. Gard. Calc. 1: 133, t. 166, 1888.

A creeper branches pubescent. Leaves ovate -elliptic or oblong. Receptacles axillary,. globose.

Mahadeophedi to Katonje at 1375 m (B. 175).

F. mysorensis Heyne ex Roth, Nov. Sp. Pl. 390, 1821; FBI. 5 : 500, 1888; King in Ann. Roy. Bot. Gard. Calc. 1 : 19, t. 14, 1888.

A large tree with serial roots embracing the stem, young branches covered with rusty tomentum. Leaves ovate or elliptic-ovate, coriaceous. Receptacles oblong, orange-red. Occasional.

Mahadeophedi to Katonje at 1068 m (B.160).

The resting places known as "chautaras" always have this species planted and it is generally accompanied by *F. religiosa.*

F. nemoralis Wall. ex Miq. in Lond. Journ. Bot. 7 : 453, 1848 ; FBI. 5 : 534, 1888 ; King in Ann. Roy. Bot. Gard. Calc. 1 : 161, t. 206, 1888.

A shrub with leaves oblanceolate, base cuneate. Receptacles subglobose. Occasional.

Okhaldunga to Reserve forest at 1832 m (B 183).

ULMACEAE

Celtis australis Linn. Sp. Pl. 1043, 1753; FBI. 5 : 482, 1888; Kanjilal et al. Fl. Assam 4 : 226, 1940.

A tree with pendulous branches. Leaves obliquely ovate or ovate-lanceolate, green when dry. Drupes subglobose. Occasional.

Tripureshwari at 1300 m (B. 12).

Hooker in FBI (5 : 482) has mentioned there is very little difference between *C. australis* and C. *tetrandra* and has expressed his doubt as to how the two species can be separated. As examination of all the sheets in Herb. Calc. convinces me that *C. australis* can be recognised. However Das in Fl. Assam 4 : 226, has treated the two species separately, and the differentiating characters given therein are convincing.

Trema politoria Planch. in Ann. Sc. Nat. Ser. 3 : 226, 1848 ; FBI. 5 : 484, 1888.

Small trec with leaves alternate, hard and very rough. Flowers unisexual in small axillary cymes. Fruit a globose berry. Abundant.

Banepa to Dolaghat at 916 m (B. 936).

JUGLANDACEAE

Engelhardtia spicata Bl. Bijdr. 528, 1825; FBI. 5: 595, 1888.

A large tree, leaves pinnate, leaflets 5-10, oblong-lanceolate, membraneous. Female flowers in pendulous spikes, middle bract in fruits 5 -7 cm long. Abundant.

Khurkote to Ramechappe at 1068 m (B. 134).

Juglans regia Linn. var. **kumaonica** C. DC. in Ann. Sc. Nat. Ser. 4 : 1338, 1862.

Tree with pinnate compound leaves; leaflets 3-4 pairs, acuminate. Fruits small, slightly oblong, endocarp very thick.

Nepali name : 'Okhar also Tarka'.

This var. is wild and also cultivated in the interior of the country.

MYRICACEAE

Myrica nagi Thunb. Fl. Jap. 76, 1784; FBI. 5 : 597, 1888.

Small tree with branches pubescent. Leaves oblanceolate or obovate. Fruit globose, red; nut rugose. Occasional.

Okhaldunga to Reserve forest at 1985 m (B. 196); Kathmandu valley at 1350 m (B. 21/2); Lebang to Tenkhu at 1375 m (B. 760).

BETULACEAE

Alnus nepalensis D. Don, Prodr. Fl. Nep. 58, 1825; FBI. 5: 600, 1888.

Tree with leaves elliptic-lanceolate. Female flowers in axillary racemes of 4-8, bracts of the fruiting spike forming a woody cone. Common as a secondary growth on old cultivation terraces.

Patale to Phaplu at 2440 m (B. 248); Sikrigaon to Those at 1832 m (B. 1040).

Betula utilis D. Don, Prodr. Fl. Nep. 58, 1825; FBI. 5 : 599, 1888.

Shrubby, bark white. Leaves ovate, tomentose, young leaves pubescent. Female spike solitary; bracts of the fruiting spike not forming a woody cone. Abundant.

Topke gola area at 3817 m (B. 848).

CORYLACEAE

Carpinus viminea Lindl. in Wall. Pl. Asiat. Rar. 2 : 4, t. 106, 1831; FBI. 5 ; 626, 1888; Bor, Man. Ind. For. Bot. 115, 1953.

Tree with thin pendulous branches, shoots and petiole glabrous. Leaves ovate cordate, doubly serrate. Fruit a nut enclosed in a thick involucre. Rare.

Hongaon to Sivrang at 2135 m (B. 534).

Bor (loc. cit.) gives the distribution of this species as North-western Himalaya and Khasia, my specimens comes form 87° 22 'E.

FAGACEAE.

Castanopsis indica A. DC. in Journ. Bot. 1 : 182, 1863; FBI. 5 : 620, 1888; King in Ann. Roy. Bot. Gard. Calc. 2 : 94, t. 83, 1889; Bor, Man. Ind. For. Bot. 123, 1953.

A medium sized tree with leaves oblong or obovate-oblong, rufous beneath, nerves 10-16 pairs. Common.

Phedim to Moktara at 1220 m (B. 724).

C. hystrix A. DC. in Journ. Bot. 1 : 182, 1863 ; FBI. 5 : 620, 1888; King in Ann. Roy. Bot. Gard. Calc. 2 : 95, t. 84, 1889; Bor, Man. Ind. For. Bot. 124, 1953.

A much bigger tree with leaves oblanceolate, minutely pubescent, nerves 7-9 pairs, one at the most common species all over the area.

Okhaldunga to Reserve forest at 1985 m (B. 200); Katonje to Okhaldunga at 1068 m (B.179); Okhaldunga to Patale at 1985 m (B. 230); Saddle to Dingla at 1832 m (B. 452).

Castanopsis tribuloides A. DC. in Journ. Bot. 1: 182, 1863; FBI. 5: 622, 1888; King in Ann. Roy. Bot. Gard. Calc. 2: 102, t. 94, 1889; Bor, Man. Ind. For. Bot. 125, 1953.

A medium sized tree with leaves lanceolate to oblong, entire or serrate, ferruginous pubescence below. Another most common species of the area.

Okhaldunga to Reserve forest at 1832 m (B. 184, B. 185); Okhaldunga to Patale at 1985 m (B. 229); Ething at 2443 m (B. 721); Patek-tinjura forest at 2290 m (B. 883).

Quercus glauca Thunb. Fl. Jap. 175, 1784; FBI. 5: 604, 1888; King in Ann. Roy. Bot. Gard. Calc. 2:29, t. 23, 1889; Bor, Man. Ind. For. Bot. 120, 1953.

A large tree with leaves long petioled, oblong to ovate-lanceolate, glaucous below. Nut ovoid Occasional.

Nepali name : 'Falata'.

Chandragiri at 1832 m (No number).

Q. lanuginosa D. Don, Prodr. Fl. Nep. 57, 1825; FBI. 5: 603, 1888; King in Ann. Roy. Bot. Gard. Calc. 2: 25, t. 19, 1889; Bor, Man. Ind. For. Bot. 119, 1953.

A large tree with leaves oblong, serrate, rufous tomentum beneath. Nut covered by a loosely lamellate cup, turbinate.

Q. lamellosa Sm. in Rees. Cycl. 29 (23); 1819; FBI. 5: 606, 1888 ; King in Ann. Roy. Bot. Gard. Calc. 2: 36, t. 30, 1889; Bor, Man. Ind. For. Bot. 121, 1953.

A very tall tree, leaves oblong to lanceolate 20-30 cm. Nut turbinate, and half covered by a loose cup.

Rhingmo to Jubing at 2290 m (B. 286).

This species extends to the east as far as Assam and Burma.

Q. semicarpifolia Sm. in Rees. Cycl. 29 (20), 1819; FBI. 5: 601, 1888; King in Ann. Roy. Bot. Gard. Calc. 2: 21, t. 15A, 1889; Bor, Man. Ind. For. Bot. 118, 1953.

A large tree, evergreen. Leaves shortly petioled, elliptic or oblong, spinous-toothed. Acorns globular with a small cup. Common.

Okhaldunga to Reserve forest at 2137 m (B. 198); Puyia to Ghate at 2595 m (B. 319, 323); Chandragiri at 1985 m (B. 58/2).

SALICACEAE

Populus tremula Linn. Sp. Pl. 1034, 1753.

A lofty tree with dimorphic leaves. Bark smooth and silvery.

Planted along the main roads of Kathmandu (B. 9).

Salix daltoniana Anders. in Journ. Linn. Soc. 4: 49, 1860; FBI. 5: 632, 1888.

Shrubby with branchlets black and glabrous. Leaves lanceolate, dull green. Catkins on leafy peduncles. Abundant.

Namchebazar to Tarangan at 3817 m (B. 334).

FBI gives the distribution of this species as from Sikkim to Bhutan only. My specimen has been collected from 27°50′ N & 86°37′ E.

S. elegans Wall. ex Anders. in DC. Prodr. 16(2); 256, 1868; FBI. 5: 630, 1888.

A small tree with leaves elliptic obovate. Catkins on leafy peduncles; bracts yellow. Abundant.

Dingla to Bhojpur at 2595 m (B. 902).

FBI gives the range of distribution as from Nepal to west-Murree. Wall. sheet 3699 was from Chandragiri (27° 37′ N & 85° 12′ E) and my 902 is further east—87° E & 27° 15′N.

Salix sikkimensis Anderss. in DC. Prodr. 16(2): 269, 1868; FBI. 5: 632, 1888.

Shrubby with branches erect and shining. Leaves ovate-lanceolate, densely silky beneath. Catkins small and sessile. Common.

Namche to Tarangan at 4428 m (B. 341); Topke gola area at 3817 m (B. 847).

FBI gives the distribution of this species as Sikkim only. My specimen has been collected from 37°50'N & 27°37'E.

S. tetrasperma Roxb. Pl. Cor. 1: 66, t. 97, 1795; FBI. 5: 627, 1888.

Tree with leaves ovate-lanceolate. Catkins very slender, male catkins sweet smelling, stamens 3-12. Common.

Kathmandu to Rhadgaon at 1300 m (B. 37); Those to Bhitrikhani at 2290 m (B. 678).

S. wallichiana Anderss. in Vet. Acad. Handl. Stock. 477, 1850; FBI. 5: 628, 1888; Rehder in Journ. Arn. Arb. 4: 143, 1923; Bor, Man. Ind. For. Bot. 109, 1953.

A small tree with twigs more or less tomentose. Leaves oblong-lanceolate, silky beneath. Male catkins subsessile. Occasional.

Patale to Phaplu at 2290 m (B. 255).

Bor (loc. cit.) gives the distribution of this species as North-western Himalayas. My specimen B. 255 has been collected at 27° 30' N & 86° 35' E.

According to Bor (loc. cit. p. 109) the species of *Salix* found in India fall into two natural groups—those which are found in the North-western Himalayas and those found in the Eastern Himalayas. Of the species collected by me *S. tetrasperma* is common to the Eastern Himalayas and North-western Himalayas. *S. daltoniana* and *S. sikkimensis* which are Eastern Himalayan species, extend westwards to Nepal; and *S. elegans* and *S. wallichiana*, which are North-western Himalayan species, extend to the east.

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