

CHAPTER VIII

ETHNOBOTANY: PLANTS OF MEDICINAL AND OTHER ECONOMIC UTILITY, POISONOUS EFFECT AND MYTHOLOGY

Besides geographical parameters, the vastness of India should also be counted from the view point of the diverse human races inhabiting the country from time unknown to us, and, their cultural heritage. The traditional methods of uses of plants for food, medicine, household purposes and on religious rituals, culture and art or mythological believes by the aborigines of the country is not fully known to us even in the present century. In fact, the beginning of the study of ethnobotany in India on a co-ordinated basis has just been over thirty years (Jain 1995).

Ethnobotany is the study of direct man-plant and heritage relationship (Jain 1981). The Darjeeling Himalayas (along with Nepal & Sikkim to which it shares its geographical, cultural and socio-anthropological uniformity) has a rich ethnobotany and there are countless ways in which plants are linked to the life and culture of the natives.

Only fractional works have been done on the ethnobotany of Darjeeling district (Bhujel 1984 a & b, 1985,1992; Yonzon R. & Mondal 1982; Yonzon G.S. *et al* 1984,1985). The vast knowledge of plant use, therefore, that has been carried on from pre historic time in the Himalayas to this age, is in an urgent need of being recorded.

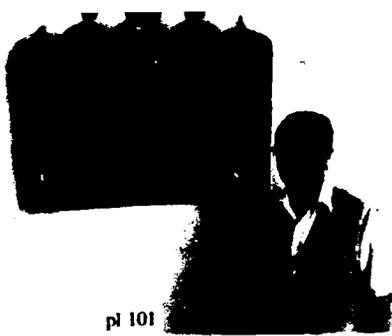
The aborigines of Darjeeling district whose descendents are continuing to live a tribal life, are Lepcha, Sherpa, Rai, Limboo, Magar, Gurung, Kagatay(Yolmo) and Gorkhas in general in the hills and Rajbansi, Koche, Meche, and Dhimal in the plains. Rated as a backward region, the true modern civil comforts in the region, have reached to the selected towns only and the people in the rural and far flung villages are living an almost primitive life. But, the knowledge of traditional plant science, that they have inherited is what the modern world envies of.

The knowledge is purely surviving on folklore and cultural inheritance. Many of such information might have been lost or discarded enroute to this age. The process of civilisation has always victimised the knowledge of plant use in socio-religious rituals, festivals and at the time of illness and famine. The plants used as ethnomedicine and wild plants of edible value have great potentials, which can be brought to scientific propagations and exploited to serve the greater spectra of human beings, in need. The knowledge of folklore science which are limited to within the families of aborigines and natives of such areas dies out with them in the course of development and civilisation process. This is especially and unfortunately so, because the process of civilisation has never been friendly to traditional system of living. And, Darjeeling district is no exception to civilisation process.

Therefore, recording of such knowledge of ethnobotany and their preservation is the only remedy to save the valuable ethnic information. The present study deals, in part, with recording of similar information, based on survey, recording, specimen examination and interviews with local people, tribals and natives.

8.1. PLANTS OF MEDICINAL VALUE.

In this age of synthetic drugs, a good number of hospitals, health centers and private dispensa



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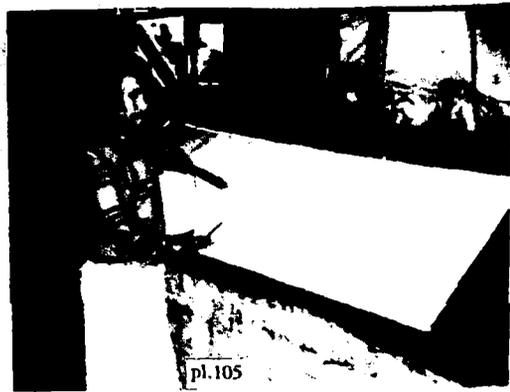
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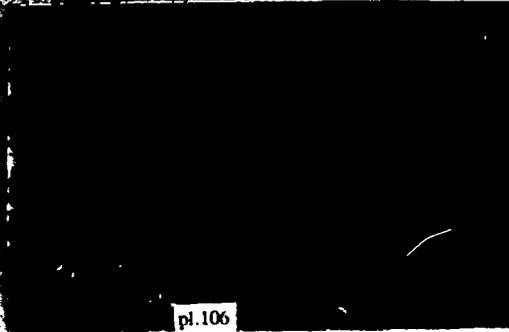
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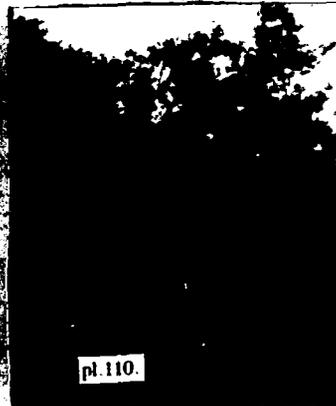
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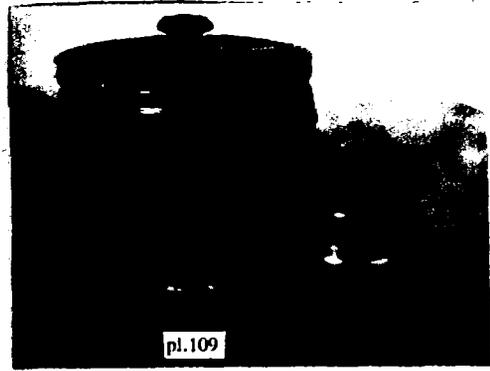
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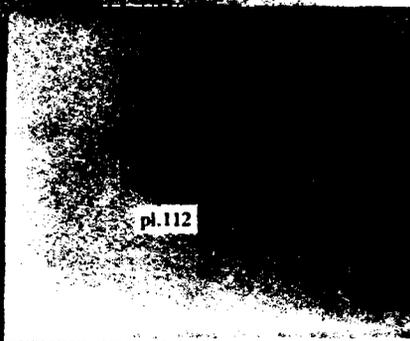
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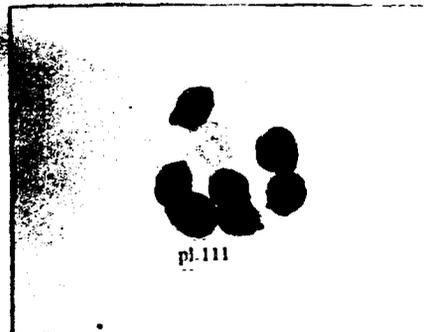
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- 101 Vaidya Chhewang Pakhrin at his Herbal Hospital, Kalimpong.
- 102 Boys under treatment (bone fracture) at Vaidya Pakhrin's Hospital.
- 103. Gaybu Tshering, a spiritual healer at Tangta village with his assistant.
- 104. Peeling off barks (*Daphne bhola*) processing to making of hand made paper.

- 105. Making of paper (final drying) from *Daphne bhola*.
- 106. Sustainable agriculture for hills *Annonum subulatum* (large cardamom) at Todey-Tangta (2000m).
- 107. Fruits of *Gynocardia odorata*.
- 108. Fruits of *Spondias pinnata*.

- 109. 'Harpay' & 'Theka' made from mature trunks of *Boehmeria rugulosa*, by local petty carvers.
- 110. *Citrus reticulatus* (orange) cultivation at Kalimpong.
- 111. Fruits of *Terminalia bellirica*, edible and medicinal.
- 112. Seeds of *Aesandra buyraccia*, yields edible oil.

ries have been established in the district, most of them and reliable ones, being localised to townships only. The people inhabiting the interior country sides, backward classes and tribals depend solely on the folk medicines for eliminating their ailments. Even the unbanised intelligentsia have been using crude drugs from wild plants, to avoid undesirable side effects brought about by the repeated use of allopathic drugs.

The available medicinal plants in Darjeeling district may be categorised to three kinds:

1. Cultivated plants of known active principles and pharmaceutical properties

The department of Cinchona and other Medicinal Plants have been cultivating this category of medicinal plants at three zones of the district viz, Mungpoo, Munsong and Rongo-Gairibas. The plants are *Cinchona ledgeriana*, *C. succirubra*, *C. officinalis*, *Cephaelis ipecacuanha*, *Catharanthus roseus*, *Digitalis purpurea*, *Dioscorea composita*, *D. floribunda*, *Rauwolfia serpentina* and others.

2. Wild plants of known pharmaceutical value

This category of medicinal plants have not entered cultivation fields but have been the victim to commercial collectors and illegal money makers while in their habitat. Such plants are collected from the wild conditions and exported to pharmaceutical industries. The species like- (1) *Aconitum bisma* (2) *A. spicatum* (4) *Gynocardia odorata* (5) *Litsea cubeba* (6) *Panax pseudoginseng*. (7) *Phyllanthus emblica* (8) *Rheum acuminatum* (9) *Rubia manjith* (10) *Terminalia bellirica* (11) *T. chebula* (12) *Viscum monoicum* are some of the examples of commercially exported plants.

3. Wild plants of unknown or less known ethnomedicinal uses

There are a large number of plants in this category whose medicinal properties are known to the tribals & native folks only and considered as ethnomedicine. The plants of the latter two categories have been enumerated below: (Table 8.1)

One of the primitive traits in the culture of people of Darjeeling, Sikkim and Nepal Himalayas is the existence of spiritual healers known as "Jhankri" (among Gorkhas in general), "Bijuwa" (among Kirat Gorkhas), "Boongthing" (among Lepchas), "Phedangma" (among Limboo Gorkhas), and "Lama" (among Murmi/Tamang Gorkhas), who side by side practise herbalism. They have invariably turned out to be successful village Vaidyas (herbal practitioners). They consider their herbal knowledge as something sacrosanct and exercise great restraint in transmitting this knowledge even to their nearest disciples (Yonzon *et al* 1985). The native villagers also take prescription from the senior knowledgeable and experienced persons of reputation. Some of the Vaidyas have distinguished themselves in their profession and have become popular among people far and near. One of such a popular herbal practitioner is Vaidya Chhewang Pakhrin who has by now established a herbal hospital at 16th mile Kalimpong. Vaidya Pakhrin has been practising herbal treatment over last 40 years, single handedly and has been healing the cases of bone fractures (the most popular and his main treatment), sciatica, arthritis, gout, rheumatism, spondylitis, piles, urinary tract infection and leucorrhoea (Bhujel 1995). Vaidya Pakhrin claims that the knowledge of healing is secret to his family and was blessed to his great grand-father in his dream. As such this traditional healing has been continuing for the 4th generation of the family. Be that as it may, but he has successfully preserved the traditional knowledge of herbal healing and served the rural and needy mass in larger scale. The further scientific assessment to his system of healing is awaited.

In the interior and many rural areas, a belief still persists that ailments such of fever , stomach-ache, chest and heart pains, nausea and vomiting, diarrhoea, dysentery and child diseases are caused by evil spirits and wrath of displeased god. Sexual disorders and diseases are thought to occur as a punitive measure for violating sex taboos and non observance of purity and cleanliness. Most of the spiritual and herbal practitioners are engaged in healing of ailments of such kinds, which are common.

There is no organised system to collect and record information on the various uses of plants by the native herbalists and for continuance of this knowledge from one generation to the other.

Therefore, herbalism is now fast on the decline. It is strongly felt that the phytochemical and pharmacological evaluation of all these herbal medicines should be undertaken without any further delay and the active principles of such medicines vis-a-vis their various inter-actions with the biological system be studied. The gradual interference and even destruction of natural vegetation and forests in Darjeeling district, has become another threat to the knowledge of ethnomedicine. The biology as a whole, of this region are known to us only fragmentarily, while very little study has been carried out on the pure and applied aspects of the natural resources.

From the present study it has been found that Darjeeling is ethnomedicinally a rich region. The ethnomedicinal dicotyledonous plants of the wild conditions used by the local tribals and native and known, unknown or less known to other communities have been recorded and enumerated as follows, along with the name of diseases applied for and plant parts used (names of diseases are given as was informed by different herbal practitioners and do not point out specific or exact nature of ailments in many cases):

Name of the plants	Family	Ailments	Plant part(s) used and preparation
<i>Abroma augusta</i>	Sterculiaceae	Menstrual disorder	Bark & leaf extract
<i>Abrus precatorius</i>	Leguminosae	Seeds & Roots	As purgative, emetic, tonic.
<i>Abutilon indicum</i>	Malvaceae	Sores/Leucoderma	Seeds' powder
<i>Achyranthes aspera</i>	Amaranthaceae	Piles, Boils, Measles, leucoderma	Young shoots & root extracts
<i>A. bidentata</i>	"	Rheumatism	"
* <i>Aconitum bisma</i>	Ranunculaceae	Food poisoning, Leprosy, Rheumatism (antidote)	Root decoction
* <i>A. spicatum</i>	"	Fever, stomachache	Root decoction
<i>Ageratum conyzoides</i>	Compositae	Cuts and burns	Extracts of smashed leaves (antiseptic)
<i>A. houstonianum</i>	"	"	"
<i>Agrimonia pilosa</i> var. <i>nepalensis</i>	Rosaceae	Helmintic, infections	Leaf extract.
<i>Ailanthus integrifolia</i>	Simaroubaceae	Asthma, tonic, febrifuge	Bark
<i>Alstonia scholaris</i>	Apocynaceae	Malaria, diarrhoea, dysentery, ulcers	Bark, milky juice

<i>Andrographis paniculata</i>	Acanthaceae	Fever, stomachache, tonic	Whole plant
<i>Anthocephalus chinensis</i>	Rubiaceae	Dental disease	Young shoots (directly applied)
<i>Antidesma acidum</i>	Euphorbiaceae	Gastritis (tonic to appetite)	Leaves & fruits
<i>Argemone mexicana</i>	Papaveraceae	Skin disease, Laxative	Roots, seeds
* <i>Artemisia dubia</i>	Compositae	Headache, nose bleeding, eye infection	Leaves & young Shoots (extract)
* <i>A. indica</i>	Compositae	Skin disease	"
<i>Artocarpus lacucha</i>	Moraceae	Desentery	Stem latex
* <i>Astilbe rivularis</i>	Saxifragaceae	A tonic to post natal women	Roots
* <i>Azadirachta indica</i>	Meliaceae	Fever, diarrhoea, dysentery, skin diseases	Leaves
<i>Bauhinia vahlii</i>	Leguminosae	Dysentery, Laxative & as tonic	Seeds, flowers
* <i>B. variegata</i>	"	"	"
* <i>Bergenia ciliata</i>	Saxifragaceae	Diarrhoea, dysentery, menstrual disorders and tonic to post natal women	Roots & leaves
<i>Betula alnoides</i>	Betulaceae	Snake bite, Hysteria, antiseptic	Bark paste
<i>B. alnoides var cylindrostachya</i>	"	"	"
<i>B. utilis</i>	"	"	"
<i>Blainvillea acmella</i>	Compositae	Flowers	Toothache
<i>Boenninghausenia albiflora</i>	Rutaceae	Infestation by lice & other parasites	Young shoots
<i>Boehmeria rugulosa</i>	Urticaceae	Snake bites	Stem barks (paste)
<i>Boerhavia diffusa</i>	Nyctaginaceae	Jaundice, urine trouble	Root extract
<i>Callicarpa arborea</i>	Verbenaceae	Skin disease, colic and fevers	Bark & leaf extract
<i>C. vestita</i>	"	"	"
<i>Calotropis gigantea</i>	Asclepiadaceae	Sores & skin eruptions	Latex from stem

* <i>Cannabis sativa</i>	Cannabaceae	Indigesttion acidpsis	Leaves and young inflorescence.
<i>Cardamine hirsuta</i>	Cruciferae	Heart troubles, low blood pressure	Whole plant extract
<i>Careya arborea</i>	Lecythidaceae	Cough, cold	Flowers bark & fruits
<i>Cassia fistula</i>	Leguminosae	Ringworm, as laxatives	Leaves & seeds
* <i>Cinnamomum bejolghota</i>	Lauraceae	Cough	Leaves
* <i>C. tamala</i>	"	Stomach disorders and as tonic	Leaves
* <i>Catharanthus roseus</i>	Apocynaceae	Diabetes (antidote)	Whole plant
* <i>Centella asiatica</i>	Umbelliferae	Pneumonia, throat infections, fever and as tonic	Shoots
<i>Chenopodium ambrosioides</i>	Chenopodiaceae	antiplasmodic, nervous breakdown	Oil of seeds
<i>Clematis acuminata</i>	Ranunculaceae	Sinusitis	Crushed roots smelt
* <i>C. buchananiana</i>	"	"	"
<i>C. gouriana</i>	"	"	"
<i>C. smilacifolia</i>	"	"	"
<i>Cissus repanda</i>	Vitaceae	Cataract, eye infection	Stem extract or bark exudations
<i>Colebrookia oppositifolia</i>	Labiatae	Wounds, skin infection	Leaf extracts
<i>Corydalis chaerophylla</i>	Fumariaceae	Stomachache, tonic	Fruits
<i>C. geraniifolia</i>	"	"	"
<i>Cotoneaster microphyllus</i>	Rosaceae	As astringent	Stolons
* <i>Croton bonplandianus</i>	Euphorbiaceae	Bone fracture	Shoots (paste)
<i>Cuscuta reflexa</i>	Cuscutaceae	Rheumatic swellings	Stem
* <i>Datura metel</i>	Solanaceae	Hydrophobia insanity, convulsion	Fruits
* <i>D. stramonium</i>	"	"	"
<i>Dicentra paucinervia</i>	Fumariaceae	Heart troubles	Shoots
<i>D. scandens</i>	"	"	"
* <i>Dichroa febrifuga</i>	Saxifragaceae	Fever, malaria and skin diseases	Leaves and roots
<i>Dillenia indica</i>	Dilleniaceae	Stomachache, tonic	Roots, barks & fruits
* <i>Drymaria cordata</i>	Caryophyllaceae	Sinusitis	Shoots (heated) fuming shoots smelt)
<i>D. villosa</i>	"	"	"
<i>Duchesnea indica</i>	Rosaceae	Mouth & tongue	Fruits

<i>Eclipta prostrata</i>	Compositae	sores Jaundice, liver, spleen enlargement	Leaf extract
<i>Elephantopus scaber</i>	Compositae	Cardiac tonic, astringent	Plant decoction
<i>Elsholtzia blanda</i>	Labiatae	Gastritis	Shoot extract
* <i>Entada rheedii</i> ssp. <i>sinohimalensis</i>	Leguminosae	Mumps	Seeds
<i>Eupatorium adenophorum</i>	Compositae	Cuts & haemorrhage	Leaf extracts
<i>E. odoratum</i>	"	"	"
<i>Fagopyrum dibotrys</i>	Polygonaceae	Dysentery, gastritis	Shoots
<i>Ficus hispida</i>	Moraceae	Ulcers, colic	Milky juice
<i>F. oligodon</i>	"	Dysentery, Eye disease	Milky juice
<i>F. racemosa</i>	"	Laxatives, diabetes	Milky juice, Root sap
<i>F. semicordata</i>	"	Ulcers, colic	Milky juice
* <i>Fraxinus floribunda</i>	Oleaceae	Bone fracture	Stem bark
<i>Girardiana diversifolia</i>	Urticaceae	Blood pressure, fever	Inflorescence extract & Root extract
<i>Gmelina arborea</i>	Verbenaceae	Snake bite	Bark (paste)
* <i>Gynocardia odorata</i>	Flacourtiaceae	Leprosy & Skin disease	Seeds oil
<i>Hedera nepalensis</i>	Araliaceae	Sores Latex	
<i>Hedyotis scandens</i>	Rubiaceae	As abortifacient, eye disease & sprain	Roots, leaves (extract)
* <i>Heracleum</i> <i>nepalense</i>	Umbelliferae	Influenza, bodyaches	Inflorescence & fruits
* <i>H. wallichii</i>	"	"	"
<i>Hibiscus</i> <i>surattensis</i>	Malvaceae	Impotency, Aborti- ficient	Flowers
* <i>Holarrhena</i> <i>pubescens</i>	Apocynaceae	Dysentery	Stem latex
* <i>Houttuynia cordata</i>	Saururaceae	Stomach disorder & as tonic	Shoots
* <i>Hydrocotyle</i> <i>himalaica</i>	Umbelliferae	Throat infection, pneumonia, tubercu- losis	Shoots
<i>H. nepalensis</i>	"	"	"
* <i>Hypericum uralum</i>	Hypericaceae	Wounds & bruises	Bark juice
* <i>Juglans regia</i>	Juglandaceae	Astringent Fruit, bark & leaves	

<i>Laportea terminalis</i>	Urticaceae	Blood pressure, Heart troubles	Flowers
<i>Leucosceptrum canum</i>	Labiatae	Epilepsy, wounds	Roots & leaves
<i>Lindera neesiana</i>	Lauraceae	Stomach troubles, digestive	Fruits & barks
* <i>Litsea cubeba</i>	Lauraceae	Food poisoning stomach disorders	Flowers
* <i>L. kingii</i>	"	As vermifuge	Leaves
* <i>Mahonia napaulensis</i>	Berberidaceae	Dysentery, as diuretic diuretic	Berries, stem bark
<i>Melissa axillaris</i>	Labiatae	Antipyretic, Heart diseases	Whole plant
<i>Mentha arvensis</i>	"	Diarrhoea, fever headache	Shoots
* <i>Mimosa pudica</i>	Leguminosae	Toothache, helminthic	Roots
<i>Mirabilis jalapa</i>	Nyctaginaceae	Piles Roots	
<i>Mucuna nigricans</i>	Leguminosae	"	"
<i>Mussaenda macrophylla</i>	Rubiaceae	Jaundice	Roots (extract)
<i>M. roxburghii</i>	"	"	"
<i>M. treutleri</i>	"	Jaundice & body smellings	Roots & leaves
<i>Nyctanthes arbortristis</i>	Oleaceae	Fever, Rheumatism	Leaf juice
* <i>Oroxylum indicum</i>	Bignoniaceae	Diabetes, throat & tongue infections, abortion	Bark (diabetes), flowers throat & roots for abortion.
<i>Paederia foetida</i>	Rubiaceae	Toothache & decay	Leaves and stem
<i>P. scandens</i>	"	"	"
* <i>Panax pseudogin- seng</i> var. <i>angus- tifolius</i>	Araliaceae	As vitaliser	Rhizome
* <i>P. pseudoginseng</i> var. <i>bipinnatifidus</i>	"	"	"
* <i>Pentapanax fragrans</i>	"	Stomach disorder & as tonic	Flowers & young Shoots
<i>Persicaria capitata</i>	Polygonaceae	Insect bites & stings	Shoots
* <i>Phyllanthus emblica</i>	Euphorbiaceae	Indigestion	Fruits
* <i>Phytolacca acinosa</i>	Phytolaccaceae	High blood pressure	Leaves

* <i>Piper longum</i>	Piperaceae	Menstrual disorder & tonic to post natal women	Fruit
* <i>P. peepuloides</i>	"	"	"
◦ <i>Plantago erosa</i>	Plantaginaceae	Toothache	Roots
* <i>Plumbago zeylanica</i>	Plumbaginaceae	Ulcers, as apettizer	Root, milky juice
<i>Plumeria rubra</i>	Apocynaceae	Syphilis, Gonorrhoea	Whole plant
◦ <i>Prunus cerasoides</i>	Rosaceae	Bone fracture, toothache	Bark & stem
<i>Quercus lanata</i>	Fagaceae	As astringent	Bark & Acorns
* <i>Rauwolfia serpentina</i>	Apocynaceae	Hypnotic, sedative, blood pressure, labour pain	Root & leaves
<i>Rhamnus nepalensis</i>	Rhamnaceae	As astringent	Fruits
R. purpureus	"	As purgative	Fruits
* <i>Rheum acuminatum</i>	Polygonaceae	As purgative/astr- ingent, tonic	Roots
◦ <i>Rhododendron arboreum</i>	Ericaceae	Dysentery, throat trouble	Fermented liquor
* <i>Rhus chinensis</i>	Anacardiaceae	Indigestion, diarr- hoea, dysentery	Fruits & fruit extract from flower
✓ * <i>Rubia manjith</i>	Rubiaceae	Paralysis, Jaundice	Shoots
* <i>R. wallichiana</i>	" " "		
<i>Rubus ellipticus</i>	Rosaceae	Fever	Roots
<i>R. lineatus</i>	"	Food poisoning	Roots
<i>Rumex nepalensis</i>	Polygonaceae	Stings by <i>Urtica</i> & skin diseases	Young shoots
<i>Schima wallichii</i>	Theaceae	Anthelmintic	Barks
* <i>Semecarpus anacardium</i>	Anacardiaceae	Skin disease, Abortion	Bark gum
<i>Shorea robusta</i>	Dipterocarpaceae	Diarrhoea	Stem barks
<i>Sida acuta</i>	Malvaceae	Bone fracture, Boils	Stem & shoots
<i>Sida cordata</i>	Malvaceae	" "	
✓ * <i>Stephania glabra</i>	Menispermaceae	Poultry epidemics	Root tubers
* <i>S. glandulifera</i>	"	Liver troubles & Jaundice	Root tubers
* <i>S. japonica</i>	"	"	"
* <i>Swertia chirayita</i>	Gentianaceae	Fever, dyspepsia, diabetes, skin	Shoots

<i>S.pedicellata</i>	"	disease	"
* <i>Terminalia bellirica</i>	Combretaceae	Diarrhoea, dysentery dropsy & as tonic	Fruits
* <i>T.chebula</i>	"	Cough, indigestion & heart diseases	"
* <i>T.citrina</i>	"	"	"
<i>Tetradium fraxinifolium</i>	Rutaceae	Dysentery, indigestion & fruits	Young shoots
* <i>Thalictrum foliolosum</i>	Ranunculaceae	Tonic, purgative	Roots
* <i>T.javanicum</i>	"	"	"
<i>Thespesia lampas</i>	Malvaceae	Sexual disease	Root & Fruits
<i>Tiarella polyphylla</i>	"	"	"
<i>Tinospora cordifolia</i>	Menispermaceae	Tuberculosis	Flowers
<i>Urtica ardens</i>	Urticaceae	Ear infection/pain	Extracts of aerial roots
<i>U.parviflora</i>	"	Blood pressure, heart pains	Flowers & roots
<i>Vallis solanacea</i>	Apocynaceae	Blood pressure	Flowers & roots
<i>Valeriana hardwickii</i>	Valerianaceae	Liver Jaundice	Milky juice
* <i>V.jatamansi</i>	"	Sores & wounds	Roots
<i>Viola betonicifolia</i>	Violaceae	As stimulant, epilepsy neurosis	Roots
* <i>V.biflora</i>	"	Colic, Hysteria, epilepsy, as tonic	Roots
* <i>V.diffusa</i>	"	Antipyretic	Whole plant
<i>V.pilosa</i>	"	As Emetic, antispetic	Root, Flowers
	"	Chest pain	Flowers
	"	As emetic, febrifuge	Whole plant

Several of the species enumerated in table 8.1 have remained in regular and extensive use in this region and are available on sale in local markets of Darjeeling, Kurseong and Kalimpong towns. The useful plant parts (dried) such as of *Astilbe rivulariis*, *Bergenia ciliata*, *Panax pseudoginseng*, *Piper longum*, *P. peepuloides*, *Rhus chirensis*, *Semecarpus anacardium*, *Swertia chirayita*, *Terminalia bellirica*, *T.chebula*, fetch a high price, even in the local markets.

It is interesting to note that some of the plants while having medicinal properties are also important sources of household uses or are edible or even poisonous at the same time. The fatal stinging plants *Urtica ardens* and *Girardinia diversifolia* are used medicinally for blood pressure while the inflorescence forms a delicious soup when cooked and taken with rice. The roots of *Aconitum bisma* if taken during flowering period is said to be highly poisonous. The acidic fruits of *Zanthoxylum nitidum*

which causes breathing trouble and suffocation when eaten raw forms an excellent pickle when smashed with tomato and chilly. The seeds of *Gynocardia odorata* if taken raw is poisonous but it is boiled and pressed to extract edible oil. The pulp and boiled seeds are medicinal.

The medicinal properties of *Swertia chirayita* as an effective substitute to quinine, *Bergenia ciliata* and *Astilbe rivularis* as tonic to post natal women, and in menstrual disorders, *Panax pseudoginseng* as vitaliser, *Clematis b Buchananiana* and *Drymaria villosa/D. cordata* for acute sinusitis, *Azadirachta indica* for fever and stomach disturbance, *Boehmeria rugulosa* and *Gmelina arborea* for snake bites, *Dicentra scandens* for heart troubles, *Holarrhena pubescens* and *Artocarpus lacucha* for dysentery, *Centella asiatica* for fever and as tonic, *Fraxinus floribunda* and *Viscum album* (and other spp.) for bone fracture, *Litsea cubeba* for stomach disorders, *Semecarpus anacardium* as antidote of allergic blisters to children, *Terminalia chebula* for cough, *Stephania glandulifera* for liver jaundice, *S. glabra* as healer of epi demics in poultry, *Woodfordia fruticosa* for dysentery, and other plants of similar category are of indispensable uses in remote and inaccessible mountain villages where the modern medical amenities are not available.

In addition, there are other plants not included here (being Monocotyledons, Gymnosperms or Dicotyledons under cultivated status), that have important ethnomedicinal uses. The species like *Acorus calamus*, *Aloe vera*, *Curcuma amada*, *C. longa*, *Similax ferox*, *Thysanolaena maxima*, *Zingiber officinale* are indispensable medicines of rural masses. The occurrence of Black Ginger (*Zingiber sp.*) and *Taxus buccata* in the district, which are now gaining international reputations in medical science, have turned out to be the valuable assets of the place.

The history of ethnomedicine, perhaps, dates back to as early as origin and developments of mankind itself. The prescription of "Sanjwani booty" then available in Dronachal hills by a Vaidyara] as mentioned in 'Ramayana', the Hindu religious literature, needs no elaborations. Along with the civilisation and gradual progress of science and technology the traditional system of medical practice went on being feeble and unconcerned, cornering them to a few rural and tribal localities. It is only in the later part of this century, when the vast acquaintance of scientific achievements have found a reason to look back to nature and its resources, the store house, fully aware that its protection, conservation and ascertaining of potentialities cannot wait for another generation.

In conclusion, the ethnomedicinal plants are very important bank of knowledge. The efforts made here are for stressing the modern science to find out the medicinal properties in these species and ascertain their correct usefulness in the interest of a larger population, in need. The ethnomedicines are the discovery of primitive and compelled class of people through experience of trial and error and not by experiments. Therefore, they are there to be studied upon, researched upon but not to be dependent on them. The life taking diseases such as tuberculosis, hydrophobia, cancer and AIDS cannot be risked to trial and error treatments of traditional herbalism.

8.2 EDIBLE WILD PLANTS

The selective use of plants by man for their food value encouraged the species having better nutritional properties and that could be easily propagated in agricultural conditions at the same time, thus creating a lacunae for knowing more plants of edible value, many of them highly nutritious in wild conditions. The process of domestication, propagation and exploitation therefore is incomplete.

The study on the dicotyledonous flora of Darjeeling district has revealed many such plants of edible value. Bhujel *et al.* (1984) have recorded 83 plants of this category from the district. During famine brought about by climatic vicissitude the poor people in the far-flung rural areas of the district survive on wild edible plants available in the forests around them. For many of them the only source of income is the sale of wild edible plant parts in the local markets. It is through these villagers that the edible plant parts such as fruits of *Aesandra butyracea*, *Baccaurea ramiflora*, *Castanopsis hystrix*, *C.indica*, *Elaeocarpus lanceifolius*, *Elaeagnus conferta*, *E.caudata*, *Ficus semicordata*, *Mangifera sylvatica*, *Melia dubia*, *Morus australis*, *Persea fructifera*, *Piper* spp., *Rubus ellipticus*, *Syzygium* spp., *Zizyphus mauritiana*; flowers of *Bauhinia variegata*, *Girardiana diversifolia*, *Heracleum nepalense*, young shoots of *Dendrocalamus hookeri* (a monocot); shoots of *Nasturtium officinale*, *Mentha arvensis*, *Phytolacca acinosa*, bark extracts of *Acacia catechu*, tubers of *Astilbe rivularis*, *Dioscorea* spp. (monocots) are brought and displayed for sale in local markets.

Some plants have a very significant application in the daily need of rural poor. The edible oil extracted from the seeds of *Gynocardia odorata* (similar to mustard oil) and *Aesandra butyracea* (similar to coconut oil) is used in villages in place of mustard oil. The extraction is done in hand made stone and wooden press. These plants have the potentiality of being introduced to commercial propagation and marketing. A good number of plants are significant for their high nutritious value e.g. *Aesandra butyracea*, *Baccaurea ramiflora*, *Sarcosperma arboreum*, *Castanopsis iridica*, *C. hystrix*, *Elaeocarpus lanceifolius*, *E. sikkimensis*, *Eugenia bracteata*, *Fragaria nubicola*, *Girardiana diversifolia*, *Morus australis*, *Nausturtium officinale*, *Persea fructifera*, *Rubus ellipticus*, *Sorbus hedlundii*, *Syzygium* spp. etc. Flowers of *Rhododendron arboreum* are fermented to prepare an excellent wine in higher mountains which is used in medicinal purposes also (Bhujel *et al.* 1984).

Many of these wild plants, therefore, qualify for entering into cultural conditions for the economic uses.

The wild edible plants of Darjeeling district have been enumerated below (Table 8.2).

Table 8.2 Dicotyledonous Wild Edible Plants of Darjeeling District

Name of the plant	Parts eaten	Form in which eaten
<i>Acacia catechu</i> (Leguminosae)	Gum from stem in betle	Dried, liquefied & used
<i>Aconogonum molle</i> (Polygonaceae)	Young stem	Raw & cooked
<i>Actinidia callosa</i> (Actinidiaceae)	Flowers & fruits	Beverage
<i>A. strigosa</i> (Actinidiaceae)	Flowers & fruits	Beverage
<i>Aesandra butyracea</i> (Sapotaceae)	Fruit	Ripe fruits
<i>Antidesma acidum</i> (Euphorbiaceae)	Young leaves & fruits	Raw
<i>Ardisia macrocarpa</i> (Myrsinaceae)	Young leaves & fruits	Raw
<i>Artocarpus chama</i> (Moraceae)	Fruit/Ripe	Fruits
<i>A.heterophyllus</i> (Moraceae)	Fruit	Ripe fruits
<i>A. lacucha</i> (Moraceae)	Fruit	Ripe fruits

<i>Aspidocarya uvifera</i> (Menispermaceae)	Fruit	Ripe fruits
<i>Astilbe rivularis</i> (Saxifragaceae)	Roots	Direct
<i>Baccaurea ramiflora</i> (Euphorbiaceae)	Fruits	Ripe fruits
<i>Bauhinia malabarica</i> (Leguminosae)	Young shoots	As curry
<i>B. purpurea</i> (Leguminosae)	Young shoots	As curry
<i>B. vahlii</i> (Leguminosae)	Fruits	Roasted
<i>B. variegata</i> (Leguminosae)	Flowers	As pickle & curry
<i>Begonia</i> (16 spp.) (Begoniaceae)	Young shoots	As curry
<i>Benthamidia capitata</i> (Cornaceae)	Fruits	Ripe fruits
<i>Berberis angulosa</i> (Berberidaceae)	Fruits	Ripe fruits
<i>Bidens bipinnatifida</i> (Compositae)	Young leaves	Boiled in water used as in Tea
<i>Cardamine flexuosa</i> (Cruciferae)	Shoots	As curry
<i>C. macrophylla</i> (Cruciferae)	Shoots	As curry
<i>Castanopsis hystrix</i> (Fagaceae)	Fruit	Ripe fruits
<i>C. indica</i> (Fagaceae)	Fruit	Ripe fruits
<i>C. lanceifolia</i> (Fagaceae)	Fruit	Ripe fruits
<i>C. tribuloides</i> (Fagaceae)	Fruit	Ripe fruits
<i>Cephalanthus naucleoides</i> (Rubiaceae)	Fruit	Ripe fruits
<i>Chisocheton cumingianus</i> (Meliaceae)	Fruit	Ripe fruits
<i>Choerospondias axillaris</i> (Anacardiaceae)	Fruit	As pickle & directly
<i>Corylus ferox</i> (Betulaceae)	Fruit	Ripe fruits
<i>Decaisnea insignis</i> (Lardizabalaceae)	Fruit	Ripe fruits
<i>Dillenia indica</i> (Dilleniaceae)	Fruit	Ripe fruits
<i>Docynia indica</i> (Rosaceae)	Fruit	Ripe fruits
<i>Dysoxylum mollissimum</i> (Meliaceae)	Fruit	Ripe fruits
<i>Elaeagnus caudata</i> (Elaeagnaceae)	Fruit	Ripe fruits
<i>E. conferta</i> (Elaeagnaceae)	Fruit	Ripe fruits
<i>Elaeocarpus lanceifolius</i> (Elaeocarpaceae)	Fruit	Ripe fruits
<i>E. sikkimensis</i> (Elaeocarpaceae)	Fruit	Ripe fruits
<i>E. varunua</i> (Elaeocarpaceae)	Fruit	Ripe fruits
<i>Eugenia bracteata</i> (Myrtaceae)	Fruit	Ripe fruits
<i>Fagopyrum dibotrys</i> (Polygonaceae)	Young shoots	Cooked as curry
<i>Ficus benjamina</i> (Moraceae)	Fruits	Ripe fruits
<i>F. hispida</i> (Moraceae)	Fruits	Ripe fruits
<i>F. neriifolia</i> (Moraceae)	Fruit	Ripe fruits
<i>F. oligodon</i> (Moraceae)	Fruit	Ripe fruits
<i>F. semicordata</i> (Moraceae)	Fruit	Ripe fruits
<i>Firmiana fulgens</i> (Sterculiaceae)	Fruits	Ripe fruits
<i>Fragaria daltoniana</i> (Rosaceae)	Fruit	Ripe fruits
<i>F. nilgerrensis</i> (Rosaceae)	Fruit	Ripe fruits
<i>F. nubicola</i> (Rosaceae)	Fruit	Ripe fruits
<i>Garcinia cowa</i> (Guttiferae)	Fruit	Ripe fruits

<i>G. stipulata</i> (Guttiferae)	Fruit	Ripe fruits
<i>G.xanthochymus</i> (Guttiferae)	Fruit	Ripe fruits
<i>Girardiana diversifolia</i> (Urticaceae)	Young leaves & inflorescence	Cooked to make soup
<i>Gordonia excelsa</i> (Theaceae)	Fruits	Ripe fruits
<i>Gynocardia odorata</i> (Flacourtiaceae)	Seeds	Cooking oil
<i>Heracleum nepalense</i> (Umbelliferae)	Flowers & fruits	As pickle & curry
<i>H.wallichii</i> (Umbelliferae)	Flowers & fruits	As pickle & curry
<i>Holboelia latifolia</i> (Lardizabalaceae)	Fruits	Ripe fruits
<i>Homskiodea sanguinea</i> (Verbenaceae)	Flower nectaries	Direct
<i>Horsfieldia kingii</i> (Myristicaceae)	Fruit	Ripe fruits
<i>Hovenia acerba</i> (Rhamnaceae)	Fruit	Ripe fruits
<i>Juglans regia</i> (Juglandaceae)	Fruit	Ripe fruits
<i>Kadsura heterochita</i> (Schizandraceae)	Fruit	Ripe fruits
<i>Laportea terminalis</i> (Urticaceae)	Inflorescence	Cooked to make soup
<i>Lepisanthes senegalensis</i> (Sapindaceae)	Fruit	Ripe fruits
<i>Linum usitatissimum</i> (Linaceae)	Shoots	As curry
<i>Litsea cubeba</i> (Lauraceae)	Fruits	Ripe & raw fruits
<i>L.kingii</i> (Lauraceae)	Fruits	Ripe & raw fruits
<i>Mangifera sylvatica</i> (Anacardiaceae)	Fruits	Ripe & raw fruits
<i>Melia dubia</i> (Meliaceae)	Fruits	Ripe & raw fruits
<i>Mentha arvensis</i> (Labiatae)	Shoots	As pickle
<i>Morns australis</i> (Moraceae)	Fruit	Ripe fruits
<i>Mucuna pruriens</i> var. <i>utilis</i> (Leguminosae)	Fruit	As curry
<i>Murraya koenigii</i> (Rutaceae)	Leaves	As curry
<i>Myrsine semiserrata</i> (Myrsinaceae)	Fruit	Ripe fruits
<i>Nasturtium officinale</i> (Cruciferae)	Shoots	As curry
<i>Osbeckia chinensis</i> (Melastomataceae)	Fruit	Ripe fruits
<i>O.stellata</i> (Melastomataceae)	Fruit	Ripe fruits
<i>Oxalis corniculata</i> (Oxalidaceae)	Fruit	Ripe fruits
<i>Pentapanax fragrans</i> (Araliaceae)	Young shoots & flowers	As pickle & curry
<i>Pegia nitida</i> (Anacardiaceae)	Fruit	Ripe fruits
<i>Persea fructifera</i> (Lauraceae)	Fruit	Ripe fruits
<i>Phyllanthus emblica</i> (Euphorbiaceae)	Fruit	Ripe & Raw fruits
<i>Phytolacca acinosa</i> (Phytolaccaceae)	Shoots	As curry
<i>Piper attenuatum</i> (Piperaceae)	Fruits	Ripe fruits
<i>P. chuvya</i> (Piperaceae)	Fruits	Ripe fruits
<i>P.longum</i> (Piperaceae)	Fruits	Ripe fruits
<i>P.mullesua</i> (Piperaceae)	Fruits	Ripe fruits
<i>P.pedicellatum</i> (Piperaceae)	Fruits	Ripe fruits
<i>P.suipigua</i> (Piperaceae)	Fruits	Ripe fruits
<i>Pithecelobium dulce</i> (Leguminosae)	Arils	Ripe arils
<i>Plumbago zeylanica</i> (Plumbaginaceae)	Shoots	Fermented along with

<i>Prunus cerasoides</i> (Rosaceae)	Fruits	rice powder
<i>P. undulata</i> (Rosaceae)	Fruits	Ripe fruits
<i>Rhamnus nepalensis</i> (Rhamnaceae)	Fruits	Ripe fruits
<i>Rhus chinensis</i> (Anacardaceae)	Fruits	Boiled to the extract of fruit juice
<i>Rosa sericea</i> (Rosaceae)	Fruits	Ripe fruits
<i>Rubus calycinus</i> (Rosaceae)	Fruits	Ripe fruits
<i>R. calycinoides</i> (Rosaceae)	Fruits	Ripe fruits
<i>R. ellipticus</i> (Rosaceae)	Fruits	Ripe fruits
<i>R. indotibetanus</i> (Rosaceae)	Fruits	Ripe fruits
<i>R. niveus</i> (Rosaceae)	Fruits	Ripe fruits
<i>R. splendidissimus</i> (Rosaceae)	Fruits	Ripe fruits
<i>R. treutleri</i> (Rosaceae)	Fruits	Ripe fruits
<i>Sarcosperma arboreum</i> (Sapotaceae)	Fruit	Ripe fruits
<i>Saurauja nepalensis</i> (Actinidiaceae)	Fruits	Ripe fruits
<i>Schizandra grandiflora</i> (Schizandraceae)	Fruits	Ripe fruits
<i>S. neglecta</i> (Schizandraceae)	Fruits	Ripe fruits
<i>Spondias pinnata</i> (Anacardiaceae)	Fruits	Raw & ripe fruits
<i>Sorbus hedlundii</i> (Rosaceae)	Fruits	Ripe fruits
<i>S. rhamnoides</i> (Rosaceae)	Fruits	Ripe fruits
<i>S. vestita</i> (Rosaceae)	Fruits	Ripe fruits
<i>Syzygium claviflorum</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. cumini</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. formosum</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. kurzii</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. operculatum</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. ramosissimum</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. tetragonum</i> (Myrtaceae)	Fruits	Ripe fruits
<i>S. wallichii</i> (Myrtaceae)	Fruits	Ripe fruits
<i>Terminalia bellirica</i> (Combretaceae)	Fruits	Ripe fruits
<i>Tetradium fraxinifolium</i> (Rutaceae)	Young shoots	As pickle
<i>Thladiantha cordifolia</i> (Cucurbitaceae)	Fruits	Cooked as curry
<i>Toddalia asiatica</i> (Rutaceae)	Fruits	Ripe fruits
<i>Trevesia palmata</i> (Arabiaceae)	Fruits	Ripe fruits
<i>Trichosanthes lepiniana</i> (Cucurbitaceae)	Seeds	Roasted
<i>T. wallichiana</i> (Cucurbitaceae)	Seeds	Roasted
<i>Zanthoxylum nitidum</i> (Rutaceae)	Fruits	As pickle
<i>Zizyphus mauritiana</i> (Rhamnaceae)	Fruits	Ripe fruits
<i>Z. rnigosa</i> (Rhamnaceae)	Fruits	Ripe fruits

8.3 Plants of Poisonous Effects

A substance with poisonous effect is capable of destroying life or impairing health when taken into or formed in the body. Chemically, it inhibits the activity of a catalyst. There are various chemical substances of organic or inorganic origin that carry poisonous effects depending upon the concentration of the active principles concerned. Although several poisonous drugs from plants have been identified and their medicinal and economic value ascertained, there are many more, known to the common people only which have not been properly analysed at scientific level. The poisonous substance may be confined to root, stem, leaf, flower, fruits or sometimes through the plant body. A number of poisons are being used in medicines in limited amounts such as atropine, digitaline, aconitine, arsenic, strychnine etc., but these are deadly when taken in larger amounts.

Bhujel *et al.* (1984) have reported 58 plants with poisonous effects to man or animals from Darjeeling district alone. The pre-historic men in search of food were no doubt the first to discover poisonous substances in plants. Such plants are known through experiences along with time and incidences therefore the possibility of occurrence of more poisonous plants of known or unknown status cannot be ruled out. Irritants and stinging plants are instantly effective and repelling and are identified quickly. The difficulty in identification lies with lethal poisonous plants. In this same context the poisonous plants may be divided into two groups as-(1) Irritants and (2) Lethal poisons.

The poisonous plants display a wide and complex degree of characters of poisonous effect. Such characters should be accounted specificity to the plant parts, climatic seasons and methods of using use plants. The fruits of *Cucumis sativus* are edible while roots are highly poisonous. The roots of *Manihot esculenta* are edible but seeds are poisonous. There are many edible plants which bear the poisonous effects at the same time. The difference in them is the method of using them. The seeds of *Gynocordia odorata* if taken directly is fatally poisonous but the oil extracted from the same after drying is edible and used in cooking. The seeds of *Tricosanthes lepiniana* are poisonous as such while roasted seeds are edible and used medicinally. The roots of *Aconitum bisma*, *A. spicatum* collected in winters are medicinal but the same carries poisonous effects during flowering time (monsoon). The common weed *Cannabis sativa*, is a halucinogenic plant.

Again some plants harmless to man are fatally poisonous to cattle, goat and pigs. The young shoots (appearing in summer/spring) of *Lyonia ovalifolia*, *Osbeckia stellata*, *Premna barbata* are poisonous to livestock and causes death if taken orally. The fruits of *Zanthoxylum nitidum* eaten by man as pickle and digestive are deadly poisonous to pigs. The stinging nettles *Girardiana diversifolia*, *Laportea terminalis* and *Dendrocnide sinuata* are easily consumed by cattle which are poisonous to men. Man has discovered many fish poisons in this course. The bark extracts of root of *Millettia pachycarpa*, seeds of *Entada rheedii* and roots and leaves of *Tephrosia candida* are used by Lepchas to poison fish.

It has been observed that poisonous plants generally emit repelling odour which if inhaled causes headache nausea and even vomiting. The flowers of *Aconitum* spp. are poisonous to cattle. The Sherpa herdsmen whose occupation is rearing cattle in higher elevation of Singalila range cut down all aconites so that their cattle may graze freely. This is one reason why the species have become endangered.

From the view point of the versatile characters of plants as useful and poisonous or both, it becomes important that man should have the knowledge of the poisonous effect of plants while searching, using and exploiting plants of edible and medicinal values, and remain safe from uncomplimentary events. The following enumeration shows the dicotyledonous poisonous plants of wild conditions of Darjeeling district

Table 8.3 Plants with Poisonous Effects

Name of the plant	Poisonous part	Organisms effected (known so far)
A. Plants producing irritant poisons		
1. <i>Clematis gouriana</i> (Ranunculaceae)	Juice of stem & leaves	Man & cattle
2. <i>Girardiana diversifolia</i> (Urticaceae)	Stinging hairs	Man
3. <i>Dendrocnide stinuata</i> (Urticaceae)	Stinging hairs	Man
4. <i>Laportea terminalis</i> (Urticaceae)	Stinging hairs	Man
5. <i>Mucuna macrocarpa</i> (Leguminosae)	Fruit bristles	Man
6. <i>M:nigricans</i> (Leguminosae)	Fruit bristles	Man
7. <i>M:pruriens</i> (Leguminosae)	Fruit bristles	Man
8. <i>Ranunculus diffusus</i> (Ranunculaceae)	Leaf juice	Man
9. <i>Rhus griffithii</i> (Anacardiaceae)	Stem & leaf juice	Man
10. <i>R. hookeri</i> (Anacardiaceae)	Stem & leaf juice	Man
11. <i>R. succedanea</i> (Anacardiaceae)	Stem & leaf juice	Man
12. <i>Urtica ardens</i> (Urticaceae)	Stinging hairs	Man
13. <i>U. parviflora</i> (Urticaceae)	Stinging hairs	Man
B. Plants containing lethal poisons		
14. <i>Aconitum bisma</i> (Ranunculaceae)	Tuberous roots & flowers	Man & cattle
15. <i>A. spicatum</i> (Ranunculaceae)	Tuberous roots & flowers	Man & cattle
16. <i>Albizia chinensis</i> (Leguminosae)	Young shoot	Cattle
17. <i>A. lucidior</i> (Leguminosae)	Young shoot	Cattle
18. <i>Anemone obtusiloba</i> (Ranunculaceae)	Roots & seeds	Man
19. <i>Anthocephalus clinensis</i> (Rubiaceae)	Seeds	Man
20. <i>Berberis insignis</i> (Berberidaceae)	Stem juice	Fish
21. <i>Berchemia floribunda</i> (Rhamnaceae)	Fruits	Man & cattle
22. <i>Cannabis sativa</i> (Cannabaceae)	Shoots & flowers	Man
23. <i>Cestrum aurantiacum</i> (Solanaceae)	Shoots	Goat
24. <i>Cimicifuga foetida</i> (Ranunculaceae)	Root powder/Whole plant	Bugs & fleas Cattle
25. <i>Codonopsis affinis</i> (Campanulaceae)	Flowers & leaves	Man
26. <i>Dalbergia stipulacea</i> (Leguminosae)	Bark & roots	Fish
27. <i>Datura metel</i> (Solanaceae)	Seeds	Man & cattle
28. <i>D. stramonium</i> (Solanaceae)	Seeds	Man & cattle
29. <i>Entada rheedii</i> ssp. <i>sinohimalensis</i> (Leguminosae)	Seeds & bark	Fish
30. <i>Gnaphalium affine</i> (Compositae)	Whole plant	Cattle
31. <i>Gynocardia odorata</i> (Flacourtiaceae)	Raw seeds	Man
32. <i>Horsfieldia kingii</i> (Myristicaceae)	Fruit when taken in excess	Man

33. <i>Hydrangea heteromalla</i> (Hydrangeaceae)	Leaves	Man & cattle
34. <i>Lyonia ovalifolia</i> (Ericaceae)	Buds & young leaves	Cattle
35. <i>L. villosa</i> (Ericaceae)	Buds & young leaves	Cattle
36. <i>Maesa montana</i> (Myrsinaceae)	Leaves & fruit	Fish
37. <i>Mahonia napaulensis</i> (Berberidaceae)	Bark juice	Fish
38. <i>Milletia extensa</i> (Leguminosae)	Flowers	Man
39. <i>M. pachycarpa</i> (Leguminosae)	Roots	Fish
40. <i>Meconopsis napaulensis</i> (Papaveraceae)	Rhizomes	Man
41. <i>Osbeckia chinensis</i> (Melastomataceae)	Young shoots	Goat
42. <i>O. nepalensis</i> (Melastomataceae)	Young shoots	Goat
43. <i>O. stellata</i> var. <i>stellata</i> (Melastomataceae)	Young shoots	Goat
44. <i>O. stellata</i> var. <i>rostrata</i> (Melastomataceae)	Young shoots	Goat
45. <i>Phytolacca acinosa</i> (Phytolaccaceae)	Root	Man
46. <i>Pieris formosa</i> (Ericaceae)	Young shoots & leaves	Cattle & goat
47. <i>Premna barbata</i> (Verbenaceae)	Young shoots & leaves	Cattle & goat
48. <i>Primula denticulata</i> (Primulaceae)	Whole plant	Cattle & goat
49. <i>Prunus cerasoides</i> (Rosaceae)	Branches, young leaves & kernel	Man & cattle
50. <i>P. rufa</i> (Rosaceae)	Branches, young leaves & kernel	Man & cattle
51. <i>Rauwolfia serpentina</i> (Apocynaceae)	Roots	Man
52. <i>Rhododendron arboreum</i> (Ericaceae)	Young leaves	Fish
53. <i>R. dalhousiae</i> (Ericaceae)	Flowers	Man
54. <i>R. grande</i> (Ericaceae)	Flowers	Man
55. <i>R. falconeri</i> (Ericaceae)	Bark & leaves	Fish
56. <i>Ricinus communis</i> (Euphorbiaceae)	Seeds	Fish
57. <i>Sambucus hookeri</i> (Sambucaceae)	Leaves	Cattle
58. <i>Semecarpus anacardium</i> (Anacardiaceae)	Bark & leaf juice	Man
59. <i>Schima wallichii</i> (Theaceae)	Bark	Man
60. <i>Solanum nigrum</i> (Solanaceae)	Fruit	Cattle
61. <i>Trichosanthes lepiniana</i> (Cucurbitaceae)	Raw seeds	Man
62. <i>T. wallichiana</i> (Cucurbitaceae)	Raw seeds	Man
63. <i>Trifolium repens</i> (Leguminosae)	Shoots & fruits	Horse
64. <i>Xeromphis uliginosa</i> (Rubiaceae)	Raw fruits	Man & fish
65. <i>Zanthoxylum acanthopodium</i> (Rutaceae)	Fruits	Man
66. <i>Z. armatum</i> (Rutaceae)	Fruits	Man
67. <i>Z. nitidum</i> (Rutaceae)	Fruits	Pig

8.4 ECONOMIC PLANTS OF OTHER USES

Besides edible and medicinal, the plants of other economic applications find their significant role in the life of people in villages and in general. Accustomed to manage his essentials and amenities from available resources, a village tribal has to purchase just the salt from the market.

8.4.1 ETHNIC USES IN HOUSEHOLD PURPOSES

The ethnic uses of plants for household and clothing purposes have an interesting identity, for every region has its own kind of tribal technology where every man exerts his own firsthand skill to improvise plants' parts into domestic utensils or others as the need may be.

In the interior fringe areas and tribal villages the common houses are thatch roofed and mud walled (and/or of bamboo partition). The roof structure is made up of *Schima wallichii* sticks tied by the thinly worked out strips of *Dendrocalamus hookeri* (called *choya*, and *bata*). In such households the following species are used for different purposes:

1. *Ailanthus grandis*: Stem exudation used as incense in religious rituals and worships.
2. *Bauhinia vahlii*: Leaves are displayed, tied and framed to make rain cover called *Ghoom* (the umbrella). Leaves are also used to make rice plates called *tapara*, significantly used during ceremonies and rituals.
3. *Boehmeria rugulosa*: Woods of this plants are carved by special carpenters called *Chandara* in a wooden machine rolled by water-current to make household vessels of various kinds. The vessels are called *theka* (curd vessel), *Dundhero* (milk vessel), *Dhungro* (millet beer vessel), etc.
4. *Calamus acanthospathus* (a monocot): The stems are stripped to smaller longitudinal fragments and used in making baskets, chair, tables etc.
5. *Dendrocalamus hookeri* (a monocot): The stems are used in making houses, ropes, water vessels, millet beer vessels, the young shoot (*tama*) tips are washed boiled and eaten as curry while this is also fermented and preserved in another form called *Mesoo* (a digestive).
6. *Ficus oligodon*: Leaves are used in making plates.
7. *Girardiana diversifolia*: The stem barks are processed to make threads, out of which the wearing clothes are prepared. This practice is rare and found only among kirats under shifting (jhum) cultivation.
8. *Gmelina arborea*: In absence of *Boehmeria rugulosa* this plant is used for similar purposes. The husk remover (of grains) called *Okhli* and *Dhiki* is made from the mature trunks of this plant alone.
9. *Leea alata*: Bark from the stem used in making ropes (especially used in cowsheds).
10. *Leea guineensis*: As in *L. alata*.
11. *Plectocomia himalayana*: (a monocot): As in *Calamus acanthospathus*.
12. *Plumbago zeylanica*: The roots and stem of this plants are powdered and made into cakes (*mar-cha*). This is used as precursor/accelerator in fermentation of millets into beer called "*Janr*".
14. *Rhododendron anthopogon*: Leaves and flowers used as incense, directly or after processing to powder.
13. *Pterospermum aceriifolium*: As in *Bauhinia vahlii*.
15. *Sterculia villosa*: The barks are beaten and processed to make ropes. It forms the most popular

ropes used in households and cowsheds (as leash for the cattle).

16. *Trema politoria*: Ropes from barks used in tying fodder bundle and other purposes.

17. *T. tomentosa*: As in *T. politoria*

8.4.2 TIMBER TREES

The following species are the timber trees of Darjeeling district. Their economic value, timber quality and commercial merit are well known.

<i>Acacia catechu</i>	<i>Populus gamblei</i>
<i>Acrocarpus fraxinifolius</i>	<i>P. glauca</i>
<i>Aglaia spectabilis</i>	<i>Quercus acutissima</i>
<i>Albizia lebbek</i>	<i>Q. lamellosa</i>
<i>Alcimandra cathcartii</i>	<i>Rhododendron arboreum</i>
<i>Alnus nepalensis</i>	<i>R. hodgsonii</i>
<i>Anthocephalus chinensis</i>	<i>Salix tetrasperma</i>
<i>Betula alnoides</i>	<i>Schima wallichii</i>
<i>B. utilis</i>	<i>Shorea robusta</i>
<i>Bombax ceiba</i>	
<i>Callophylla polyantha</i>	
<i>Camellia kissi</i>	
<i>Careya arborea</i>	
<i>Castanopsis hystrix</i>	
<i>C. indica</i>	<i>Styrax hookeri</i>
<i>C. lancifolius</i>	<i>S. serrulatus</i>
<i>C. tribuloides</i>	<i>Symlocos glomerata</i>
<i>Chukrasia tabularis</i>	<i>S.theifolia</i>
<i>Cinnamomum glaucescens</i>	<i>Tectona grandis</i>
<i>Dalbergia latifolia</i>	<i>Terminalia alata</i>
<i>D. sissoo</i>	<i>I. myriocarpa</i>
<i>Dillemia pentagyma</i>	<i>Tetrameles nudiflora</i>
<i>Duabanga grandiflora</i>	
<i>Eriobrya bengalensis</i>	<i>Toona ciliata</i>
<i>E. hookeriana</i>	<i>T. microcarpa</i>
<i>E. petiolaris</i>	<i>T. sureni</i>
<i>Exbucklandia populnea</i>	
<i>Gmelina arborea</i>	<i>Turpinia nepalensis</i>
<i>Lindera heterophylla</i>	<i>Wrightia coccinea</i>
<i>Lithocarpus elegans</i>	
<i>L.pachyphyllus</i>	
<i>Mesua ferrea</i>	
<i>M.floribunda</i>	
<i>Magnolia pterocarpa</i>	

Michelia champaca
Litsea glutinosa
M.doltsopa
M.velutina
Morus macroura
Nyssa javanica
Phoebe attenuata
P.hainesiana
Persea clarkeana
P.kurzii

8.4.3 POTENTIAL ORNAMENTAL PLANTS

There are a large number of wild plants which can be domesticated for ornamental uses. Some plants of this category bear beautiful flowers while others have an attractive foliage. Das & Chanda (1987) have reported more than 200 plants of ornamental potential of wild conditions, from Darjeeling district.

There are 16 species of *Begonia* in the district. Many of *Begonias* are now under cultivation. The *Rhododendron* spp. are not yet brought to cultural conditions at this region. All the species under the genera *Aristolohia*, *Argyreia*, *Euonymus*, *Jasminum*, *Porana* and *Sedum* are potential ornamentals. The species like *Agapetes serpens*, *A. serpens* var. *alba*, *Beaumontia grandiflora*, *Buddleja colveili*, *Cissus javana*, *Clematis montana*, *Cotoneaster microphyllus*, *Cuscuta reflexa*, *Gentiana speciosa*, *Helwingia himalaica*, *Kalanchoe integra*, *Meconopsis* spp, *Oenanthe javanica*, *Thunbergia coccinea*, *Tripteroserum nigrobaccatum*, *T. volubile* are only a few of the examples.

8.4.4 FODDER PLANTS

The study and assessment of fodder plants in relation to enriched livestock nutrition and their implementations will be a great contribution to the Himalayan district of Darjeeling. This is so, because on one hand the hilly terrains do not favour annual agricultural cultivations on which rural mass has to depend, while on the other, the climatic conditions favour the living of livestock, and can be reared in industrial scale.

In the present work the informations on fodder plants were noted wherever the opportunities provided. It was noted that the plants producing milky latex e.g. the members families Moraceae, Euphorbiaceae, Verbenaceae, Vitaceae etc. are more preferred by cattle as a fodder. But the same is not true with family Apocynaceae and Asclepiadaceae. The species like *Boehmeria macrophylla*, *B.rugulosa*, *Borreria alata*, *B.pusilla*, *B.repens*, *Brassaiopsis glomerata*, *B.hainla*, *B.hispida*, *Calli carpa arborea*, *C. vestita*, *Castanopsis tribuloides*, *Celtis tetrandra*, *Cissus elongata*, *C.simplex*, *Debregeasia longifolia*, *Eranthemum splendens*, *E.pulchellum*, *Ficus neriifolia*, *F.oligodon*, *F.semicordata*, *Gmelina arborea*, *Litsea monopetala*, *Macaranga* spp., *Mallotus* spp., *Meliosma pinnata*, *Parthenocissus semicordata*, *Phoebe lanceolata*, *Stereospermum chelonoides*, *S.persontum*, *Tetras tigma serrulatum*, *Thysanolaena maxima*, *Vernonia saligna* are rated good fodders rural farms.

8.4.5 SPICE PLANTS

The most important spice plants of the wild conditions that are extensively used are *Cinnamomum bejolghota* (bark) and *C. tamala* (leaves)

8.5 CULTIVATED PLANTS

The proportion of cultivated lands are comparatively low in the Darjeeling hills. Of a total of 3254.7sq.km area of the district, 2417 sq km fall in the hills and the cultivated land area in the hills comprise only 371 sq km(15.34%). The major crop of Darjeeling, the tea covers an area of 530 sq km. The subdivision of Kalimpong is suitable for agriculture and 60% of the agriculture of Darjeeling district should be counted from Kalimpong. In Darjeeling and Kurseong the open areas are mostly covered by tea gardens. However, in the plains of Siliguri subdivision the cultivation is properous and the agriculture is practised in larger scale. The following category of cultivated plants are recorded in the district:

CEREALS: *Hordeum vulgare*, *Fagopyrum esculentum*, *F. tataricum*, *Oryza sativa*, *Triticum aestivum*
Zea mays.

MILLETS: *Eleusine coracana*, *Setaria italica*, *Sorghum bicolor*.

VEGETABLES: *Abelmoscus esculentus*, *Amaranthus blitum*, *A. caudatus*, *Artocarpus heterophyllus*, *Beta vulgaris*, *Brassica oleracea* var. *capitata*, *B. campestris* var. *sarson*, *B. juncea* var. *cunifolia*, *B. hirta*, *Canavalia gladiata*, *Capsicum frutescens*, *Coccinea corolifolia*, *Colocasia esculenta*, *Cucumis sativus*, *Cucurbita maxima*, *C. pepo*, *Daucus carota*, *Lablab purpureus*, *Lagenaria ciceraria*, *Luffa acutangula*, *L. cylindrica*, *Lycopersicon esculentum*, *Momordica charantia*, *M. dojca*, *Moriga oleifera*, *Mucuna cochinchinensis*, *Phaseolus lunatus*, *Raphanus sativus*, *Rumex vesicarius*, *Sechium edule*, *Solanum melongena*, *S. tuberosum*, *Spinacea oleracea*, *Tricosanthus doica*, *I. cucurmerica*, *Vicia faba*, *Vigna sinensis*.

PULSES: *Cajanus cajan*, *Cicer arietinum*, *Dolichos biflorus*, *Lathyrus sativus*, *Lens culinaris*, *Phaseolus aureus*, *P. aconitifolius*, *P. mungo*, *Pisum sativum*.

OIL SEEDS: *Arachis hypogea*, *Brassica campestris*, *B. juncea*, *Helianthus annuus*, *Sesamum orientale*.

SUGAR: *Saccharum officinarum*.

SPICES: *Allium cepa*, *A. sativum*, *Ammomum subulatum*, *Areca catechu*, *Capsicum annum*, *C. frutescens*, *Coriandrum sativum*, *Curcuma longa*, *Cuminum cyminum*, *Foeniculum vulgare*, *Mentha piperita*, *Trigonella foenum graecum*, *Zingiber officinale*.

TUBER FOOD: *Dioscorea hamiltoniana*, *Ipomoea batatas*, *Manihot esculenta*.

FRUIT PLANTS: *Achras zapota*, *Aegle marmelos*, *Ananas comosus*, *Artocarpus heterophyllus*, *Careca papaya*, *Citrus aurantifolia*, *C. limon*, *C. medica*, *C. sinensis*, *C. reticulata*, *Cocos nucifera*, *Litchi chinensis*, *Mangifera indica*, *Musa paradisiaca*, *Prunus domestica*, *P. persica*, *Psidium guajava*, *Pyrus communis*.

FIBRE PLANTS : *Corchorus capsularis*, *C. olitorius*, *Gossypium arboreum*, *G. herbaceum*.

NARCOTICS: *Areca catechu*, *Cannabis sativa*, *Papaver somniferum*.

BEVERAGES: *Camellia sinensis* var. *assamica*, *C. sinensis*, var. *bohea*, *Coffea arabica*.

DRUG YIELDING PLANTS: *Atropa belladana*, *Cephaelis ipecacuanha*, *Cinchona calisaya*, *C. ledgeriana*, *C. succirubra*, *Digitalis purpurea*, *Dioscorea spp.*, *Rauwolfia serpentina*.

ORNAMENTAL PLANTS: There are a large number of cultivated ornamentals and wild plants of ornamental potentiality including foliage plants, succulents, Cacti, hedge plants, shrubs &

flowering annuals which are grown in gardens, in the district. Many of these plants are restricted to cultural conditions (detailed in Chapter VII under 'Exotic Elements' and 8.4.3 of this chapter under 'Potential Ornamental Plants').

TIMBER TREES: In the present scenario of economic developments several timber plants are being introduced to cultivation. (The list has been given in 8.4.2 of this chapter under 'Timber Trees'). The plants already under large scale cultivation are *Alcimandra cathartii*, *Dalbergia sissoo*, *Gmelina arborea*, *Shorea robusta*, *Tectona grandis* and *Terminalia alata*.

The most important cultivated plants of the district which fetch the cash income to the growers are *Amomum subulatum*, *Camellia sinensis*, *Citrus reticulata* and *Zingiber officinale*. Kalimpong and Mirik are popularly known as a land of Orchids. There are more than 50 flower nurseries in these places and at least 6 of them are indulged in international marketing of Orchids, Cacti and other flowers.

8.6 PLANTS RELATED TO ETHNIC MYTH

Superstitious belief and worship of supernatural powers are common among the people in rural villages. The sacred groves locally known as '*Devi Than*' (place of goddess) are important because these are located inside forest areas. The annual public rituals are observed here and the forest locality is completely protected. The *Devi thans* of Senchale (east), Takdah, Peshok, Darjeeling, Ambotay Kurseong, Kafer, Yangmakum are some, to cite examples. In comparison to sacred groves of other regions of the Indian subcontinent, these groves are smaller and cover an area of few square kilometers. Another sacred place is *Deorali* (place of God and also a resting place for long distant travellers). *Deorali* is usually situated in fringe areas and village borders. This place is similarly worshiped and protected. All the temples located in forest areas are carefully protected along with the surrounding vegetations. There are a good number of temples at the source areas of streams, especially of drinking water and generally of others. The snake god (*Nag devta*) is worshiped in such places.

Many plants are specifically treated as blessed by god while several are considered as evil doer and a bad omen. *Maesa chisia* is not used by the natives in any form. It is believed that if the sticks are used in beating cattles or goats the animals will move to slow death. Flowers of *Cestrum aurantiacum* are considered as cursed as an offering to dead bodies and not used in house holds or worships. Any stem marked by the impressions of a twiner are not permitted to household uses as they are believed to bring in monetary debts in the house.

In any religious ritual and worships the species like *Piper betle*, *Areca catechu*, *Santalum album*, *Oroxylum indicum*, *Hordeum vulgare*, *Sesamum indicum*, *Ocimum sanctum*, *Saccharum spontaneum* etc. are invariably used along with many other flowers, fruits and sugar. In spiritual worships performed by Jhankri (spiritual healer) *Phoebe lanceolata* (Jhankri seula) and stem tips of *Arundinaria maling* find their indispensable use. The other plants related to religious rituals are *Artemisia vulgaris*, *Euphorbia royleana*, *Calotropis procera*, *Mimosa himalayana* etc. as repeller evil spirits

During the first naming ceremony (*Nuwaran*) of a seven to eleven days old child the seeds of *Semecarpus anacardium* are burnt and let the baby smell the smokes so produced. This is believed to be a process of immunisation against the skin blisters caused by the same plant and *Rhus succedanea* as well as protection of body from evil eyes.

The important useful plants are mentioned in a large number of folk songs and oral poetry highlighting their usefulness.

The superstitious belief appears to sound odd in the present scenario of civilisation yet, this has become a blessing in disguise to many sacred forests and plants species.