KEYS TO THE DICOT GENERA IN NEPAL

PART I

(Polypetalae)

His Majesty's Government of Nepal,
Ministry of Forests,
Department of Medicinal Plants,
Kathmandu, Nepal.

1967

KEYS TO THE DICOT GENERA IN NEPAL

PART I

(Polypetalae)

Published by

His Majesty's Government of Nepal,
Ministry of Forests,
Department of Medicinal Plants,
Kathmandu, Nepal.

1 9 6 7

1st. Edition 1000 Copies

April 1967

Price —

Printed at H M G Press, in Nepal

PREFACE

Generally speaking there are three stages in the growth of understanding about the plants of a region. First comes the period of exploration, identification and discovery, second is the compilation and preparation of lists and writing the descriptive floras, and the third will be the studies on the total composition, origin and relationships of plant population. Some, however, prefer to add a fourth stage namely studies on photogeography. At present the Botanical Survey Section of this Department is engaged in the first type of work viz. exploration, identification and discovery of plants.

This booklet is the first of the series of keys to the identification of Nepal Plants and is our first venture which could be carried out only under the able guidance of Dr. M. L. Banerji, advisor to the Botanical Survey Section of this Department from the Indian Co-operation Mission under the Colombo Plan. I sincerely hope this booklet will be helpful in identifying the plants both in the field and in the herbarium.

I thank all of my colleagues particularly Mr. T. B. Shrestha, Mrs. P. Pradhan, Miss. R. Thapa and others who have helped me to bring out this booklet into publication.

P. R. Pande.
Senior Botanist.

Department of Medicinal Plants,
H. M. G. of Nepal,
Thapathali, Kathmandu.

April 2, 1967.

INTRODUCTION

To follow Bentham & Hooker's system; even in its modified form as has been done in recent times by authorities on taxonomy by regrouping genera or by constituting new families or by elevating certain tribes to family status, needs an explaination, particularly in the face of the International Association for Plant Taxonomist's decession to follow the systems as outlined by Engler and Prantl, for all modern floras.

Firstly: this little work is not a flora, but an aid to identify the genera from the study of external morphological characters of plants occuring in an area which is so far botanically very poorly known.

Secondly: are the Magnoliales primitive or the "Amentiferae least specialised"? It is too well known that according to Hallier, Bessey and Hutchinson, the Magnoliales are primitive and on the basis of wood anatomy there is much to recommend this. Also according to these authorities the bisexual, polypetalous flower with spiral arrangement of parts is considered as primitive. Evidence from living plants supports the view that apocarpous gynoecia are primitive and syncarpous gynoecia are advanced.

Eichler, Engler, Wettstein, Rendle and others consider the unisexual apetalous cyclic flower to be primitive. Evidence has accumulated from various sources that the Salicaceae, Urticales, Betulaceae, Juglandaceae, and Platanaceae are highly specialised and having undergone extreme reduction. The fact that "Amentiferae" produce ovaries with two or more united carpels is an additional argument in favour of their reduced and derived nature, and against the primitive nature of these plants.

In some apetalous flowers as in Salicaceae, Juglandaceae, Urticaceae etc. vestigial vascular systems are present. From the stand-point of wood anatomy also the "Amentiferae" are highly specialised. There is, thus, little to support that the "Amentiferae" are a primitive group of Angiosperms.

Based on the characters that have been selected to be most primitive; Flacourtiaceae, Annonaceae, Magnoliaceae, Myristicaceae and Euphorbiaceae have been concluded as primitive dicotyledonous families while Labiatae, Valerianaceae, Dipsacaceae, Phyrmaceae as the most advanced; and the amentiferous familes are scattered in between. (See Sporne, Proc. Linn. Soc. (Lond.) 160, 1948 & New Phytol. 48,1949)

It will be quite pertinent to recall that hypogyny is regarded primitive in contrast to epigyny; so also polypetaly to sympetaly and actinomorphic to zygomorphic. Keeping all these in mind, the system of Bentham & Hooker answers fairly well to these requirements, and if there is effected the exchange of position of the Heteromerae and the Inferae, as was proposed earlier by Bessey, things will improve considerably.

Thirdly: Bentham & Hooker set forth a system in their "Genera Plantarum" a work published in parts from 1862 to 1883; and the system of theirs is not now the latest. The system of Engler and Prantl in "Die Naturelichen Pflanzenfamilien" is now well known, and this no doubt presents the best system for the present, till it is surpassed. In Engler and Prantl's system the plants are arranged as far as possible in the order in which the various families probably have made their appearence on the earth's surface, or at all events in accordance with the from simple to complex. Perhaps this system of Engler and Prantl is better adapted for showing relationships or likeness, while that of Bentham & Hooker is well adapted to bring out the differences. The system used by Bentham & Hooker is still a standard

authority in descriptive botany. This, then furnishes an additional reason for the use of Bentham & Hooker's system although in its modified form, in the present work.

Fourthly; Avoiding injury to the feelings of those taxonomists who have strong prediliction for any other system, the selection of Bentham & Hooker's system in broad outlines and with all the modern readjustments of family limits becomes a necessity as long as in most English herbaria and in the English speaking countries this system is still followed unless the tenets of the Hutchinson system are accepted; also so long as Hooker's Flora British India continues to be the chief reference book available for plants of the neighbouring areas.

The sequence adopted here in the following pages is after Metcalf & Chalk's treatment in 'Anatomy of the Dicotyledons', except for the Rosaceae. It is earnestly hoped that these ideas will meet the approval of the kind readers. The genera listed here are based on the published papers. There may be some genera that may have been collected but so far no publication records it. It is quite possible that these genera have not been accounted for in this work, and in the course of further botanical explorations some additions may have to be made. This being a preliminary work, there is bound to be many shortcomings and ommissions. The plan of this work is, firstly there is a key for the families which is followed by detailed account of the characteristics of the family and the key to the genera so far recorded from the different parts of the country. This is the first part and covers all the families falling under Polypetalae.

KEY TO THE FAMILIES

Polypetalae- Calyx and corolla both present, the latter of separate petals.

Thalamiflorae- Calyx mostly inserted under the ovary; petals often in 2 or more series, sometimes 1 serie; stamens indefinite or definite, inserted on the often small or raised or stipitate receptacle, which is not developed into glandular disk; ovary very generally free.

RANALES- Stamens indefinite or if definite then the parienth in 3- oc series; carpels 1 or more, usually distinct, rarely united (see exceptions in Saxifragaceae, also hypogynous in 'Leguminosae')

Sepals 5 or few or 0; petals in about 1 series-

Seeds not arillate; sepals decidious, usually coloured. Herbs or shrubs- RANUNCULACEAE.

Seeds arillate; sepals persistent, herbaceous. Shrubs and trees- DILIENIACEAE.

Sepals or petals in 2 or oc series, rarely wanting-

Plants not aquatic. Perianth present-

Petals and stamens usually oc; ovules 1-oc-

Flowers bisexual; leaves stipulate, without pellucid dots.Woody trees-MAGNOLIACEAE

Flowers unisexual; leaves exstipulate, with pellucid dots.Twinning-SCHISANDRACEAE.

Petals and stamens mostly multiples of 3 or 2-

Stamens and carpels usually numerous; ovules 1-oc; Flowers bisexual; sepals 3; petals 6. Shrubs or trees- ANNONACEAE.

Stamens usually 6; carpels 3; ovules solitary, Flowers dioecious; sepals and petals usually 6. Mostly climbers- MENISPERMACEAE.

Stamens 4, 6, or 9, anthers opening by 2 lids, rarely birimose; carpels 1,ovules 2-oc; flowers bisexual.Herbs or shrubs-BERBERIDACEAE

Stamens usually 6, anthers birimose; carpels mostly 3, ovules many; flowers unisexual. Vines or erect,woody-LARDIZABALACEAE.

Petals 5; stamens 10; carpels 5 - 10, ovules solitary; Leaves opposite- See *Coriariaceae.*

Plants aquatic- NYMPHAEACEAE.

PARIETALES- Stamens definite or indefinite; ovary 1-celled or several celled by false partitions; carpels several; placentae parietal (some Ranunculaceae and Berberidaceae)

Embryo minute near the base of the fleshy endosperm

Petals all alike or nearly so- PAPAVERACEAE.

Petals in two series, the inner unlike the outer— FUMARIACEAE.

Embryo curved, endosperm absent-

Stamens 6, tetradynamous, rarely 4— CRUCIFERAE,

Stamens indefinite or if few not tetradynamous—
CAPPARIDACEAE.

Embryo not curved, rather large, radicle very near hilum; ovule anatropous or amphitropous—

Anthers dehisce introsely; mostly herbs—
VIOLACEAE

Anthers dehisce by apical pores or cracks; receptacle enlarged; woody — FLACOURTIACEAE

Anthers versatile, dehiscing by longitudinal fissures; woody— (See Stachyuraceae)

POLYGALALES- Stamens as many as or twice as petals; Carpels 2, ovary usually perfectly or imperfectly 2-celled, usually compressed.

Flowers regular or slightly oblique. Stamens 5, as many as sepals or petals; woody—
PITTOSPORACEAE

Flowers irregular; stamens united; herbaceous—
POLYGALACEAE

CARYOPHYLLALES- Stamens definite, rarely indefinite; Ovary 1-celled or imperfectly septate, placenta central, rarely parietal; embryo curved or coiled, rarely straight.

Sepals of same number as petals; placenta 1, central; herbs with cymose inflorescence—
CARYOPHYLLACEAE

Sepals of same number as petals; placenta several; mostly woody with flowers spicate or racemose—
TAMARICACEAE.

Sepals less than petals; placenta basal; succulent herbs with entire leaves having scaly or hairy nodal appendages— PORTULACACEAE.

GUTTIFERALES Stamens usually indefinite; sepals imbricate; Ovary septate, placentae on the inner angles of the cell -axile (exceptions with disk absent in Linaceae, Geraniaceae etc.)

Leaves opposite or whorled, coriaceous; flowers cymose or panicled, unisexual—GUTTIFERAE.

Leaves alternate, coriaceous; flowers mostly racemose—

Cells of the ovary 2-10; stamens numerous; flowers 5 merous—

Petals free or slightly connate; stamens free or in 5 bundles, attached to the base of the petals. Flowers showy (Unisexual and plants dioecious in EURYA); trees or shrubs— THEACEAE.

Petals free or slightly connate, much twisted; sepal lobes enlarged and wing-like; stamens numerous. Flowers bisexual; Trees— DIPTEROCARPACEAE.

Petals shortly connate at the base; stamens adnate to the base of the petals. Flowers bisexual; Trees— SAURAUIACEAE.

Petals free; flowers unisexual; plants dioecious. Lianous— ACTINIDACEAE.

Cells of ovary 4; stamens 8; flowers 4-merous— STACHYURACEAE.

MALVALES Stamens usually indefinite or monadelaphous; sepals valvate; ovary septate placentae axile.

Anthers 1-celled, pollen grains rough; herbs or woody— MALVACEAE.

Anthers 1-to several celled. pollen grains smooth; woody plants— BOMBACACEAE.

Anthers 2-celled, flowers with staminodia and stamen-tube; woody plants— STERCULIACEAE.

Anthers 2-celled; stamens nearly free, no staminodia; ovules pendulous—

Petals ordinary; herbs or woody— TILIACEAE.

Petals firm, ofter hairy or incised; woody plants— ELEOCARPACEAE.

Anomalous group— Stamens indefinite; free; sepals valvate; carpel 1, ovary1-celled; flowers regular. Leaves compound; herbs or woody—MIMOSACEAE

Disciflorae— Calyx usually inserted under the ovary; petals in 1 series; stamens usually definite, inserted within or upon or around the receptacle which is usually expanded as a disk with the calyx; ovary usually free or imbedded in the disk. *(See Flacourtiaceae).*

GERANIALES— Disk usually a ring between stamens or adnate to staminal tube or reduced to glands alternating with the petals, rarely absent. Ovary commonly lobed, rarely entire or subapocarpous; ovules 1-2 in each cell, pendulous; raphae towards axis.

Ovary more or less grooved or lobed—

Anthers elongated; disk enlarged in fruit— OCHNACEAE.

Anthers normal—

Calyx-lobes 5, all or mostly with 2 glands outside. Carpels usually 3; fruit indehiscent often winged. Woody— MALPIGHIACEAE.

Calyx-lobes not biglandular—

Foliage glandular-dotted; carpels sometimes seperate— RUTACEAE.

Foliage not gland-dotted—

Disk well developed, regular; petals regular; Ovary closed. Woody plants— SIMARUBACEAE.

Disk indistinct, otherwise as in previous. Herbaceous plants—

Ovules solitary; stamens 6-10, connate at base; fruit dehiscent. Flowers regular- Leaves stipulate— GERANIACEAE.

Ovules several; fruit dehiscent. Leaves exstipulate—

Stamens 10; flowers regular. Leaves compound — OXALIDACEAE.

Stamens 5: flowers irregular. Leaves simple— BALSAMINACAEE

Ovary entire; stamens monadelaphous, atleast below. Woody plants

Stamen-tube stipitate; disk various— MELIACEAE.

Stamen-tube sessile; disk absent; petals not appendaged; fruit a capsule— LINACEAE.

OLACALES- Disk cup-shaped or ring-shaped, free or bearing the stamens and petals on its edges. Ovary 1 to indefinite celled,

entire; ovules solitary, pendulous; raphae away from the axis.

Petals or corolla-lobes usually valvate; woody— OLACACEAE.

Petals or corolla-lobes usually imbricate or convolute—

Ovary 3 or more locular; fruit drupaceous, 3 or more seeded. Woody— AQUIFOLIACEAE:

Ovary 1 rarely 3-5 locular; fruit drupaceous, 1 seeded. Woody— ICACINACEAE.

CELASTRALES- Disk tumid or adnate to the calyx or covering its base; stamens inserted around the disk or affixed to its margin; ovary usually entire; ovules usually 2 in each cell, erect; raphae turned towards axis, Leaves simple or rarely compound.

Calyx valvate; petals small,concave; stamens opposite the petals Woody— RHAMNACEAE.

Calyx imbricate—

Stamens alternate with the petals,the later spreading and imbricate. Woody— CELASTRACEAE.

Stamens opposite the petals, the later valvate and dropping off early; woody and herbaceous— VITACEAE.

SAPINDALES- Disk various; stamens variously inserted on the disk; ovary entire or more often lobed or subapocarpous, ovules commonly 1-2 in each cell, ascending with raphe towards the axis or reversed or solitary and pendulous from ascending funicle,

rarely oc and horizontal. Leaves pinnate, simple or digitate.

Carples 2, fruit a samara— ACERACEAE.

Carpels 2-3, fruit a drupe, 1-seeded— SABIACEAE.

Carpels 3-5 , fruit rarely samaroid—

Bark containing resin; disk intrastaminal; fruit usually a drupe— ANACARDIACEAE.

Bark not resinous—

Endosperm abundant; embryo straight; disk intrastaminal; carpels 3— STAPHYLEACEAE.

Endosperm sparse or wanting; embryo curved—

Leaves opposite, palmately compound; large flowered thyrse. Capsule leathery; cotyledons large, fused— HIPPOCASTANACEAE.

Leaves alternate, variously compound or simple; flowers small in racemose or paniculate unilateral cymes; unilateral staminal disk. Fruit very variable. Lianous genera with coiled tendrils— SAPINDACEAE.

Anomalous family- Disk absent; sepals and petals 5 each; stamens 10; carpels 5-10 distinct; ovules one in each loculus, pendulous. Fruit a pseudodrupe because of the fleshy and persistent petals which become enlarged and adhere to the fruiting carpels— CORIARIACEAE.

(Gundersen places this family under— *RUTALES*).

Calyciflorae- Petals in 1 series; stamens oc or definite, inserted with the petals and sepals on the edge the cup-shaped receptacle (hypanthium) or on the

disk lining the latter; ovary often adnate to this receptacle and therefore inferior.

LEGUMINALES- Carpel one, developing into legume (rarely indehiscent); flowers of most species zygomorphic, stamens usually definite, 10 or 5, sometimes oc.

Flowers zygomorphic, perianth segments predominatingly imbricate in bud—

Corolla caesalpinnaceous, aestivation imbricate-ascending, posterior petal innermost, petals typically 5 and distinct — CAESALPINIACEAE.

Corolla papilionaceae, aestivation imbricate-descending, posterior petal outermost, the two anterior petals often connate forming the keel — FABACEAE.

Flowers actinomorphic, calyx and corolla valvate in bud; inflorescence dense, flowers small; stamens many, filaments long — MIMOSACEAE.
(also see under Thalamifloreae-anomalous group.)

ROSALES Carpels superior, solitary or free or united only at base, sometimes to the apex and then rarely inferior styles distinct, rarely united in a column and easily seperated or rarely connate (as in some Saxifragaceae).

Endosperm rare. Fruit either a follicle, drupe, pome, achene or aggregate; leaves simple or compound, with-out pulvinus. Calyx cupshaped, 5 or 4 parted; petals 5; stamens oc in several whorls- ROSACEAE.

Endosperm moderate or copious—

Plants insectivorous. Leaves bearing tantacles tipped with capitate viscid glands. Herbs—
DROSERACEAE.

Plants not insectivorous—

Carpels 5 rarely 3 or more, seperate with a scale at the base of each, superior, ovules many. Succulent herbs or small shrubs—
CRASSULACEAE.

Carpels 2 to several, rarely seperate, no scale at the base.Plants not conspiciously succulent—

Ovary usually 2 celled, usually inferior; ovules oc, placentae usually axile. Fruit a capsule or a berry—

Trees or shrubs; leaves alternate, rarely otherwise, mostly with gland-tipped teeth. Stamens 5 rarely 4 or 6, sometimes alternating with staminodes. Ovary inferior or half superior; placentae parietal; fruit a capsule or a berry— ESCALLONIACEAE.

Shrubs or small trees. Leaves opposite, pubescence stellate. Flowers bisexual or sometimes the outer flowers sterile with large petal-like sepals; stamens 5 or 10 or oc; ovary inferior to half inferior, 6-3 locules, placentae axile. Fruit a capsule—
HYDRANGEACEAE.

Shrubs, scandent often armed with spines; leaves alternate, usually palmately lobed. Flowers unisexual; stamans 5; ovary inferior, unilocular, placentae parietal Fruit a pulpy berry crowned by the persistent calyx— GROSSULARIACEAE.

Herbs; leaves mostly alternate or basal. Flowers bisexual; disk nectariferous; ovary 1-3 locular free or adnate to the tubular receptacle, placentae axile and swollen; styles free. Fruit a capsule—
SAXIFRAGACEAE.

Ovary 2 celled, inferior or rarely superior; ovules 1-oc pendulous or axile; fruit a 2-valved woody capsule with a seperating inner layer of different texture. Trees or shrubs with stellate indumentum; flowers hermaphrodite or unisexual— HAMAMELIDACEAE.

Ovary 1-4 celled, usually inferior; ovules pendulous fruit indehiscent. Herbs or undershrubs; flowers hermaphrodite or unisexual; stamens 2-8, rarely 1—
HALORRHAGACEAE.

The family Rosaceae is now seperated on the characters of the axis, ovary, and fruit; and a key to the now recognised families is as—

Ovary superior--

Fruit aggregate, follicular, of achenes, seperate drupelets or otherwise Carpels usually seperate— ROSACEAE.

Fruit a drupe (not aggregate of drupelets). Carpel single— AMYGDALACEAE. (Drupaceae).

Ovary inferior: fruit a pome—
MALACEAE (Pomaceae)

MYRTALES— Ovary syncarpous, inferior or inclosed in a cupshaped receptacle, usually divided into cells; styles undivided; ovules 2-oc in the cells.

Ovules pendulous from the apex of cell; ovary 1-celled; plants woody— COMBRETACEAE.

Ovules affixed to the inner angles of the cells or to basilar placentae, ascending, horizontal or pendulous—

Stamens oc, rarely definite; oil glands in foliage; plants woody (Seive tubes in pith rays)— MYRTACEAE.

Stamens definite, rarely oc—

Calyx-tube usually imbricate or open; anthers curved usually opening by pores at the apex; connectives usually appendaged or thickened— MELASTOMATACEAE.

Calyx-tube usually valvate; anthers normal, not appendaged, opening bongitudinally—

Ovary superior—

Herbs rarely shrubs. Petals corrugated; stamens 4-8, rarely more, filaments usually inflexed in bud— LYTHRACEAE.

Trees. Petals 4-8, small; stamens oc, filaments long— SONNERATIACEAE.

Ovary inferior or half inferior—

Carpels in 1 whorl; petals convolute— ONAGRACEAE.

Carpels in stories, superimposed; petals corrugated— PUNICACEAE.

PASSIFLORALES—Ovary syncarpous, inferior or semi-inferior; 1-celled with parietal placentation or divided into cells; ovules 1-oc. styles united or distinct from the base.

Corona of 1 or more rows of thread-like filaments or scales or annular. Herbaceous climbers; leaves often with glands on the petioles; ovary superior, sometimes with a gynophore— PASSIFLORACEAE.

Corona absent; ovary inferior—

Stamens usually 3; ovary 1-celled with 3 parietal placentae. Climbers with tendrils— CUCURBITACEAE.

Stamens oc; ovary 2-3 celled, usually sharply angled and winged. Undershrubs or herbs— BEGONIACEAE.

Stamens numerous to few; ovary 1-celled; petals free, small or absent. Trees or (herbs.)— DATISCACEAE.

FICOIDALES Ovary syncarpous, inferior or superior, divided into cells with sub-basilar placentae, or rarely 1 celled with parietal placentae; ovules 1-oc; styles distinct or united to near apex; embryo curved or excentric.

Calyx-lobes, petals and stamens usually oc; ovary 1-celled— CACTACEAE.

Calyx-lobes usually 4-5; petals absent; ovary 2- oc celled— AIZOACEAE.*

*No member belonging to this family is so far recorded, but it is expected to be present in the area, particularly in dry places.

UMBELLALES Ovary syncarpous, inferior, crowned by the disk, divided into cells or 1-carpelled; styles distinct or united

part way; ovules solitary and pendulous in the cells.

Fruit longitudinally seperating into 2 dry indehiscent one seeded mericarps; stylopodium prominent; leaves sheathing- (Umbelliferae) APIACEAE

Fruit usually drupaceous, the stones distinct but not seperating naturally--

Leaves simple, pinnately veined--

Flowers in cymes; corolla villous within; ovary 1-2 celled; leaves alternate. Trees or shrubs-- ALANGIACEAE

Flowers in heads or cymes; ovary 1-5 celled; leaves opposite or alternate. Woody or subligneous plants- CORNACEAE

Leaves compound or simple and palmately veined, stipules present, hairs stellate; stylopodium absent- ARALIACEAE

EXCEPTIONAL FLORAL STRUCTURES

Trimerous flowers in *Annonaceae*, *Menispermaceae*, *Berberidaceae* and some others.

Flowers with petals more or less connate at the base occur in *Annonaceae*, *Menispermaceae*, *Theaceae*, *Saurauiaceae*, *Malvaceae*, *Aquifoliaceae*, *Crassulaceae*, *Myrtaceae*, *Cucurbitaceae* and also in *Oxalidaceae*, and *Mimosaceae*.

Besides, there are some genera in some of the families that have exceptional characters e. g.

RANUNCULACEAE-

Anemone, *Caltha*, *Clematis* and *Thalictrum* have a petaloid calyx and no corolla.

In *Aconitum* and *Delphinium* the sepals and petals are peculiarly formed so it is difficult to make out which belongs to the former and which to the latter series.

Actaea differs from the others in having a berry fruit. In *Nigella* the carpels are connate except at the tip.

DILLENIACEAE-

Ovary apparently syncarpous in *Dillenia*.

MAGNOLIACEAE-

The receptacle or axis on which the carpels are seated elongates in the fruiting condition and has

the appearance of being the axis of a raceme of flowers each containing a single carpel.

NYMPHEACEAE-

Ovary apparently syncarpous in *Nympheae*.

PAPAVERACEAE-

The sepals fall off very early so that the opened flower consists of petals, enclosing the stamens and pistil.

POLYGALACEAE-

Two of the sepals are like petals, and the lowest of the three petals is much larger than the others and crested.

BALSAMINACEAE-

In *Impatiens*, the lower three sepals are combined and largest. They are the most showy part of the flower.

RHAMNACEAE-

In *Helinus* the ovary is inferior.

FABACEAE-

Lower two petals united to form the keel which enclosed the stamens and the carpel.

CORNACEAE-

The bracts of the involucre are white, and resemble the sepals of *Clematis*.

THALAMIFLORAE

RANUNCULACEAE

Annual or perennial herbs with radical and alternate leaves, or shrubs or climbers with opposite often compound leaves, mostly exstipulate. Flowers typically bi-sexual rarely dioecious, actinomorphic or medianly zygomorphic, inflorescence solitary or racemose to paniculate. Perianth biseriate and differentiated into calyx and corolla or not so, sepals sometimes petaloid, rarely spurred at the base; petals many to few, often 5, showy or much reduced or even absent, then sepals often petaloid. Stamens usually many, spirally arranged, hypogynous; gynoecium of 3 to many carpels, rarely 1, distinct, spirally arranged, simple pistils or multicarpellate and syncarpous, ovary superior, placentation parietal along ventral suture. Fruit an eterio of achenes or follicles, rarely a berry or a capsule. (see exceptions). (15 Genera).

Analysis of the genera—

Climbing shrubs—

Petals absent; tendrils absent, but petioles and petiolules twinning— CLEMATIS.

Petals present, linear; terminal leaflet modified into a tendril— NARAVELIA.

Herbs with leaves alternate or radical—

Fruit an eterio of achenes—

Sepals petaloid—

Petals absent—

Involucre present— ANEMONE

Involucre absent— THALICTRUM

Petals 5-15, with nectaries— CALLIANTHEMUM

Sepals herbaceous—

Sepals 3-5, decidious; petals 5-8— RANUNCULUS*

Sepals 5, persistant; petals 10-15— OXYGRAPHIS

Fruit an eterio of follicles or a follicle—

Flowers solitary or panicled—

Flowers solitary or panicled—

Petals absent— CALTHA

Petals small; carpels sessile—

Leaves palmate— TROLLIUS

Leaves not so, decompound—

Carpels usually about 5, mostly erect in fruit. Plants caespitose— PARAQUILEGIA

Carpels 2 (rarely 3), divaricate in fruit. Plants perennial— ISOPYRUM §

Flowers in racemes—

Flowers irregular—

Posterior sepal spurred— DELPHINIUM

Posterior sepal vaulted— ACONITUM

---

* Rydberg segregated **Ranunculus** into **Batrachium, Halerpestes, Cyrtorhyncha, Beckwithia** and **Coptidium** besides **Ranunculus**. Cook (Watsonia, 1963) treats **Batrachium** as a subgenus of **Ranunculus.**

§ Drummond & Hutchinson have seperated **Paraquilegia** & Asteropyrum from **Isopyrum** (Kew Bull 1920).

Flowers regular—

Sepals & Petals 5-7, no clear distinction between them; carpels 2-5; fruit an eterio of follicles— CIMICIFUGA

Sepals & Petals 4 each, petals shorter than sepals; carpel solitary; fruit a berry— ACTAEA

DILLENIACEAE

Trees or shrubs, (rarely herbaceous). Leaves alternate, simple, veination seemingly parallel, stipules absent or caducous. Flowers bisexual or unisexual, often large and showy, actinomorphic; sepals 5, imbricate, persistent; petals 5 or fewer, imbricate, decidious, often crumpled in bud. Stamens numerous, distinct or variously basally fasciculate, hypogynous, usually persistent. Gynoecium usually of several distinct carpels cohering in the axis, ovary superior; styles as many as pistils, free. Fruit a follicle or berry-like, seeds with copious fleshy endosperm.

(1 Genus).

Analysis of the genus-

Trees; leaves large, simple, parallel-nerved from the mid-rib; stipules absent. Flowers large; stamens oc; carpels 5-20, coherent in the centre. Fruit globose, composed of an accrescent calyx- DILLENIA

MAGNOLIACEAE

Trees or shrubs, decidious or evergreen. Leaves alternate, simple, mostly entire; stipules usually present and then enclosing the young bud, early decidious and leaving a large scar. Flowers terminal or axillary, usually solitary, bisexual, actinomorphic, large and showy. Sepals often 3; petals 6 to many; stamens numerous, hypogynous, spira-

ally disposed on the basal portion of the floral axis- androphore. Gynoecium sessile or on a gynophore, of many pistils spirally arranged on an elongated axis. Fruit an eterio of berries or of follicles. (3 Genera).

Analysis of the genera

Flowers terminal; gynophore absent-

Carpels with two ovules- MAGNOLIA

Carpels with 4 or more ovules- MANGLIETIA

Flowers axillary; gynophore present- MICHELIA

SCHISANDRACEAE

Climbing or trailing glabrous shrubs; leaves exstipulate, simple, alternate and often pellucid- dotted. Flowers unisexual, small, white, yellow or reddish; axillary or in the axils of scales near the base of short lateral leafy ranches. Sepals and petals 9-15, scarcely differentiated one from the other. Male flowers with 5-15 or more stamens, spirally arranged on an ovoid fleshy cushion. Female flowers with numerous distinct carpels; 2-3 ovules in each carpel. Fruit baccate composed of a highly modified torus. (2 Genera.)

Analysis of the genera-,

Carpels scattered on an elongated axis after flowering. Fruit with a slender spike- SCHISANDRA

Carpels remaining crowded in a head after flowering Fruit with a globose head- KADSURA.

ANNONACEAE

Trees or shrubs often climbing, with aromatic wood and foliage. Leaves alternate, exstipulate, simple, entire and penninerved. Flowers mostly bisexual rarely unisexual, actinomorphic, hypogynous, perianth usually triseriate. Sepals 3 or rarely 2, basally connate or distinct, valvate;

petals 6, usually biseriate, fleshy, hypogynous. Stamens numerous, distinct, spirally arranged and closely packed on the torus, filaments short or absent, anthers often overtopped by the truncate enlarged connective; carpels numerous or few, apocarpous rarely syncarpous, superior. Fruit a berry or the maturing pistils becoming connate and adnate to the floral axis to form a single fleshy aggregate fruit.

(2 Genera.)

Analysis of the genera

Carpels free or if slightly so, then always quite free in fruit; fruit moniliform, with several seeds in a single row. Flowers trimerous; sepals 3; petals 3 & 3- DESMOS

Carpels united into a fleshy mass especially in fruit, surface covered with knobs, bulges etc. Flowers extra-axillary; sepals 3; petals 6 or inner whorl very small or absent- ANNONA.

MENISPERMACEAE

Climbing or twining shrubs, rarely erect. Leaves alternate, exstipulate, simple or rarely compound, mostly entire or occasionally palmately lobed and palmately veined, petioled. Flowers unisexual, small, solitary, fascicled, capitate or cymose or frequently racemed or panicled, sometimes bracteate, occasionally 3 bracteoleate. Sepals 6 in 2 whorls, rarely fewer or numerous in 3-4 whorls, petals 6 or fewer, free or connate. Male flowers with stamens usually as many as petals or indefinite when petals few, antipetalous, filaments free or connate; rudimentary carpel present or absent. Female flowers with staminodes 6 or 0; carpels 3 or rarely more, simple or divided, style scar becoming basilar by the curvature of the ovary. Fruit a drupe. (6 Genera.)

Analysis of the genera-

Male specimens.

Stamens free-

Stem without bark; leaves not peltate or cordate; anthers bursting transversely- COCCULUS.

Stem with bark; leaves cordate; anthers bursting obliquely- TINOSPORA.

Stamens united into a column. Leaves peltate or cordate, glabrous-

Flowers in axillary dichotomous cymes. Branches pubescent with milky juice. Sepals 6; petals 3, very small; stamens 6- PARABAENA.

Flowers in axillary panicles. Branches glabrous, no milky juice. Sepals 6; petals 6; stamens 6- TILACORA.

Flowers in solitary umbellate heads. Sepals 6-10; petals 3-5; stamens 6- STEPHANIA.

Flowers in cymes or clustered in the axils of orbicular bracts. Sepals and petals 4 each; Stamens 4- CISSAMPELOS.

Female specimens-

Ovary solitary; staminodes 0-

Flowers in a small raceme of small cymes. Drupes hirsute- CISSAMPELOS.

Flowers in umbellate heads or in solitary condensed cymes. STEPHANIA.

Ovaries 3 or many; staminodes 6-

Flowers in short erect panicles or sub-solitary. Drupes pisiform- COCCULUS.

Flowers in axillary panicles. Drupes obovoid- TILACORA.

Flowers in axillary dichotomous cymes. Drupes ovoid- PARABAENA.

Flowers in axillary or terminal racemes or panicles. Drupes dorsally convex, ventrally concave- TINOSPORA.

LARDIZABALACEAE

Twining or erect shrubs. Leaves alternate, digitately compound or rarely pinnatc, petiolules swollen at the base. Flowers mostly unisexual or rarely bisexual, actinomorphic, racemose or solitary. Sepals 3 or 6, imbricate or the outer valvate, often petaloid; petals 6, smaller than the sepals or absent. Male flowers with stamens 6 free or basally connate, connectives often produced. Female flowers with staminodes 6 or absent; carpels 3 or more, free, soon divergent; stigmas oblique, subsessile. Fruit a berry.

(3 Genera.)

Analysis of the genera-

Erect shrubs. Leaves unequally pinnate, with several pairs of opposite leaflets. Flowers bisexual; petals 0; stamens free; fruit of 3 spreading fleshy many seeded follicles- DECAISNEA.

Climbing shrubs. Leaves digitate, pinnately 3-foliate-

Sepals 6; petals 6; minute; stamens free- HOLBOELLIA.

Sepals 3; petals absent; stamens united- STAUNTONIA.

BERBERIDACEAE

Perennial undershrubs or shrubs or herbs, fleshy rootstocks, sometimes creeping rhizomes. Leaves alternate, 1-many foliate, mostly exstipulate and petioles basally dialated. Flowers hermaphrodite, regular, axillary, solitary or in simple or compound racemes, usually yellow. Sepals 3-9 in 1-3 whorls, often petaloid, imbricate or outer rarely

valvate; petals equal in number to the sepals or twice as many and like them, caducous, nectariferous at the base. Stamens 4-6 rarely8, opposite the petals, free, hypogynous, anthers adnate; carpel 1, style short, stigma large and dialated. Fruit usually a berry. (3 Genera.)

Analysis of the genera.

Shrubs or undershrubs, wood yellow. Flowers yellow-

Leaves of long shoots transformed into thorns, those of short shoots simple, often decidious; inflorescence terminating short shoots, arising in the axils of leafthorns- BERBERIS.

Leaves of long shoots compound,evergreen;inflorescence arising from the axils of scales of winter-buds whieh terminate long shoots- MAHONIA.

Perennial herbs with fleshy root-stocks; leaves peltate, palmately lobed. Flowers large, solitary, white- PODOPHYLLUM.

NYMPHAEACEAE

Aquatic herbs. Leaves on long petioles, floating, peltate or cordate. Flowers bisexual, solitary, large and showy. Sepals 4-6, free or adnate to the torus; petals numerous, hypogynous or perigynous, sometimes gradually passing into the stamens; stamens indefinite; carpels 8 or more, sunk in the enlarged torus or ovary syncarpous. Fruit formed of the connate carpels or of seperate and individual carpels or the enlarged turbinate flat-topped disk. (1 Genus.)

Analysis of the genus

Carpels or ovary more or less immersed in the torus; sepals and petals subhypogynous; stamens epigynous. Leaves with a basal sinus- NYMPHAEA.

PAPAVERACEAE

Annual or perennial herbs, juice coloured. Leaves alternate, pinnatifid, exstipulate. Flowers bisexual, regular; sepals 2 or 3, falling off as the flower opens; petals 4 or 6 in 2 series, often crumpled, hypogynous, free, and soon falling off; stamens indefinite, free, anthers 2-celled; ovary syncarpous, superior, 1- celled; stigma sessile; ovules numerous on parietal placentae. Fruit a capsule opening by pores or by valves. (4 Genera.)

Analysis of the genera

Capsule usually short, opening by short valves or pores-

Leaves not spinous; flowers red- PAPAVER.

Leaves spinous; flowers generally yellow or purple-

Stigmas 4-6, radiating from the top of a depressed style- ARGEMONE.

Stigmas 4-6, decurrent on the top of the style- MECONOPSIS.

Capsule long dehiscing throughout its length; stigmas 2-4, persistent- STYLOPHORUM.

FUMARIACEAE

Glabrous herbs with brittle stems, rootstock usually perennial; juice watery. Leaves alternate, rarely subopposite, pinnately divided; stipules none. Flowers bisexual, zygomorphic, corymbose or racemed. Sepals 2, small, scale-like; petals 4, tips conniving, two outer large, one or both gibbous or spurred, the two inner narrower and coherant at the apex; stamens 4, free and antipetalous or 6 in 2 bundles: ovary superior, 1-celled, two parietal placentae, ovules several or one, style thread-like, stigma often 2-lobed. Fruit a 2 valved capsule. (4 Genera.)

Analysis of the genera

Stamens 6, diadelphous-

Outer petals both spurred; leaf-stalk ending into a tendril- DICENTRA.

One outer petal spurred; tendrils absent-

Fruit a capsule, many seeded: spur about half the length of the petals- CORYDALIS.

Fruit indehiscent, 1 seeded; spur about 1/3 rd the length of the petal or less- FUMARIA.

Stamens 4, free- HYPECOUM.

CRUCIFERAE

Annual or perennial herbs, some shrubby, juice watery and often pungent, indumentum of simple, medifixed or stellate hairs; leaves usually alternate rarely opposite, exstipulate. Flowers hermaphrodite, actinomorphic rarely bracteate, in terminal racemes or corymbs. Sepals 4 free, the lateral often larger than others, dialated or saccate; petals 4, mostly equal, free, placed crosswise; glands mostly present on the torus; stamens 6, free, 2 opposite the lateral sepals short, 4 opposite the anterio-posterior sepals, large and in pairs; ovary 2-celled, many ovules on parietal placentae, a spurious membranous septum present. Fruit a siliqua or a silicula; seeds usually folded, cotyledons accumbent, incumbent or folded. (18 Genera.)

Analysis of the genera—

Pods long or short, dehiscing throughout their length, terete, 4-angled or compressed dorsally (parallel to the septum.)

Pods narrow, long, Seeds usually 1-seriate; cotyledons accumbent

Sepals spreading, seeds 2-seriate, minute. Flowers usually yellow NASTURTIUM

Sepals not saccate. Pods 4-angled, seeds 1-seriate,. Flowers yellow BARBAREA.

Sepals erect, not saccate. Pods flat, strongly nerved. seeds flattened. Flowers white or rose ARABIS.

Sepals erect; seeds 1-seriate, flattened. Flowers white or purple; leaves generally pinnatisect CARDAMINE.

Pods short, broad. Seeds usually 2-seriate; cotyledons accumbent

Leaves entire; herbs with stellate pubescence (cotyledons rarely incumbent) DRABA.

Leaves divided; glabrous herbs with a covering of simple hairs—

Single gland on each side of the short stamen. Fruit valve convex COCHLEARIA.

Lateral glands horse-shoe shaped or lunate. Fruit valves sometimes keeled. The six stamens equal in size LIGNARIELLA.

Pods usually sessile, long and narrow, Seeds usually 1-seriate, but 2-seriate in *EUTREMA*; cotyledons straight, flat, incumbent-

Sepals erect or spreading; pods many seeded, valves 1-3 nerved, seeds usually 1-seriate. Hairy plants—

Valves of pods 3-nerved, siliqua 1" or more in length. Leaves undivided or pinnately lobed. Hairs simple SISYMBRIUM.

Valves of pods 1-nerved—

Flowers ebracteate; sepals not saccate. Leaves twice or thrice pinnatisect, glanduar hairs consisting of a multicellular stalk and a head of 1 or more cells. Siliqua small, 1" and straight DESCURAINIA.

Flowers bracteate; sepals saccate. Leaves lyrate-pinnate pinnatifid, hairs stellate. Siliqua less than 1/2" and bent backwards, always curved MICROSISYMBRIUM.

Sepals short, erect; pods terete, valves 1-nerved, seeds usually 2- seriate. Glabrous herbs- EUTREMA.

Sepals erect; pods compressed or terete, valves 1-nerved, keeled. Herbs with spreading forked hairs- ERYSIUM.

Pods short, valves convex, 1- nerved, seeds few, large, 2- seriate cotyledons flat, incumbent. Tufted glabrous or hoary pubescent herbs (compare from *DRABA*)- BRAYA.

Pods short or long, seeds 1- seriate; cotyledons longitudinally folded or deeply grooved. Stigma truncate or 2- lobed. Flowers in long racemes- BRASSICA.

Pods short, dehiscing throughout their length, compressed laterally - i.e. at right angles to the septum-

Cotyledons incumbent; straight, curved or longitudinally folded-

Pods many seeded, valves not winged. Seeds numerous, 2- seriate, narrowly margined- CAPSELLA.

Pods few-seeded, valves keeled or winged. Seeds 1 in each cell- LEPIDIUM.

Cotyledons accumbent, straight-

Pods compressed not notched; valves winged or keeled. Sepals erect and equal at the base- THLASPI.

Pods elliptic or oblong, valves keeled. Sepals erect, lateral saccate at the base- IBERIDELLA.

CAPPARIDACEAE

Herbs or shrubs. Leaves alternate , simple or digitately compound, stipules when present minute or spiny. Flowers regular, hermaphrodite, hypogynous, solitary or in racemes. Sepal 4, free; petals 4, free, imbricate; torus elongated or short; stamens numerous, free, at the base of or on a long or short gynophore, ovary sessile or stalked, 1-celled, ovules many on parietal placentae. Fruit a linear or ovoid capsule. (2 Genera.)

Analysis of the genera-

Herbs; glandular pubescent; leaves 3-7 foliate; gynandrophore present; stamens 6; fruit a capsule- (GYNANDROPSIS.)

Climbing shrubs or small tree; leaves simple or absent, stipules spinescent; gynophore present; stamens indefinite; fruit a berry- CAPPARIS.

VIOLACEAE

Herbs with leaves alternate rarely opposite, entire, stipulate, stipules small or leafy. Flowers zygomorphic, hermaphrodite, 2 bracteoles. Sepals 5, persistent, equal or unequal; petals 5, erect or spreading, mostly unequal, lower largest, saccate or spurred; stamens 5, hypogynous, more or less connivent in a ring around the ovary, filaments short and broad; ovary sessile, 1-celled, ovules many on parietal placentae, style simple, stigma capitate. Fruit a 3 valved capsule. (1 Genus.)

Analysis of the genus-

Corolla irregular; sepal produced at the base, lower petal dissimilar; anthers connate, staminode nil; fruit a 3-valved capsule- VIOLA.

FLACOURTIACEAE
(including Samydaceae)

Trees and shrubs; leaves simple, alternate and in 2 ranks, sometimes pellucid-dotted, stipules caducous. Flowers often dioecious, floral structure varies, regular, mostly in lateral or terminal cymose inflorescence. Sepals 2-15, sometimes not distinguishable from the petals; petals none or equal to sepals, sometimes not in regular relation to sepals; stamens numerous, hypogynous or perigynous, receptacle enlarged and variously modified, free or in bundles; ovary 1-celled, carpels 2-10, superior, rarely half inferior or even inferior, placentae parietal, ovules 2 or more, styles and stigmas as many as placentae. Fruit indehiscent berry or rarely a capsule.

(5 Genera.)

Analysis of the genera-

Flowers bisexual; petals present-

Leaves with two distinct glands at the base of the blade or apex of petiole. Stamens indefinite; ovary 1-celled; fruit a berry- SCOLOPIA.

Leaves without 2 distinct basal glands. Stamens solitary or in fascicles of 1-7, opposite the petals; ovary half-superior, 1-celled. Fruit a capsule- HOMALIUM.

Flowers unisexual; petals absent-

Leaves alternate, distichous, with pellucid dots. Ovary 1-celled, perigynous; style simple; stigma capitate or 3-fid- CASEARIA.

Leaves glabrous, oblong-lanceolate, 3-5 nerved at the base. Ovary 1-celled; style 1; fruit a berry- XYLOSMA

Leaves pubescent, ovate; ovary apparently 2-8 celled; style 2 or more- FLACOURTIA.

PITTOSPORACEAE

Trees (rarely shrubs or woody climbers); leaves simple, alternate or whorled, leathery. Flowers bi-sexual, mostly dioecious, actinomorphic, solitary, cymose or paniculate. Sepals 5, free or connate; petals 5, sometimes connate; stamens 5, hypogynous, no disk at the base; carpels 2, rarely 3-5, ovary 2-5 loculed, ovules numerous on parietal placentae, style 1, stigmas usually as many as carpels. Fruit a capsule or a berry with numerous seeds immersed in a pulpy juice. (1 Genus.)

Analysis of the genus-

Erect trees or large shrubs. Sepals 5, free or connate; petals 5, erect, conniving or connate at the base; stamens 5, opposite the petals; ovary incompletely 2-3 celled; parietal placentae; fruit capsular or indehiscent- PITTOSPORUM.

POLYGALACEAE

Herbs, a few shrubs (or climbers and small trees). Leaves usually alternate, sometimes opposite or whorled, simple, exstipulate or with small stipular gland. Flowers hermaphrodite, zygomorphic, pedicel articulating. Sepals generally 5, free, persistent, commonly 3 inner small and greenish, 2 larger, wing-like and often coloured; petals rarely 5, generally 3 more or less forming a tube, or united with the stamens, lower petal crested; stamens 8 in two whorls (4 & 4) forming a tube open on the dorsal side, rarely 5 or 4, anthers dehiscing by terminal pores or slits, pollen grains characteristic; ovary superior, carpels and locules usually 2 (rarely 1, 3 or 5), axile placentation, style 1 dialated above, stigmas as many as carpels. Fruit usually a loculicidal capsule (rarely a drupe), seeds with a conspicious micropylar aril- strophiole.

(2 Genera.)

Analysis of the genera-

Herbs or rarely shrubs. Sepals 2 inner larger, alaeform; stamens 8, united- POLYGALA.

Leafy diffuse herbs. Sepals nearly equal or 2 anterior somewhat large; stamens 4-5, united- SALMONIA.

CARYOPHYLLACEAE

Herbs and undershrubs, annual or perennial, stem characteristically with swollen nodes. Leaves opposite, simple entire, mostly linear to lanceolate. Flowers bisexual rarely unisexual, regular in simple to complex dichasial inflorescence or solitary and terminal. Sepals 5, free or united, persistent as a tube; petals 5, rarely wanting; stamens as many as petals or upto 10, rarely fewer, hypogynous or perigynous, sometimes raised on a short androgynophore; carpels 3-5, ovary superior, 1-celled, with free central placentation or basally 3-5 loculed with axile placentation but free central above, styles and stigmas 2-5. Fruit a capsule opening by valves at apex or indehiscent, rarely a berry. (12 Genera.)

Analysis of the genera

Calyx gamosepalous, 4-5 lobed; petals clawed and stamens inserted on an elongated gynophore-

Styles 2; calyx bell-shaped, 5 nerved; petals white, notched- GYPSOPHYLA.

Styles 5; calyx 10 nerved; petals fringed- LYCHNIS.

Styles 3-

Calyx cylindric or ovoid and inflated, 10-0 nerved; petals pink, margin jagged- SILENE.

Calyx bell-shaped. Fruit berry-like- CUCUBALUS.

Sepals free or connate at the base only. Petals subsessile and stamens inserted on an annular disc. Leaves opposite; stipules none:-

Petals notched or entire. Capsule cylindric or conic, 8-10 valved; style 3-5 opposite the sepals. Seeds many CERASTIUM.

Petals 2-fid. Capsule globose, ovoid or oblong. Style 3-5. Seeds few or many- STELLARIA.

Petals entire. Capsule depressed and 1-seeded; styles 2- BRACHYSTEMMA.

Petals entire or lacerated. Capsule globose, ovoid or oblong. Styles usually 3. Seed many Leaves flat, bases not united- ARENARIA.

Petals entire, minute or absent. Capsule 4-5 valved. Stamens and styles 4-5, opposite the sepals. Leaves terete, bases united into a scarious sheath- SAGINA.

Sepals free. Petals subsessile and stamens inserted on an annular disc. Leaves in opposite clusters; stipules scarious-

Sepals not keeled-

Petals 2-6 fid. Leaves opposite, flat- DRYMARIA.

Petals entire. Leaves opposite with leafy buds in their axils hence apparently whorled- SPERGULA.

Sepals keeled. Petals entire. Leaves appearing whorled due to the axillary fascicles of leaves- POLYCARPON.

PORTULACACEAE

Herbs or undershrubs, often succulent; leaves alternate or opposite with setose stipular appendages. Flowers actinomorphic bisexual, solitary or variously cymose or racemose. Sepals 2, imbricate, free or united at the base; petals 4-6, imbricate or connate at the base, falling off soon; stamens as many as petals, antipetalous or numerous; superior or half-inferior, 1-locular, ovules 1 or many on a basal placentum, style divided. Fruit a capsule usually a pyxidium, (1 Genus.)

Analysis of the genus

Herbs or undershrubs with succulent stems and flat leaves. Flowers laxly paniculate; sepals free, decidious. Ovary superior; style 3-fid- TALINUM.

TAMARICACEAE

Shrubs or small trees with slender flexuous branches. Leaves small or needle-like or scale-like, alternate, stipules absent. Flowers minute, bisexual, actinomorphic, ebracteate in dense spike-like racemes. Sepals 4-6, free; petals 5, free, withering and drying, persistent, disk present; stamens 5-10, free or connate at base, inserted on a more or less evident disk; ovary superior, unilocular, usually 3-4 carpelled, placentation parietal or reduced to a basal-parietal position, ovules many, styles 3-4, or stigmas sessile. Fruit a capsule, seeds with a tuft of hairs at apex. (2 Genera.)

Analysis of the genera

Bushes or small trees. Stamens free or slightly united at the base; styles 3- TAMARIX.

Fastigate shrubs. Stamens connate and more or less monadelphous; stigmas 3, sessile- MYRICARIA.

HYPERICACEAE

Herbaceous or woody plants, sap resinous. Leaves opposite or whorled, simple, often pellucid- or black-punctate, exstipulate. Flowers bisexual, regular, cymose, showy, yellow. Sepals 4-5, often basaly connate, the outer smaller; petals as many as sepals, sessile or clawed, claw when present with nectary pit or groove; stamens numerous, hypogynous, usually in 3-5 bundles, members of which are more or less connate, rarely monadelphous; ovary superior, 3-5 carpelled and locular, rarely unilocular, placentation

axile, rarely parietal, ovules numerous, style 3-5, distinct or basally connate. Fruit a capsule. (1 Genus.)

Analysis of the genus.

Shrubs or perennial herbs; leaves usually sessile. Sepals and petals 5 each: stamens numerous; ovary 1-celled with parietal placentae or 3-5 celled and axile placentae- HYPERICUM.

(Some taxonomists recognise two other genera-*Sarothra* and *Norysca* besides *Hypericum*.)

GUTTIFERAE

Shrubs or trees with resinous sap, oil glands present. Leaves opposite (or whorled) rarely alternate, simple exstipulate. Flowers usually unisexual, sometimes bisexual on the same plant and functionally polygamodioecious, actinomorphic. Sepals 6-2, decussate or imbricate, outer smaller than the inner ones; petals 6-2, usually imbricate; stamens mostly numerous, distinct or variously united, pistillode often present in male flower; ovary superior, 3-5 carpels, as many locules or 1, ovules 1 or many on axile or parietal placentae, styles as many as carpels and usually connate, stigmas as many as carpels, sometimes shield-shaped peltate or radiating. Fruit often capsular, sometimes a berry or drupaceous, seed with large embryo often arillate. (1 Genus.)

Analysis of the genus

Trees with white or yellow juice in the bark. Leaves narrowly oblong-elliptic or narrowly elliptic, glaucous, white below. Style 1; stigma peltate- MESUA.

THEACEAE

Tree or shrubs; leaves alternate, simple, mostly evergreen, exstipulate. Flowers mostly solitary, showy, actinomorphic, hermaphrodite or unisexual. Sepals 5, free

or slightly connate at the base; petals 5, free or slightly connate at the base; stamens numerous, hypogynous, free or slightly connate and adnate to the base of the petals; ovary superior, 3-5 locular, placentation axile, ovules 2 to many in each loculus. Fruit usually a capsule. (4 Genera.)

Analysis of the genera

Peduncles 1-flowered; stamens adherant to the base of the corolla; anthers basifixed. Fruit indehiscent-

Flowers hermaphrodite; stamens many; ovary 2-3 celled. Bracts minute or absent- CLEYERA.

Flowers dioceious; stamens 15 or less; ovary 3-celled. Bracteoles persistent- EURYA.

Peduncles 1-flowered; anthers versatile. Fruit dehiscent-

Trees. Petals large, outer concave; stamens many. Seeds dorsally winged- SCHIMA.

Shrubs. Sepals 5-6, gradually grading from the bracts towards the petals; stamens many, slightly or wholly monadelphous. Seeds wingless- CAMELLIA.

ACTINIDIACEAE

Trailing or climbing shrub; leaves alternate, simple, exstipulate, hairs simple or stellate. Flowers small in axillary cymes, hermaphrodite, polygamous or dioccious. Sepals 5, petals 5, deciduous; stamens hypogynous, 10 or more, inflexed in bud; ovary 3 or more locular, placentation axile, style 5, united at the apex, usually persistent. Fruit a berry (or a capsule.) (1 Genus.)

Analysis of the genus

Shrubby climbers. Peduncles many flowered. Sepals slightly sub-connate at the base, stamens numerous, ovary many celled; styles as many. Fruit a berry- ACTINIDIA.

SAURAUIACEAE

Trees or shrubs, branches usually brown with whitish tubercular dots. Leaves usually at the ends of the branches, alternate, simple, mostly serrate with strong parallel lateral veins as in *Dilleniaceae*, often roughly hairy or scaly, exstipulate. Flowers mostly hermaphrodite, hypogynous, in small axillary or lateral panicles, bracts small and far away from calyx. Sepals 5, free, imbricate; petals 5, connate into a short tube at the base, imbricate; stamens numerous, adnate to the base of the petals, anthers small and opening by an apical pore; ovary superior, 3-5 locular, placentation axile, ovules many in each loculus, styles 3-5 free or united. Fruit a berry, rarely somewhat dry and slightly dehiscent (subdehiscent.) (1 Genus.)

Analysis of the genus

Trees or shrubs. Peduncles many flowered. Bracts small and remote from the sepals; anthers dehiscing by pores; ovary 3-5 celled; styles 3-5, distinct or connate-

SAURAUIA.
(Saurauja).

STACHYURACEAE

Glabrous shrubs or small trees with straggling branches. Leaves alternate, exstipulate, serrate, membranous. Flowers hermaphrodite, small in pendulous axillary racemes or spikes, yellow; bracteoles 2 which are connate at the base. Sepals 4, imbricate; petals 4, free imbricate; stamens 8 free; ovary superior, syncarpous, 4 locular by the intrusion of the large parietal placentae thus appearing axile, ovules numerous in each loculus, style simple, stigma 4 lobed or capitate. Fruit a berry, berries of the size of a small pea. (1 Genus.)

Analysis of the genus

Glabrous shrubs or small trees. Flowers in axillary pendulous spikes or racemes; tetramerous; stamens 8; ovary 4-celled- STACHYURUS.

DIPTEROCARPACEAE

Trees (a few shrubs) with resinous wood. Leaves alternate, simple, coriaceous, indumentum of stellate hair or peltate scales, stipules small or large, caducous. Flowers hermaphrodite, actinomorphic, large, fragrant in axillary panicles. Calyx gamosepalous, 5 lobed, calyx-tube free or adnate to the ovary, persistent, enlarged and winglike in fruit; petals 5, twisted, free or slightly connate often hairy; stamens numerous, hypogynous or slightly perigynous, connectives produced, ovary syncarpous, superior, 3 locular, ovules usually pendulous, style 3 lobed or entire. Fruit indehiscent mostly 1 seeded, enclosed in the accrescent calyx-tube. (1 Genus.)

Analysis of the genus

Larger resinous tree. Flowers in axillary or terminal lax panicles Calyx-tube short, adnate to the receptacle; fruit coriaceous, indehiscent, usually 1-seeded closely surrounded by the base of the accrescent calyx-segments- SHOREA.

MALVACEAE

Mostly herbs and shrubs, rarely small trees, often with fibrous stems, mucilage present, indumentum usually stellate or lepidote. Leaves alternate entire or variously lobed mostly palmately nerved, stipulate, stipules free sometimes caducous. Flowers actinomorphic, hermaphrodite rarely dioecious or polygamous, mostly large, inflorescence various. Sepals 3-5, more or less united, valvate, persistent, Sometimes subtended by an involucre or bracteoles, 3 or more (epicalyx); petals 5, free from each other

but often adnate at the base to the staminal-column, contorted or imbricate; stamens indefinite, hypogynous, monadelphous, staminal-column divided at the apex, anthers reniform, monothecous, pollen grains characteristically spiny; ovary usually 5 locular but sometimes 2-locular, placentation axile, ovules many or 1 in each loculus, style branched. Fruit dry breaking up into mericarps (Carcerulus.) (5 Genera.)

Analysis of the genera

Herbs or shrubs. Ripe carpels seperating from the axis-

Styles as many as carpels; carpels without spinous projections-

Bracteoles 3; styles stigmatic along their free ends- MALVA.

Bracteoles none; stigmas capitate- SIDA.

Styles twice as many as the carpels; carpels beset with spines- URENA.

Herbs or shrubs. Fruit capsular. Sepals leafy-

Stigmas spreading; stamens numerous; bracteoles 5 or more- HIBISCUS.

Stigmas connate; staminal-tube 5-toothed at the apex; bracteoles 5, minute, deciduous- THESPESIA.

BOMBACACEAE

Trees often with swollen trunks; leaves alternate simple or digitate, pubescence stellate or scrufy, stipules decidious. Flowers hermaphrodite, large and showy. Calyx 5 lobed or cup-shaped, closed and valvate in bud, leathery; petals 5, often elongated, sometimes absent, twisted in bud; stamens indefinite, free or lower part united into a tube, anthers reniform, monothecous, sometimes bithecous, pollen grains smooth, staminodes often present; ovary superior, 2-5 locular, placentation axile, ovules 2 or

more in each loculus, style simple, capitate or lobed. Fruit a capsule, valves rarely falling away. (2 Genera).

Analysis of the genera

Leaves simple; bracteoles 4-6; capsule 3 valved- KYDIA.

Leaves digitate; bracteoles absent; capsule 5 valved- BOMBAX.

STERCULIACEAE

Trees or shrubs with mostly soft wood, rarely herbs, mucilage present, indumentum often stellate. Leaves alternate rarely subopposite, simple or digitately compound, stipules usually present and caducous. Flowers hermaphrodite or unisexual, actinomorphic, variously arranged. Sepals 3-5 more or less united at the base, valvate; petals 5 or absent, hypogynous, free or adnate at the base, to the staminal tube; stamens often connate into a tube with as many staminodes, anthers bithecous; ovary superior, 4-5 celled, placentation axile, ovules many in each loculus, styles 4-5, free or connate, Fruit usually dry. (5 Genera).

Analysis of the genera

Flowers polygamous; petals absent- STERCULIA.

Flowers all bisexual; petals 5-

Petals deciduous; staminal-tube antheriferous throughout; staminodes absent- ERIOLENA.

Petals persistent; staminal-tube short, stamens 5; staminodes absent- MELOCHIA,

Petals deciduous, with a concave dialated claw; fertile stamens in groups of threes or solitary between the staminodes-

Stamens in groups between the staminodes- ABROMA.

Stamens solitary between the staminodes- BUETTINERIA.

TILIACEAE

Trees or shrubs rarely herbs, mucilage present in cells, cavities or even in canals in the cortex; leaves alternate, rarely opposite, simple, entire or variously lobed, stipules present and often caducous or absent. Flowers hermaphrodite rarely unisexual, actinomorphic, cymose; sepals 5, valvate; petals as many as sepals or rarely absent, sometimes like the sepals, imbricate, valvate or contorted; stamens numerous, free or slightly connate at the base or in 5-10 bundles, staminodes sometimes present, anthers bithecous, opening by slits; ovary superior, sessile, 2-10 locular, placentation axile, ovules 1 to many in each loculus, style usually simple but divided at the apex, rarely stigmas sessile. Fruit usually 2-10 locular rarely 1 locular by abortion, baccate or drupaceous. (3 Genera.)

Analysis of the genera

Petals glandular at the base. Fruit globose or ovoid-

Stamens numerous. Fruit a smooth drupe- GREWIA.

Stamens about 10. Fruit a prickly capsule-TRIUMFETTA.

Petals not glandular at the base. Fruit a long narrow glabrous capsule- CORCHORUS.

ELAEOCARPACEAE

Trees or shrubs with entire alternate or opposite leaves without slime-cells. Flowers usually bisexual, regular, usually in axillary racemes ; sepals 4-5, free or connate, usually valvate; petals 4-5 or absent, free or slightly connate, usually valvate, often incised; stamens many, hypogynous, intra-staminal disk present, anthers opening by a terminal pore; ovary superior 2-many celled rarely 1 celled, ovules many in each loculus, style 1. Fruit capsular or drupaceous. (1 Genus.)

Analysis of the genus

Trees with simple leaves. Petals 5, usually lacinate at the apex; stamens numerous arising from a glandular raised torus; ovary 2-5 celled. Fruit a drupe-ELAEOCARPUS.

DISCIFLORAE

LINACEAE

Herbs, shrubs or (rarely trees); leaves simple, alternate or opposite rarely whorled, stipules present or absent, sometimes gland-like. Flowers hermaphrodite, actinomorphic, inflorescence usually a dichasial cyme; sepals 4-5, free or partially united, imbricate, persistent; petals 4-5, free, fugacious, often clawed, claws sometimes crested, contorted; stamens the same number as petals and alternating with them, sometimes alternating with small staminodes, filaments connate at the base, glands 5, entire or bilobed, adnate to the staminal ring; ovary superior 3-5 locular, loculi often again subdivided nearly to the placentae, ovules 2 in each loculus, styles 3-5 , filiform, free or united. Fruit a septicidal capsule enclosed in the persistent calyx. (3 Genera.)

Analysis of the genera-

Herbs--

Perennial herbs. Calyx setose; styles 3; capsule 1-celled, 1-seeded-- ANISADENIA.

Annual herb, 4-10''. Calyx glabrous or pubescent; styles 5; capsule 5-celled-- LINUM.

Shrubs. 2-3 ft.; calyx glabrous; styles usually 3-4; capsule 3-4 celled-- REINWARDTIA.

MALPIGHIACEAE

Trees, shrubs or climbers with often appressed medifixed hairs; leaves mostly opposite, simple, glands often present either on the petiole or on the lower surface

of the leaves, stipules present or absent, sometimes large and connate, petioles jointed. Flowers hermaphrodite, rarely polygamous, usually obliquely irregular, showy, variously arranged; sepals 5, imbricate or rarely valvate, some biglandular rarely eglandular; petals 5, unequal, free, clawed, convolute, fringed or toothed; disk small; stamens mostly 10, hypogynous, filaments often connate at the base, some staminodes, outer opposite the petals; ovary superior, 3 rarely 2 or 4, more or less united into a 3-locular ovary, one ovule in each loculus. Fruit of one or more winged samaras. (2 Genera.)

Analysis of the genera--

Flowers irregular; calycine gland 1, large, adnate to the pedicel; petals clawed, unequal; style 1-- HIPTAGE.

Flowers small, regular; calycine gland none; petals not clawed, equal; styles 3-- ASPIDOPTERYS.

GERANIACEAE

Annual herbs or undershrubs, stem often fleshy; leaves alternate or opposite, mostly simple, lobulate and dissected or compound, stipules often paired. Flowers often handsome, hermaphrodite, actinomorphic or (slightly zygomorphic), axillary, solitary, or subumbellate; sepals 4-5, free or connate to the middle, imbricate or rarely valvate, (the dorsal one sometimes spurred), persistent; petals 5 rarely 4,(very rarely absent),-hypogynous or subperigynous, imbricate rarely contorted; stamens 2-3 times the number of sepals, the outer whorl opposite the petals, sometimes a few without anthers. filaments mostly more or less connate at the base, often glandular at the base, glands alternate with petals, anthers 2-locular, opening lengthwise; ovary 3-5 lobed, ovules 1-2 in each loculus, superposed, rarely more than 2. Fruit a lobed capsule, lobes 1 seeded, rarely more seeded (capsule septicidal or loculicidal).

(1 Genus)

Analysis of the genus--

Petals imbricate, alternating with the glands of the disc; stamens 10, distinct; fruit of 5 cocci-- GERANIUM.

BALSAMINACEAE

Succulent herbs rarely shrubby at the base; leaves alternate or opposite, simple, stipules absent or with stipular glands at the base of the petiole. Flowers zygomorphic, hermaphrodite, brightly coloured, solitary to subumbellate, resupinate; sepals 3, rarely 5 often coloured, anterior two when present minute, unequal, the lowermost (posterior) elongated into a tubular spur; petals 5, the upper one exterior, usually erect, concave, the lateral ones united or free,; stamens 5, filaments short and broad, connate towards the top, disk absent, anthers 2-locular , connate around the ovary; ovary superior, 5-locular, placentation axile, ovules numerous, stigmas 1-5, more or less sessile. Fruit a succulent capsule opening elastically by 5 twisted valves. (1 Genus)

Analysis of the genus--

Herbs; leaves simple; flowers irregular, posticous sepal spurred, lateral petals connate in pairs; stamens 5. Fruit a capsule-- IMPATIENS.

OXALIDACEAE

Herbaceous (or suffrutescent) often producing fleshy rhizomes or bulbils; leaves alternate or radical, digitate or pinnately compound, sometimes simple by supppression of the leaflets, leaflets spirally coiled when young, folded in bud and at night, stipules absent. Flowers hermaphrodite, actinomorphic, sometimes of two kinds, some perfect and others minute and apetalous (cleistogamous), solitary or umbellate, rarely racemose or cymose; calyx 5-fid or partite, imbricate; petals 5, shortly clawed, free or shortly connate at the base, contorted, glands of the disk absent;

stamens 10, hypogynous, connate at the base, outer whorl opposite the petals, filaments of the outer whorl shorter, sometimes 5 without anthers, anthers 2-locular, opening lengthwise; ovary superior, 5-locular, placentation axile, ovules 1 or more in each loculus, styles 5, free, persistent, stigmas capitate or shortly divided. Fruit a capsule. (2 Genera)

Analysis of the genera--

Leaves 3-foliate; fruit a loculicidal capsule, valves cohering with the axis-- OXALIS.

Leaves pinnate; fruit a loculicidal capsule, valves detaching from the axis-- BIOPHYTUM.

RUTACEAE

Shrubs or trees, very rarely herbs, glandular punctate and strongly smelling; leaves alternate or opposite, simple or compound, sometimes reduced to spines, mostly gland-dotted, stipules absent. Flowers hermaphrodite, rarely unisexual, actinomorphic rarely zygomorphic, inflorescence various but never spiked; sepals 4-5 , imbricate, free or connate; petals imbricate, rarely valvate, mostly free, hypogynous or perigynous; stamens same as or double the number of the petals, inserted at the base of a thick disk, free or rarely united, anthers 2-locular, introse, opening lengthwise, connectives often glandular at the apex, disk usually present; ovary superior, syncarpous, often 4-5 locular or sometimes the carpels free towards the base or rarely altogether free, usually placentation axile, ovules 1-many in each loculus, styles as many, free or variously united, stigmas entire or lobed. Fruit usually baccate, drupaceous, or coriaceous, rarely capsular. (11 Genera)

Analysis of the genera--

Herbs--

Petals 4; stamens 6-8; ovary pedicelled- BOENNINGHAUSENIA.

Petals 4-5; stamens 8-10; ovary sessile-- RUTA.

Shrubs or small trees--

Flowers 1-sexual (polygamous); fruit usually coriaceous, seeds albuminous--

Plants unarmed; leaves compound, opposite; stamens 4-5; ovules 2 in each cell-- EVODIA.

Plants armed; leaves compound, alternate; stamens 3-5; ovules 2 in each cell-- ZANTHOXYLUM.

Plants usually armed; leaves compound; stamens 2-5; ovule 1 in each cell-- TODDALIA.

Plants unarmed; leaves simple, oblong-lanceolate; ovule 1 in each cell-- SKIMMIA.

Flowers hermaphrodite; fruit usually a berry; seed exalbuminous--

Unarmed; leaves pinnate with leaflets alternate--

Petals imbricate--

Petals thick; stamens 10, filaments linear-subulate-- MURRAYA.

Petals membraneous; stamens 8-10, filaments dialated below-- CLAUSENIA.

Petals valvate, thick; stamens 10, filaments linear-subulate-- MICROMELUM.

Armed with axillary spines. Leaves foliate--

Leaves 3-foliolate; ovary 8 or more locular; rind of fruit woody-- AEGLE.

Leaves 1-foliolate; ovary many celled, rind of fruit leathery-- CITRUS.

SIMAROUBACEAE

Trees or shrubs sometimes with a very bitter bark; leaves alternate, rarely opposite, pinnate (rarely simple), very large, without oil glands, stipules absent. Flowers

small, unisexual or polygamous rarely hermaphrodite; calyx-lobes 3-5; petals 3-5, free, imbricate or valvate, rarely united into a tube or absent, disk present and prominent; stamens same as or double the number of petals, rarely numerous, free, inserted at the base of the disk, anthers 2-locular; ovary mostly 2-5 lobed, 1-5 locular, rarely carpels quite free, placentation axile, ovule solitary in each loculus, rarely more, styles 2-5. Fruit usually indehiscent sometimes samaroid. (1 Genus)

Analysis of the genus--

Trees or shrubs with bitter properties; leaves very large, unequal, pinnate. Flowers polygamous in axillary panicles. Petals and stamens 4-5; ovary 3-5 partite, styles connate-- PICRASMA.

OCHNACEAE

Trees or shrubs with watery juice, (rarely herbs); leaves alternate, simple very rarely pinnate, often with numerous pinnate nerves, stipules present, coriaceous, Flowers hermaphrodite actinomorphic, bracteate, racemose or paniculate; sepals 4-5 rarely 10, free, imbricate rarely contorted; petals 4-10, free, contorted or imbricate, disk enlarging after flowering, sometimes absent; stamens few to many, free, staminodes sometimes present, subulate or petaloid, sometimes connate into a tube, hypogynous, filaments persistent, anthers linear; ovary 1-10 locular, entire or deeply lobed, placentation axile or parietal, ovules 1 to many in each loculus, style simple or divided at the apex,. Fruiting carpels often becoming quite separate on the enlarged torus, drupaceous (drupes seated on the broad disk.) (1 Genus)

Analysis of the genus--

Undershrubs; leaves simple. Flowers large; sepals 5, persistent; petals 5-10, disk thick and lobed; stamens oc,

shorter than the petals; ovary deeply 3-10 lobed. Fruit of 3-10 drupes with reticulate epicarp-- OCHNA.

MELIACEAE

Trees or shrubs mostly with hard scented wood; leaves alternate, mostly pinnate, sometimes bipinnate (rarely simple), lacking pellucid dots, exstipulate. Flowers mostly hermaphrodite, actinomorphic often in cymose panicles; calyx small, usually partly connate, imbricate, rarely valvate; petals free or partly connate or adnate to the staminal-tube, disk sometimes present; stamens mostly 8 or 10 or rarely numerous, filaments connate and anthers sessile in the tube, anthers bithecous; ovary superior 3-5 locular, placentation axile, ovules mostly 2 in each loculus, stigmas disciform or capitate. Fruit baccate, capsular or even a drupe. (6 Genera)

Analysis of the genera--

Stamens united into a tube--

Leaflets toothed--

Staminal-tube cylindrical, dialated at the base and apex, 10 or 12 striate. Drupe smooth-- MELIA.

Staminal-tube deeply 10-lobed, adnate to the base. Drupe ribbed-- CIPADESSA.

Leaflets entire--

Anthers included in the staminal-tube, staminal-tube globular; fruit a 3 celled capsule-- AMOORA.

Anthers exserted or filaments free--

Leaves 1-5 foliate; filaments connate half-way or more, free at the apex. Fruit a berry-- WALSURA.

Leaves 5-11 foliate; staminal-tube 8-10 fid, lobes linear, bidentate. Fruit a loculicidal capsule-- HEYNEA,

Stamens distinct, 5, filaments free. Capsule septicidally 5 valved; seeds winged either at the upper end or at the both ends-- TOONA*

OLACACEAE

Trees, shrubs or climbers; leaves alternate rarely opposite, simple or lobed, exstipulate. Flowers usually hermaphrodite, actinomorphic, small in cymes; calyx-lobes imbricate, sometimes accrescent, free or adherent to the ovary; petals free or variously connate, valvate, disk often annular; stamens free, the same number as and opposite to the petals, sometimes fewer or more numerous, some often without anthers; ovary superior or slightly immersed in the annular disk, 1-3 locular, sometimes imperfectly so, ovules 1-5 on a central placentum when ovary unilocular or pendulous from the inner angles of the loculii, style simple, stigma 2-5 lobed. Fruit often drupaceous. (3 Genera)

Analysis of the genera--

Fertile stamens anisomerous or twice or thrice the number of the petals. Leaves alternate. Fertile stamens 3-5, staminodes 5-6; calyx accrescent. Trees and shrubs-- OLAX.

Fertile stamens isomerous with and opposite the petals--

Staminodes 5, stamens 5; ovary 1-celled- Climbing shrubs with tendrils axillary. ERTHYROPALUM.

Staminodes absent, stamens 4-5, epipetalous; ovary 3-celled. Small trees- SCHOEPFIA.

(*The genus *CEDRELA* is American and is distingished from *TOONA* in having seeds winged at the lower end only. In Indian floras *CEDRELA* is given.)

ICACINACEAE

Trees and shrubs; leaves mostly alternate, simple, exstipulate. Flowers hermaphrodite or rarely unisexual by abortion, actinomorphic; calyx-lobes 4-5, small inferior, imbricate; petals 4-5, free or united, valvate; stamens the same number as the petals and alternating with them, disk rarely present; ovary 1-locular, rarely 3-5 locular, ovules pendulous, usually 2, style short. Fruit drupaceous. (1 Genus)

Analysis of the genus--

A climbing shrub; flowers diocious. Stamens isomerous, alternate with the petals, staminodes 5; ovary 1-2 celled-- NATSIATUM.

AQUIFOLIACEAE (Ilicaceae)

Trees or shrubs, mostly evergreen; leaves alternate or opposite, simple, coriaceous, evergreen, stipules very small or absent. Flowers hermaphrodite or unisexual, actinomorphic, usually fasciculate; calyx 3-6, more or less connate, imbricate, persistent; petals 4-5, free or connate at the base, imbricate or valvate; disk absent; stamens 4-5, rarely more, free or adhering to the bases of the petals; ovary superior, 3 or more locular, ovules 1-2 in each loculus, pendulous, style terminal or absent. Fruit drupaceous of 3 or more 1-seeded pyrenes. (1 Genus.)

Analysis of the genus

Evergreen shrubs or trees; leaves alternate, simple, usually toothed, Flowers in cymes, small, white, 1 or 2 sexual; calyx 4-partite, persistent; petals 4, imbricate, connate at the base; stamens 4; ovary globose, 5-4 (8-7) celled; fruit a drupe- ILEX.

CELASTRACEAE

Trees, shrubs or climbers, branches sometimes spinecent; leaves alternate or opposite, petioled or subsessile, simple, coriaceous, stipules small and caducous or absent. Flowers hermaphrodite, actinomorphic, small, greenish; calyx-lobes 4-5, imbricate; petals 5, rarely absent, imbricate or rarely valvate;disk usually present, fleshy and flat, ining the bottom of calyx; stamens 4-5, rarely more, inserted on the margin of the disk; ovary superior, 1-5 locular,free or adherent to the disk, axile placentation, ovules mostly 2 in each loculus, style short and lobed. Fruit variouscapsular, baccate, drupaceous or samaroid. (4 Genera.)

Analysis of the genera

Leaves opposite. Stamens inserted on the margin of the disk; ovary sunk in the disk. Fruit a winged, angled or prickly capsule. Trees or shrubs- EUONYMUS.

Leaves opposite or sub-opposite. Ovary confluent with the disc. Fruit drupe or dry. Trees or shrubs- ELAEODENDRON*.

Leaves alternate-

A scandent shrub. Flowers in terminal or axillary panicles. Stamens inserted on the margin of the disk; fruit a globose capsule- CELASTRUS.

An erect shrub, often spinous. Flowers in axillary dichotomous cymes; stamens inserted underneath the disk. Fruit a 3-angled capsule- GYMNOSPORIA.

RHAMNACEAE

Trees, shrubs rarely herbs, sometimes scandent; leaves alternate or opposite or even subopposite, simple, mostly stipulate, stipules decidious or modified into prickles,

(* This genus has been reported from extreme west of Nepal only.)

cirrhose in *Gouania*. Flowers hermaphrodite, rarely unisexual, small in cymes calyx tubular, 4-5, lobed, lobes erect or recurved; petals 4-5 or absent, small; disk mostly present, intrastaminal, sometimes lining the calyx-tube; stamens 4-5, opposite the petals and often enclosed within their folds; ovary superior, rarely inferior, 2-4 locular, free or sunk in the disk, ovules solitary in each loculus, style shortly lobed. Fruit usually drupaceous. (7 Genera.)

Analysis of the genera

Shrubs or trees-

Disk filling the calyx-tube; ovary superior-

Leaves prominently 3-5 nerved from the base- ZIZYPHUS.

Leaves penninerved- BERCHEMIA.

Disk lining or filling the calyx-tube-

Disk thin, linning the calyx-tube- RHAMNUS.

Disk fleshy, filling the calyx-tube-

Leaves alternate, unequal. Unarmed trees- HOVENIA.

Leaves opposite or sub-equal. Spinous shrubs- SAGERETIA.

Unarmed climbing shrubs. Rachis often cirrhose. Ovary inferior, crowned with persistent sepals-

Flowers fascicled; stamens enfolded by petals- GOUANIA.

Flowers umbellate; stamens equaling the petals- HELINUS*.

(* The genus *HELINUS* is reported from extreme west of Nepal only.)

VITACEAE (Ampelidaceae)

Mostly climbing shrubs with tendrils (or small trees and shrubs destitute of tendrils) stem angled, compressed or cylindrical, growth sympodial, nodose or jointed branches modified into tendrils, often with watery juice; leaves alternate or lower ones opposite, simple or compound, digitately or pedately 3-9 foliolate, often pellucid-puncate, stipules petiolar or absent. Flowers hermaphrodite or unisexual, actinomorphic, small in leaf-opposed spikes, racemes or cymes, peduncles often cirrhose; calyx small, entire or 4-5 toothed or lobed; petals 4-5 free or united, caducous, valvate; stamens 4-5 opposite the petals, inserted at the base of the disk or between its lobes, anthers free or connate, 2-locular, opening lengthwise, disk intra-staminal, usually very distinct, annular or variously expanded; ovary superior, 2-6 locular, axile placentation, 1-2 ovules in each loculus, style short, stigma capitate or dscoid. Fruit baccate, often watery 1-6 locular, seeds with copious endosperm. (6 Genera.)

Analysis of the genera

Flowers polygamous-dioecious-

Petals 5; stigmas obtuse; seeds pyriform, 2-furrowed on the face and 1-furrowed on the back- VITIS.(s.s.)

Petals 4; stigmas 4-lobed; seeds globose, oblong or pyriform, 2-furrowed on the face- TETRASTIGMA.

Flowers polygamous-monoecious; petals 4-5; stigmas small discoid; seeds oblong or obovoid concave on the back, 2-furrowed on the face. Tendrils on the peduncles. Leaves simple or lobed, sometimes digitate or pedate- AMPELOCISSUS.

Flowers hermaphrodite; petals 4. Tendrils leaf opposed-

Leaves trifoliate. Petals 5, spreading; seeds globose, smooth- PARTHENOCISSUS.

Leaves usually simple, sometimes 3-foliate or digitate; berry 1-seeded, seeds ellipsoid or pyriform, smooth or pitted- CISSUS.

Leaves trifoliate or pedate or digitate; berry 2-4 seeded, seeds hemispheric with deep pits- CAYRATIA.

SAPINDACEAE

Trees, shrubs, undershrubs or climbers; leaves usually alternate or very rarely opposite, simple or commonly compound, stipules present in climbing species. Flowers actinomorphic or zygomorphic, often much reduced and usually polygamo-dioecious (really unisexual but apparently polygamo-dioecious), variously arranged; sepals 5 usually free, unequal or variously connate, imbricate or rarely valvate, petals 3-5, rarely more, often absent equal or unequal, often with scaly or hair-tufted nectaries in lower side, imbricate; disk usually present, sometimes unilateral; stamens hypogyonus, often 8 in two whorls or variable number, inserted within the disk or unilateral, filaments free, subulate, often hairy, anthers 2-locular; ovary superior, entire, lobed or divided nearly to the base, 3-locular occasionally 1-4 locular, style terminal or between the lobes rarely 2-4,simple or divided, ovule 1-2 or rarely many in each loculus, axile placentation rarely parietal. Fruit various-capsule, nut, berry or drupe, frequently winged, seeds without endosperm. (1 Genus.)

Analysis of the genus

A climbing herb; leaves alternate, ternately pinnate, 3-leaflets on division. Capsule membraneous and inflated- CARDIOSPERMUM.

ACERACEAE

Trees (or shrubs) with perulate buds; leaves opposite, simple usually with palmate veination or palmately lobed

(or pinnately foliolate). Flowers in fascicles, racemes or corymbs, actinomorphic, andromonoecious or dioecious; sepals 4-5, distinct or basally connate, imbricate; petals 4-5, rarely absent, distinct, imbricate; disk annular or lobed or reduced to teeth, rarely absent either outside or within the stamens (extrastaminal or intrastaminal); stamens 4-10, often 8, hypogynous or perigynous or in the male flowers central, filaments free, rudimentary ovary often present in the male flowers; ovary superior, 2-locular compressed contrary to the septum, ovules 2 in each loculus attached to the central axis or one erect from the base as in *Dobinea*, styles 2, free or connate at the base. Fruit a samaroid schizocarp, splitting into 2 one-winged mericarps (double samara). (2 Genera)

Analysis of the genera--

Tree with simple or palmately lobed leaves. Ovary 2-celled. Fruit a double samara, fruit lobes connate with the wings only on the upper side-- ACER.

A shrub with terete virgate branches; leaves undivided. Ovary 1-celled. Fruit indehiscent. Female bracts adnate. to the pedicel, persistent and membranous - reticulate in fruit-- DOBINEA*

HIPPOCASTANACEAE
(Aesculaceae)

Trees (and shrubs), winter buds often sticky; leaves opposite, digitately 5-9 foliolate, leaflets serrate or entire, pinnately nerved, stipules absent. Flowers polygamous, somewhat zygomorphic in terminal panicles or racemes,

(*This genus appears in Hook f. Fl. Brit. Ind. under Sapindaceae; in Brandis, Indian Trees under Anacardiaceae; in Bor's Manual of Indian Forest Botany under Aceraceae; while some place it under a seperate family- Podoaceae.)

white, red or yellow; sepals 5, imbricate or tubular and 5-fid; petals 5-4, unequal, clawed, imbricate; disk entire, annular or unilateral; stamens 8-5; inserted within the disk, filaments free; ovary sessile, superior, 3-locular or by abortion 2-1 locular, placentation axile, ovules 2 in each loculus, style elongated, stigma simple. Fruit usually a 1-loculed, 1-seeded leathery capsule, smooth or echinate, seed solitary by abortion, subglobose, testa coriaceous, cotyledons thick. (1 Genus)

Analysis of the genus--

Tree; leave opposite, digitately compound, leaflets 5-9. Flowers large, irregular; sepals united in a tube; stamens 5-9; fruit a leathery, smooth capsule. Cotyledons large and fused-- AESCULUS.

STAPHYLEACEAE

Trees or shrubs; leaves alternate or opposite, trifoliolate or pinnate, stipules paired. Flowers hermaphrodite or unisexual, actinomorphic in drooping racemes or panicles; sepals 5, imbricate; petals imbricate, inserted on or below the large cup-shaped disk; stamens 5 inserted with the petals and alternate with them, free, anthers 2-locular; ovary superior, 2-3 more or less united, 2-3 locular and lobed, placentation axile, ovules numerous, style free or coherant, at length free. Fruit a capsule membranous and inflated, opening at the top or indehiscent. (2 Genera)

Analysis of the genera--

Branches smooth; leaflets usually 6. Flowers small; ovary 3-lobed, completely united, disk large, collar-like; fruit coriaceous, dry to softly fleshy, indehiscent-- TURPINIA.

Branches with spotted bark; leaflets usually 3. Flowers 1/2" long; ovary 2-3 parted, united in the lower third;

fruit with a thin skin, more or less bladdery the ripe carpels united in their lower half and opening along the inner suture of the free part-- STAPHYLEA.

SABIACEAE

Trees or shrubs, some climbing or sarmentose; leaves alternate, simple or pinnate, exstipulate. Flowers hermaphrodite or polygamo-dioecious, zygomorphic, small often paniculate; calyx 4-5 partite, imbricate; petals 4-5, imbricate, opposite or alternate with the sepals; disk small, annular; stamens 4-5, opposite the petals, free or adherent to the petals, sometimes only 2 fertile, anthers 2-locular, connective usually thick; ovary sessile, superior, 2-3 locular, axile placentation, ovules 1-2 in each loculus, styles more or less united. Fruit dry or drupaceous, seeds with very thin endosperm or none at all. (2 Genera)

Analysis of the genera--

Erect trees; leaves toothed simple or old-pinnate. Flowers minute; inner petals large, outer much smaller; stamens 5, 2 fertile, very unequal- MELIOSMA.

Climbing shrubs; leaves simple entire. Flowers 3/4" in diam.; stamens 4-5, equal and all fertile-- SABIA.

ANACARDIACEAE

Trees or shrubs, usually with resinous bark; leaves alternate, simple or compound, stipules absent very rarely present but obscure. Flowers hermaphrodite or unisexual, mostly actinomorphic, small in racemes, fascicles, spikes or panicles; calyx 3-5, variously divided, sometimes semi-superior in fruit; petals 3-7 or absent, free or rarely connate and adnate to the torus; disk present; stamens often double the number of petals, rarely equal as in *Rhus* or numerous, filaments free, filiform, anthers 2-locular, versatile; ovary superior and 3- carpelled but functionally 1-carpelled,

rarely 2-5 locular or very rarely carpels free, ovules solitary, pendulous or adnate to the wall of the ovary, styles 1-3, widely seperated. Fruit a drupe, seed without endosperm. (6 Genera)

Analysis of the genera--

Carpels combined into a 1-celled ovary; leaves simple or compound--

Leaves compound;

Leaves 3-foliate. Sterile flowers many on long hairy pedicels; calyx 4-5 partite; petals 4-6; stamens 4-10; ovary superior, styles 3-4-- RHUS*

Leaves pinnate; flowers apetaliferous, calyx 5 partite; petals 0; stamens 3-4; styles 3-- PISTACIA§

Leaves odd-pinnate; flowers petaliferous, calyx 5 partite, persistent; petals 5; stamens 10; styles 4-5-- TAPIRIA.

Leaves simple;

Petals 5; stamens 5 all fertile; styles 3-4 -- SEMECARPUS.

Petals 4-5; stamens 5 but only one fertile; style single and lateral-- MANGIFERA.

Carpels combined into a 5-celled ovary; stamens 10. Leaves odd-pinnate-- SPONDIAS.

CORIARIACEAE

Glabrous shrubs with angular branchlets; leaves opposite or verticillate, simple, entire, exstipulate. Flowers herma-

**Rhus cotinus* has simple leaves, and this species is present in the Western Himalays. It has not been so far reported from West Nepal.

§ This genus is so far reported from West Nepal only

phrodite or polygamous, small, green, axillary or racemose; sepals 5, imbricate; petals 5, shorter than the sepals, keeled inside, fleshy; persistent and enlarged in fruit; stamens 10, hypogynous, free or those opposite the petals adnate to the keel, anthers large, exserted; ovary superior, 5-10, free , unilocular, ovules solitary in each carpel ,pendulous from the top, styles free, long, Fruit of five or ten compressed dry nuts enclosed in the enlarged fleshy, persistent petals- a pseudodrupe. (1 Genus.)

Analysis of the genus

Usually glabrous shrub with 4-angled branches. Leaves opposite or rarely 3-nately whorled, sessile or sub-sessile, 3-7 nerved. Petals smaller than the sepals, fleshy. Carpels 5-10, free, fruit of 5-10 small dry nuts closely embraced by the fleshy petals- CORIARIA.

CALYCIFLORAE

MIMOSACEAE

Trees or shrubs, unarmed or thorny, erect or scandent, very rarely herbs; leaves mostly bipinnate, rarely simply pinnate (or reduced,) stipules free, caducous, sometimes persistent and spinescent. Flowers hermaphrodite, actinomorphic, small, spicate, racemose or capitate, 3-6 usually 5 merous; calyx tubular, 5-lobed or toothed, valvate or very rarely imbricate; petals valvate, free or connate into a short tube, mostly hypogynous; stamens equal in number to the sepals or more usually more numerous, free or monadelphous, anthers small often with a gland at the apex; ovary superior, 1- locular. Fruit a legume or indehiscent, seeds with scanty or no endosperm. (5 Genera.)

Analysis of the genera--

Stamens definite -

Inflorescence elongated. Stamens usually 10 anthers crowned with a gland. Pods very long and wide. Large tendril-bearing climbers-- ENTADA.

Inflorescence a globose head. Stamens usually 10. anthers not gland-crested. Pods jointed. Plants prickly and sensitive— MIMOSA.

Inflorescence a cylindrical spike. Pods dehiscent. A tree armed with conical spines— PIPTADENIA

Stamens indefinite -

Stamens free. Usually spiny or prickly tree or shrub-- ACACIA.

Stamens monadelphous. Usually unarmed tree-- ALBIZZIA.

CAESALPINIACEAE

Trees, shrubs or rarely herbs; leaves pinnate or bi-pinnate, rarely simple or unifoliolate, stipels mostly absent. Flowers mostly showy, racemose, spicate or rarely cymose, zygomorphic rarely subactinomorphic; sepals 5 or the 2 upper ones connate, mostly free, imbricate or rarely valvate; petals 5 or fewer or absent, the adaxial one inside the adjacent lateral petals, the others variously imbricate often clawed; stamens usually 10, very rarely numerous often few or aborted, often free or variously connate, anthers various, sometimes opening by terminal pores; ovary superior, 1-locular. Fruit a legume or indehiscent, often winged. (4 Genera)

Analysis of the genera--

Leaves 2-pinnate -

Trees and shrubs, often scandent. Leaves abruptly bi-pinnate. Hypanthium not oblique and not very deep. Upper suture of pod not or scarcely winged-- CAESALPINIA.

Prickly shrubs. Leaves ample, abruptly bipinnate. Hypanthium very oblique and deep. Upper suture of pod winged-- MEZONEURON,

Leaves simple pinnate or 1-foliolate (*Bahuinia*) -

Leaves simple pinnate. Calyx tube short, 5-partite; disk subbasal; anthers mostly dehiscing by apical pores. Trees anf shrubs-- CASSIA.

Leaves simple, deeply 2-lobed. Calyx-tube with the disk produced to the top. Trees-- BAUHINIA.

FABACEAE (Papilionaceae)

Trees , shrubs and herbs; leaves simple or compound, alternate or opposite, often terminating in tendrils, sometimes absent. Flowers zygomorphic, mostly hermaphrodite; sepals usually 5 or more or less, connate into a tube, sometimes bi-labiate, petals 5, imbricate, free , the upper (adaxial) exterior to the adjacent lateral petals (wings) and forming the standard, the lower two interior and connate by their lower margins into a keel; stamens perigynous, inserted with the petals on the disk, often 10, monadelphous or diadelphous sometimes all free mostly all perfect, anthers opening lengthwise; ovary sessile or stipitate, superior, 1-locular, usually several ovuled. Fruit usually a legume or indehiscent, sometimes jointed and breaking up into 1-seeded segments. (52 Genera)

Analysis of the genera--

(This key is adapted from Hooker's Fl. Brit. Ind.)

Tribe *Podalyrieae* -- Stamens free. Pod dehiscent. Leaves digitate.

Shrub with connate stipules -- PIPTANTHUS.

Herb with free stipules -- THERMOPSIS.

Tribe *Genisteae* - Stamens monadelphous. Pods dehiscent, jointed. Leaves simple or digitately 3-foliate.

Flowers in terminal racemes. Pods flattened-- PRIOTROPIS.

Flowers in terminal or leaf-opposed racemes. Pods turgid -- CROTOLARIA.

Tribe *Trifoliaee* -- Stamens diadelphous. Pods usually dehiscent not jointed. Leaves digitately or pinnately 3-foliate, leaflets usually toothed.

Le es digitately 3-foliate -

Petals persistent, adnate to the staminal tube -- TRIFOLIUM.

Petals caducous, free from the staminal tube -- PAROCHETUS.

Leaves pinnately 3--foliate -

Pods elongated, straight or recurved. Stigma terminal -- TRIGONELLA.

Pods falcate or spiral. Stigma oblique- MEDICAGO.

Tribe *Loteae* -- Stamens diadelphous. Pods dehiscent, not jointed. Leaves pinnately 5-foliate, leaflets entire. LOTUS.

Tribe *Galegeae*--Stamens usually diadelphous. Pods dehiscent not jointed. Leaves imparipinnate, leaflets entire.

Anthers apiculate. Hairs fixed by the centre. Stamens diadelphous -- INDIGOFERA.

Anthers obtuse. Hairs basifixed -

Pods few or many seeded, usually subdehiscent -

Pods very firm or woody- MILLETIA.

Pods membranous and inflated COLUTEA.

Pods many seeded and some dehiscing (linear or oblong not seperate)

Calyx very oblique. Low undershrub; leaf rachis usually spine tipped -- CARAGANA.

Calyx not oblique -

Keel very short, obtuse. Spineless perennials-GULDENSTAEDTIA.

Keel long, obtuse. Herbs or undershrubs with pinnate leaves, leaf rachis terminating in a leaflet or a spine-- ASTRAGALUS.

Keel long, appendiculate. Herbaceous perennials with odd-pinnate leaves -- OXYTROPIS.

Tribe *Hedysareae*-- Stamens diadelphous or monoadelphous. Pods jointed if more than 1-seeded. Leaves odd-pinnate. Leaves exstipellate -

Stamens monadelphous; anthers uniform. Leaflets 4-- GEISSAPSIS.

Stamens diadelphous; anthers unifrom -

Ovules solitary. Pod 1-jointed -- LESPEDEZA.

Ovules few -

Spiny shrubs with simple leaves -- ALHAGI.

Herbs. Pods distinctly jointed- HEDYSARUM.

Herbs. Pods marked by faint lines- STRACHEYA.

Leaves stipellate -

Pods distinctly jointed, twisted. Calyx not accrescent, teeth setaceous -- URARIA.

Pods not twisted -

Joints turgid -- ALYSICARPUS.

Joints flattened --

Racemes in fascicles from the old wood. Trees -- OUGENIA*

Racemes simple or panicled from the year's shoot. Shrubs and herbs -- DESMODIUM §

Tribe *Vicieae* -- Stamens diadelphous. Pods dehiscent, not jointed. Leaves equally pinnate, petiole ending in a tendril or bristle.

Stamens 10, diadelphous -

Wings free from the keel; leaflets toothed-- CICER.

Wings attached to the keel -

Staminal tube with oblique mouth -

Style longitudinally bearded with minute hairs on the inner surface -- LENS.

Apex of the style dorsally bearded by a bunch of hairs or pilose all around- VICIA.

Staminal tube truncate at the mouth -

Style flattened at the apex; leaflets entire -- LATHYRUS.

Style dialated from the base upwards; leaflets obscurely dentate -- PISUM.

---

* This genus has been reported from West Nepal only.

§ Genus *CODARIOCALYX* was seperated from Genus *DESMODIUM* by Hassak (Flora 25, Beibl. 2 : 48, 1848) but Knapp-van Meeuwen has again merged the genus with *DESMODIUM* (Reinwardtia 6(3) : 239-276, 1962).

Tenth stamen absent. Climbers with bright polished seeds -- ABRUS.

Tribe *Phaseoleae* -- Stamens monadelphous or diadelphous. Pods dehiscent, not jointed. Climbing, rarely erect herbs or shrubs with pinnate 3-foliate leaves.

Subtribe *Glycineae* -- Leaves not gland-dotted; leaflets stipellate. Nodes of racemes not tumid. Flowers small; petals about equal in length; style beardless.

Stamens diadelphous. Stipules and bracts conspicious, persistent-

Style filiform. Standard not spurred; calyx teeth distinct -- SHUTERIA.

Style flattened upwards. Calyx truncate -- DUMASIA.

Stamens monadelphous. Stipules and bracts minute and caducous. Anthers all fertile -- GLYCINE.

Subtribe *Erythrineae* -- Leaves not gland-dotted; leaflets stipellate. Nodes of racemes tumid. Flowers conspicious; petals very unequal; style beardless.

Keel exceeding the standard and wings -

Anthers dimorphic MUCUNA.

Anthers uniform -- APIOS.

Standard exceeding the keel and wings -- ERYTHRINA.

Subtribe *Galactieae* -- Leaves not gland-dotted. Leaflets stipellate. Nodes of racemes tumid. Petals equal; style beardless.

Stamens diadelphous -

Herbs. Upper two calyx-teeth fused into one; keel semicircular.- COCHLIANTHUS.

Shrubs -

Flowers small, panicled - SPANTHOLOBUS.

Flowers large, racemose - BUTEA.

Stamens monadelphous. Pods many seeded, flat, linear - PUERARIA.

Subtribe *Cajaneae* -- Leaves gland-dotted below; stipels often abortive. Nodes of racemes not tumid. Styles not bearded.

Ovules (later seeds) 3 or more. Pod with depressed line between each seed -- ATYLOSIA.

Ovules (later seeds) 1 - 2 --

Pods oblong, turgid, 1-2 seeded, densely pubescent - ERIOSEMA.

Pods turgid, usually 2 seeded. Shrubs rarely herbs. Leaves digitately 3-foliate - FLEMINGIA.

Subtribe *Euphaseoleae* -- Leaves not gland-dotted. Stamens diadelphous. Style bearded below the stigma.

Stigma oblique -

Keel and style spirally twisted -- PHASEOLUS.

Keel not spirally twisted (keel and style much less curved and lengthened out) -- VIGNA.

Stigma terminal; keel obtuse or rostrate -- DOLICHOS.

Tribe *Dalbergieae* -- Stamens monadelphous or diadelphous. Pods continous, indehiscent. Leaves odd-pinnate.

Leaflets distinctly alternate. Flowers small, white or reddish -- DALBERGIA.

Leaflets opposite -

Pods flat, almost woody, wingless -- PONGAMIA.

Pods flat, thin, winged down one or both sutures -- DERRIS.

Tribe *Sophoreae* -- Stamens free. Pods not jointed. Leaves oddpinnate.

Stigma oblique. Pod thick and turgid; seeds 3-4 -- ORMOSIA.

Stigma terminal. Pod moniliform-- SOPHORA.

ROSACEAE (s. r.)

Trees, shrubs and herbs; often thorny, sometimes climbing; leaves alternate or rarely opposite, simple or compound, stipules mostly present and paired, sometimes caducous or adnate to the petiole, rarely absent as in *Spiraea.* Flowers actinomorphic, hermaphrodite rarely unisexual as in *Aruncus*, variously arranged, perigynous, basal portion of perianth adnate into an hypanthium; calyx free (or adnate to the ovary), lobes mostly 5, imbricate, the fifth lobe adaxial, occasionally with an epicalyx;

petals the same number as the calyx-lobes, rarely absent, white, red or yellow, usually equalling each other, imbricate arising from the rim of the hypanthium; the hypanthium often bearing a nectiferous glandular rim; stamens numerous sometimes definite and then usually 5 or 10 and in 1-several whorls, filaments free rarely connate, bent inwards; ovary 1- numerous carpels, free, superior, usually situated on a carpophore. Fruit various, dry or fleshy, often an aggregate of achenes or drupe or follicles, sometimes on an enlarged fleshy torus. (13 Genera)

Key to the tribes:--

Fruit follicular, dehiscent -- SPIRAEA tribe.

Fruit not follicular, indehiscent or carpels growing into drupelets -

Pistils borne on a flat, hemispherical or convex receptacle subtended by a cup-shaped portion of the receptacle (hypanthium) -

Carpels becoming dry achenes, many; ovules 1. Calyx usually with bractlets alternating with the lobes of the calyx -- POTENTILLA tribe.

Carpels becoming drupelets; ovules 2 but seed solitary -- RUBUS tribe.

Pistils enclosed in the tubular or urn-shaped receptacle (hypanthium) -

Number of pistils 1 or 4; hypanthium urceolate, completely enclosing the 1-4 achenes. Sepals usually 4. (Herbs or shrubs) - SANGUISORBA tribe.

Number of pistils many. Calyx-tube becoming fleshy. Shrubs with odd pinnate leaves -- ROSA tribe.

Analysis of the genera

SPIRAEA tribe

Pistils opposite to the petals, less than 5 --

Leaves simple, entire or lobed; flowers bisexual --

Stipules present, large, caducous; leaves doubly serrate. Staminal disk wanting. Follicles dehiscent along one suture, several shinning seeds. Flowers in elongated racemes -- NEILLIA.

Stipules wanting; leaves usually serrate or dentate. Flowers in panicles, corymbs or umbel-like racemes. Carpels free; ovules 2 many. Petals orbicular or obovate -- SPIRAEA.

Leaves 2 - 3 pinnate; flowers unisexual in ample panicles composed of slender spikes. Herbs, dioecious -- ARUNCUS.

Pistils opposite to the sepals --

Leaves pinnate, leaflets coarsely serrate. Petals rounded, imbricate in bud. Carpels connate at the base. Follicles dehiscent on the ventral suture. Shrubs -- SORBARIA.

POTENTILLA tribe

Styles deciduous -

Receptacle in fruit much enlarged, coloured -

Flowers white. Receptacle pulpy, juicy - FRAGARIA.

Flowers yellow. Receptacle dry -- DUCHESNEA.

Receptacle not fleshy even in fruit -

Pistils 1 - 12; stamens 5; petals minute -SIBBALDIA.

Pistils numerous; petals white or yellow, obtuse or emarginate -- POTENTILLA.

Styles elongated after anthesis -

Flowers 5 merous; sepals valvate; hypanthium flat. Herbs with leaves pinnate or pinnatifid -- GEUM.

RUBUS tribe

Drupelets pulpy; no epicalyx -- RUBUS.

SANGUISORBA tribe

Calyx with 5 - 6 bractlets, each with setose limb. Petals 4 - 5. Leaves interrupted pinnate -- AGRIMONIA.

Calyx without bractlets, imbricate; petals 0; stamens oc; carpels 2. Leaves pinnate -- POTERIUM.

ROSA tribe

Pistil enclosed in the hypanthium; pistils many; calyx-tube becoming fleshy. Shrubs usually prickly, with odd-pinnate leaves; stipules large, adnate -- ROSA.

AMYGDALACEAE
(Drupaceae or Prunaceae)

Trees or shrubs, branches with axillary spines as in *Prinsepia;* leaves alternate, simple, stipules when present small or two glands on the petiole. Flowers regular, hermaphrodite, solitary, fascicled, corymbose or racemed, calyx cup-shaped; petals 5; stamens numerous or 10, perigynous, inserted in the mouth of calyx-tube; carpel 1, superior, ovules pendulous, style terminal. Fruit a drupe, usually 1-seeded by the abortion of one of the 2 ovules. (8 Genera)

Analysis of the genera --

Leaves usually serrate; pith of branches solid. Style terminal -- PRUNUS.

Leaves entire; pith of branches lamellate. Style lateral- PRINSEPIA.

The genus *Prunus* is now seperated into a number of genera, and a key for the now receognised genera is as follows :

Flowers sulcate, usually bloomy, sometimes pubescent; leaves convolute or conduplicate--

Axillary buds solitary, terminal bud wanting--

Ovary and fruit glabrous; stone sculptured or smooth. Flowers 1-3, pedicellate. Leaves convolute or conduplicate-- PRUNUS.

Ovary and fruit pubescent. Flowers sessile. Leaves convolute-- ARMENIACA.

Axillary buds 3, the lateral ones flower buds; terminal bud present. Flowers 1-2, sessile, rarely stalked.

Ovary and fruit pubescent, rarely glabrous. Leaves conduplicate-- AMYGDALUS.

Flowers not sulcate, not bloomy; stones turgid. Leaves conduplicate. Terminal bud present--

Flowers solitary or few, sometimes in short few flowered racemes, usually with conspicious bracts-- CERASUS.

Flowers in elongated racemes of 12 or more flowers; bracts small--

Leaves deciduous; peduncles usually leafy- PADUS.

Leaves persistent; peduncles leafless- LAUROCERASUS.

MALACEAE (Pomaceae)

Small trees and large shrubs; leaves simple or pinnate, stipulate. Flowers actinomorphic, hermaphrodite; calyx 5 partite; petals 5 as in Rosaceae; stamens usually in three whorls outer of 10, middle of 5 or 10 and inner of 5,

epigynous; ovary interior, 5-2 carpels, syncarpous, united with the cup-shaped floral axis, rarely ripe carpels seperate in *Stranvaesia*, two ovules in each loculus but only one maturing. Fruit a pome. (11 Genera.)

Analysis of the genera

Carpels bony at maturity, fruit hence with 1-5 stones--

Pistils with 2 fertile ovules--

Leaves entire; spineless shrubs. Styles 2-5. Fruit red or black-- COTONEASTER.

Leaves crenulate, persistent; spiny shrubs. Styles 5. Fruit red or orange-- PYRACANTHA.

Pistils with only 1 fertile ovule; carpels 1-5 more or less distinct at the ventral suture and free at the top; styles 1-5. Stem with spines-- CRATAEGUS.

Carpels with leathery or papery walls at maturity, hence fruit 1-5 celled, each cell with 1 or 2 seeds--

Flowers in compound corymbs--

Styles 1-5, distinct or connate. Carpels partly free--

Fruit solid and pointed at the top. Leaves simple or pinnate compound; deciduous--

Sepals deciduous; sytles 2-3. Leaves simple, serrate with excurrent veins-- MICROMELES.

Sepals persistent—

Styles usually, 2, rarely 3 or 5. Leaves pinnate, rarely simple, serrate or lobed with excurrent veins, deciduous- SORBUS.

Styles 3-5. Leaves evergreen no glands on the midrib-- STRANVAESIA.

Fruit hollow and rounded at the top, small, 1-2 seeded. Styles usually 2. Leaves simple, deciduous or evergreen, with curving veins-- PHOTINIA.

Styles 5, distinct; carpels wholly connate; fruit pearshaped. Leaves evergreen with excurrent veins.- ERIOBOTRYA.

Flowers in umbels--

Carpels 1-2 seeded--

Styles connate at base; fruit usually 'apple' shaped, fleshy, without or with few grit cells (flesh mealy) MALUS.

Styles free; fruit usually pear-shaped, its flesh with numerous grit cells-- PYRUS.

Carpels 4 to many; styles free. Fruit subglobose, fleshy intruded at the base and apex-- CYDONIA.

SAXIFRAGACEAE

Herbs not or slightly succulent; leaves alternate, exstipulate. Flowers actinomorphic, hermaphrodite, rarely solitary; sepals usually, 5, imbricate or valvate; petals 5, alternate with the sepals or absent, often clawed, perigynous rarely epigynous; stamens inserted with the petals, 5-10 , free, anthers 2-locular, dehiscing longitudinally; ovary 1-3 locular, free or adnate to the tubular receptacles, axile placentation, ovules numerous, styles usually free. Fruit a capsule. (5 Genera.)

Analysis of the genera

Stamens 5--

Leaves compound, bi-pinnate. Petals none. Herbs- ASTILBE

Leaves simple, sometimes lobed. Petals 5--

Herbs. Flowers solitary, terminal on erect scapes. Staminodes prominent. Placentae parietal- PARNASSIA.*

* Some taxonomists place this genus in a seperate family- Parnassiaceae.

Herbs. Flowers racemose. Petals minute. Placentae nearly basal.-- TIARELLA.

Stamens more than, 5, usually 10--

Leaves simple, usually crenate. Petals none. Ovary 1-celled. Usually delicate small plants-- CHRYSOPLENIUM.

Leaves simple. Petals 5. Ovary 2-celled-- SAXIFRAGA.

ESCALLONIACEAE

Trees or shrubs, leaves simple rarely subopposite or subverticillate, mostly with gland-tipped teeth, stipulate. Flowers hermaphrodite, actinomorphic, rarely dioecious or polygamous mostly in racemes; sepals mostly united in the lower part, rarely free, imbricate or valvate often persistent; petals free or rarely connate into a short tube, imbricate or valvate; disk-lobes alternating with the stamens; Stamens 5, rarely 4 or 5, sometimes alternating with staminodes, perigynous, free; ovary superior to quite inferior, syncarpous (rarely apocarpous), 1-6 locular, placentation parietal in the 1-locular ovaries otherwise central, ovules numerous. Fruit a capsule or a berry. (1 Genus.)

Analysis of the genus

Shrubs or trees. Leaves alternate, glandular dentate. Racemes axillary and terminal, many flowered. Calyx-tube adnate to the base of the ovary. Petals 5, stamens 5; styles divisible into two;ovary 3/4 superior (adnate at the base), two loculed-- ITEA*.

GROSSULARIACEAE

Woody shrubs often armed with spines; leaves often fasciculate or alternate, simple, plicate or convolute in bud,

* Some taxonomists place the genus in a seperate family-Iteaceae.

stipules absent or adnate to the petiole. Flowers often unisexual by abortion, racemose or subsolitary; calyx-tube adnate to the ovary, lobes imbricate or subvalvate; petals 4-5, mostly small or scale-like, stamens 4-5, alternate with the petals, anthers didymous or subglobose; ovary inferior, 1-locular with 2 parietal placentas, ovules few or many, styles 2, free or connate with undivided stigmas. Fruit a pulpy berry crowned by the persistent calyx. (1 Genus.)

Analysis of the genus

Prickly or unarmed shrubs. Leaves alternate, simple. Flowers racemose or subsolitary. Ovary 1-celled- RIBES.

HYDRANGEACEAE

Herbs or softly wooded undershrubs, rarely climber leaves alternate or opposite, simple, exstipulate Flowers hermaphrodite or sometimes the outer flowers sterile and with large petal-like sepals, cymose or corymbose; calyx-tube more or less adnate to the ovary, 5-lobed or toothed, lobes imbricate; petals 5-4, free, contorted or valvate, disk absent; stamens numerous and in several series or 10 or 8, anthers linear to very short; ovary half-inferior to inferior, 6-3 locular or incompletely so, placentation axile or intrusive parietal, ovules numerous, styles as many as the loculi, free or partly connate. Fruit a loculicidal capsule, seeds small, sometimes winged and reticulate. (4 Genera.)

Analysis of the genera

Stamens less than 12--

Flowers in compound corymbs, some of the outer ones much larger than the others. Filaments thread-like-- HYDRANGEA.

Flowers in spreading corymbs, all alike, white. Filaments flattened, 3-pointed. Ovary 3-5 celled- DEUTZIA.

Flowers in terminal panicles, all alike, blue or purplish. Ovary 1-celled. Berry blue-- DICHROA.

Stamens 20-40. Petals 4; ovary 4-celled. Capsule opening by 4-valves. Shrubs.-- PHILADELPHUS.

CRASSULACEAE

Herbs and undershrubs, usually succulent; leaves opposite or alternate, exstipulate. Flowers actinomorphic, hermaphrodite, usually in cymes; sepals free or united into a tube, 4 or 5; petals the same number as the sepals, free or variously connate, hypogynous; stamens as many as or twice as many as tbe petals, if few then alternate with the petals, slightly perigynous, scales present within the stamens; ovary superior, the same number as the petals, free or united at the base. 1-locular, ovules usually many, style short or elongated. Fruit follicular often surrounded by the persistent membranous corolla. (3 Genera.)

Analysis of the genera

Petals connate--

Calyx tubular, 4-toothed-- BRYOPHYLLUM

Calyx4-lobed to the base; carpels adnate to the base of the corolla tube-- KALANCHOE.

Petals free. Calyx of 4-5 sepals-- SEDUM.

DROSERACEAE

Herbs often stemless (rarely subshrubs), with rosette of leaves, leaves often circinate in bud, both surfaces generally covered with viscid stalked glands responsible for trapping small insects. Flowers actinomorphic, hermaphrodite, hypogynous, in usually simple circinate cymes; sepals 5-4 more or less connate basally, imbricate, persistent; petals 5, hypogynous, (very rarely perigynous), stamens 4-20 often 5, hypogynous, free or rarely united at the base, extrose; ovary superior, 1-locular, placentation parietal (or subbasal); ovules many, styles 3-5, mostly free. Fruit a loculicidal capsule (1 Genus.)

Analysis of the genus

Herbs, terrestial, catching insects by means of glandular sticky hairs on the leaves-- DROSERA.

HAMAMELIDACEAE

Trees or shrubs often with stellate indumentum; leaves alternate, rarely opposite, decidious or evergreen, simple, glandular-toothed to palmately lobed, stipulate, stipules often persistent, fleshy and large. Flowers small, sometimes precocious (hermaphrodite or) unisexual, actinomorphic or zygomorphic in dense heads or catkins; calyx-tube more or less adnate to the ovary, lobes imbricate or valvate; petals 4 or more, rarely absent, perigynous or epigynous, imbricate or valvate, rarely circinate; stamens 4 or more, perigynous, 1-seriate, filaments free, connectives often produced, disk absent or of seperate glands between the stamens and ovary; ovary inferior or nearly so, carpels 2 often free at the apex, ovule (1 or) more in each loculus, pendulous from axile placentas; styles subulate, free often recurved. Fruit a woody capsule. (1 Genus.)

Analysis of the Genus

Trees with leaves cordate-ovate, entire. Petals linear-spathulate, fleshy in hermaphrodite flowers but rudimentary in female flowers. Ovary half inferior, ovules several in each cell. Fruit a capsule, woody; the fertile seeds winged-- SYMINGTONIA.

HALORAGACEAE (Halorrhagaceae)

Herbs (or undershrubs), often aquatic; leaves (alternate or opposite) or verticillate, sometimes very large, the submerged ones pectinate, exstipulate or stipules scale-like or ochreate. Flowers usually unisexual or hermaphrodite, actinomorphic, solitary, paniculate or corymbose, very small, subtended by 2 bracteoles; calyx- tube adnate to the

ovary, lobes 2- 4 or absent; petals (2-4 or) absent, when present free and slightly larger then the calyx-lobes, valvate or slightly imbricate; stamens (2-8) rarely 1, large, anthers basifixed; ovary inferior, 1 (-4) locular, ovules (4-) 1, pendulous from the apex of the loculus, styles 1 (-4). Fruit small, a nut or drupe, sometimes winged. (1 Genus.)

Analysis of the genus

A glabrous water plant; leaves whorled. Flowers minute and solitary. Calyx truncate; stamen 1; ovary 1-loculed-- HIPPURIS.*

COMBRETACEAE

Trees or shrubs, often lianous, spinescent in some; leaves alternate or opposite, simple, coriaceous, exstipulate. Flowers actinomorphic rarely zygomorphic, hermaphrodite rarely unisexual, mostly small in spikes or racemes;calyx-tube adnate to the ovary, 4-8 fid or lobed, lobes valvate, persistent; petals 4-6 or absent, rarely many, small, imbricate or valvate; stamens 2-5 or twice as many as petals, rarely numerous, epigynous, filaments inflexed in bud, anthers versatile; disk epigynous; ovary inferior, rarely half inferior, 1-locular sometimes with as many ribs or angles as calyx-lobes, sometimes crowned by a fleshy disk, ovules 2-6, pendulous from the apex of the ovary, style long, filiform. Fruit leathery and drupaceous, 1-seeded, 2-5 angled, the angles forming broad wings, as in *Terminalia.*

(3 Genera.)

Analysis of the genera

Petals absent; calyx-limb deciduous--

Flowers spiked or racemed.-- TERMINALIA.

Flowers capitate-- ANOGEISUS.

(* Some taxonomists segreagrate this genus and place it under a seperate family--Hippuridaceae.)

Petals 5-4. Calyx-limb deciduous, calyx-tube constricted above the ovary and less than half inch. long-- COMBRETUM.

MYRTACEAE

Trees or shrubs; leaves usually opposite rarely alternate as in *Eucalyptus* simple, mostly entire, glandular-punctate, stipules absent or rarely very small. Flowers actinomorphic hermaphrodite or polygamous by abortion, generally cymose rarely racemose; calyx-tube more or less adnate to the ovary, lobes usually 5, mostly inconspicious, imbricate or valvate or irregularly splitting; petals 4-5, rarely 6 or absent, inserted on the margin of the disk lining the calyx-tube, imbricate or connivent into a cap or operculum; stamens numerous rarely few, sometimes in fascicles, inserted with the petals on the margin of the disk lining the calyx-tube, 1 or more seriate, inflexed in bud or twice folded or rarely straight, filaments filiform, free or connate at the base into a short tube or in bundles opposite the petals, anthers small, opening by slits or by apical pores, connectives often tipped by a gland; ovary inferior, syncarpous, 1-many locular, placentation usually axile rarely parietal, ovules few. Fruit usually fleshy or a capsule loculicidal or indehiscent. (3 Genera.)

Analysis of the genera

Embryo apparently undivided. Seed coat smooth and often free from the pericarp; embryo apparently homogenous within. Inflorescence of 1-flowered pedicels, solitary or clustered or in a short raceme. Anther-sacs parallel, opening longitudinally-- EUGENIA.

Embryo divided i.e. with distinct cotyledons; seed-coat roughish, loosely or closely adhering to the pericarp. Anther-sacs parallel, opening longitudinally--

Calyx not calyptrate, lobes distinct both in the bud and in the flower-- SYZYGIUM.

Calyx calyptrate i.e. not at all lobed, the entire upper part circumscissile and falling as a more or less indurated lid or calyptra-- CLEISTOCALYX.

Features of identification for *Cleistocalyx* are being given in the key because there is a lot of confusion, and difficulty is often experienced to identify *Eugenia* and *Syzygium*. There is no record of *Cleistocalyx* from Nepal.

MELASTOMATACEAE

Herbs, Shrubs (or trees), branches opposite; leaves opposite and decussate, one of a pair often smaller than the other or verticillate, simple, sometimes spotted or verigated as in *Sonerila*, 3-9 parallel longitudinal veins united by parallel transverse veins rarely pinnately veined, exstipulate. Flowers actinomorophic slightly zygomorphic as to androecium, hermaphrodite, mostly very showy, terminal solitary, cymes, panicles or umbellate cymes; calyx tubular, free or adnate to the ovary, sometimes by septa-like connections, lobes imbricate or rarely valvate; petals free, very rarely united at the base, brightly coloured, imbricate; corona usually present between the petals and stamens; stamens the same number as or double the number of the petals, sometimes all fertile and equal, sometimes those opposite the petals sterile, filaments free often geniculate and inflexed, anthers basifixed, opening by a single pore rarely by 2 pores or slits, connectives often appendaged; inferior 2-many locular (rarely 1-locular), placentation basal or parietal, ovules numerous, style simple. Fruit a loculicidal capsule or baccate. (5 Genera.)

Analysis of the genera

Seeds curved through half a circle, minutely punctate--

Stamens all alike, connectives not produced at the base. Fruit a capsule-- OSBECKIA.

Stamens very unequal, longer stamens with connectives produced at the base. Fruit somewhat berry-like, bursting irregularly-- MELASTOMA.

Seeds falcate. Inflorescence terminal, panicle large and showy Ovary with vertex usually free and conical-- OXYSPORA.

Seeds straight. Ovary flattened or depressed at the vertex--

Petals 3; Stamens 3; Ovary 3- celled. Inflorescence scorpoid-- SONERILA.

Petals 4; stamens 8; Ovary 4-celled. Flowers nearly sessile-- SARCOPYRAMIS.

LYTHRACEAE

Herbs rarely shrubs or trees; leaves usually opposite or whorled, rarely alternate, stipules absent or very small. Flowers usually actinomorphic rarely zygomorphic as in *Cuphea*, hermaphrodite,solitary or paniculate; sepals united into a tube, valvate often with appendages between the lobes; petals present or absent, inserted towards the top of the calyx-tube, crumpled in bud; stamens usually 4 or 8 or rarely more, inserted below the petals, filaments variable in length, usually inflexed in bud; ovary superior, sessile or shortly stipitate, completely or incompletely 1-6 locular, rarely 1-locular, placentation axile, sometimes not reaching the top of the ovary, ovules many. Fruit capsular. (4 Genera.)

Analysis of the genera

Low or aquatic herbs with small or minute flowers. Calyx membraneous. Stamens 8--

Capsule septicidally dehiscent; capsule walls horizontally striate, but faintly-- ROTALA.

Capsules indehiscent or irregularly dehiscent; capsule walls not striated-- AMMANNIA.

Trees or shrubs. Calyx herbaceous or coriaceous. Petals very often large and wrinkled--

Calyx curved, red, half inch long. Stamens 12-- WOODFORDIA.

Calyx straight. Flowers 6-fd. Stamens very many. Seeds winged-- LAGERSTROEMIA

PUNICACEAE

Woody shrubs or small trees, sometimes spiny, twigs sometimes 4-winged; leaves mostly opposite, subopposite or fascicled simple not glandular, membraneous, exstipulate. Flowers hermaphrodite large, coloured, terminal solitary or clustered; calyx coloured, tubular, adnate to the ovary, turbinate 5-7 lobed, lobes valvate; petals 5-7, imbricate and crumpled in the bud; stamens numerous, many seriate emerging from within upper half or more of hypanthium, epigynous, filaments free, slender; ovary inferior, many locular, loculi superimposed in two series, lower with axile and upper with parietal placentation, ovules numerous on each placenta, style slender. Fruit a spherical berry crowned by the calyx-limb, with a thick coriaceous rind. (1 Genus.)

Analysis of the genus

Flowers epigynous. Calyx-tube adnate to the ovary. Stamens in several rows. Fruit with coriaceous pericarp; seeds pulpy-- PUNICA.

SONNERATIACEAE

Trees with long pendent branches; leaves opposite, simple, entire, coriaceous, exstipulate. Flowers actinomorphic, hermaphrodite, large,showy,smelling of sour milk, solitary or in clusters of 3, axillary or terminal; calyx-tube campanulate, thick and leathery, lobes 4-8, valvate; petals 4-8, small or absent; stamens numerous, inserted on the calyx in many series, filaments free, reflexed, anthers reniform,

versatile; ovary adnate at the base to the calyx-tube or free, many-4 locular, septa thin, placenta axile and thick, ovules many, style long. Fruit a capsule (or berry). (1 Genus.)

Analysis of the genus

Large glabrous tree sometimes even 100 ft. high. Leaves opposite, usually 10" by 3·5", shortly petioled. Flowers large on terminal panicles, 4-8 fid. Stamens many-- DUABANGA.

ONAGRACEAE

Mostly herbs rarely shrubs, often aquatic leaves simple, oppoite or alternate, stipules mostly absent or decidious. Flowers hermaphrodite, actinomorphic (rarely zygomorphic), tetramerous, often solitary; calyx adnate to the ovary, lobes 4-5,valvate, persistent; petals 4-5, free, contorted or imbricate, rarely absent; stamens as many or twice as many as the calyx-lobes; ovary inferior to rarely semi-superior, 2-6 locular, rarely incompletely locular, axile placentation, ovules 1 to many. Fruit a capsule, berry or nut. (3 Genera.)

Analysis of the genera

Ovary 1-2 celled; cells 1-ovuled. Fruit nutlike--CIRCAEA.

Ovary 2-6 celled; cells many ovuled. Fruit a capsule-- Stamens 4-8, rarely 3. Seeds bearded-- EPILOBIUM*.

* Some taxonomists recognise a genus- *CHAMAENERION* seperate from *EPILOBIUM*. In Raven's view (Bull. Brit. Muse. N.H. 2 (12): 327-382, 1962) "nothing is to be gained by recognising a number of small genera peripherial to *Epilobium*" However *CHAMAENERION* has slightly zygomorphic flowers, alternate leaves, very short hypanthium, entire petals and pollen grains falling individually, in contrast to *EPILOBIUM* which has actinomorphic flowers, opposite lower leaves, well developed hypanthium, emarginate petals and pollen grains falling as tetrads.

Stamens 8-13, Seeds not bearded or winged--LUDWIGIA.

PASSIFLORACEAE

(Shrubs or) herbaceous often lianous climbers with tendrils; leaves alternate, (entire or) lobed, often with glands on the petiole, stipulate, stipules small and deciduous, tendrils opposite the leaves. Flowers hermaphrodite or unisexual; sepals 5, free or partially united, often fleshy, persistent, imbricate; petals 5, rarely absent, free or shortly united, imbricate; corona of one or more rows of thread-like filaments or scales, fleshy, usually concave to cup-shaped; stamens 3 or more, hypogynous to perigynous, shortly united or in bundles, usually opposite the petals, sometimes arising from a gynophore; ovary superior, sometimes situated on a gynophore (more commonly an androgynophore), 1-locular, 3 or 4 or 5 parietal placentas, ovules numerous, styles free or united, stigmas 3-5, often capitate. Fruit capsule, berry or indehiscent, seeds surrounded by a pulpy aril. (1 Genus.)

Analysis of the genus

Herbaceous climbers with tendrils; leaves alternate. Hypanthium short; petals 4-5; corona of many rows of short threads; stamens 4-5-- PASSIFLORA.

CUCURBITACEAE

Climbing or prostrate herbs rarely undershrubs, with watery juice, often scabrid, stem often 5-angled, tendrils present and spirally coiled, simple or divided, situated at the upper side of the petiole base; leaves alternate, petioled, frequently cordate, simple, lobed or pedately divided, exstipulate. Flowers unisexual, monoecious or dioecious (very rarely hermaphrodite), very variable in structure, actinomorphic, yellow or white, solitary or in racemes. Male flowers— calyx tubular, 5-lobed, lobes imbricate; corolla gamopetalous (rarely polypetalous), campanulate or rotate

or salverform, imbricate of induplicate-valvate; stamens free or variously united, mostly 3 rarely 1-5, usually highly modified, curved, flexuous or conduplicate, connectives often produced; female flowers- calyx-tube adnate to the ovary and often produced beyond; petals similar as in male flower; staminodes usually not present; inferior syncarpous, usually 3 carpellary (very rarely free), 1-locular, placentae often 3, parietal but meeting in the middle, ovules numerous rarely few arranged towards the walls of the ovary, style simple or rarely 3 free, stigmas thick. Fruit generally a pepo, seeds often flattened. (12 Genera.)

Analysis of the genera

This key is adapted after Chakravarty (Rec. Bot. Surv. Ind. XVII (1), 1959.)

Key to the tribes--

Ovules horizontal (except in *Herpetospermum*). Female flowers usually solitary, never panicled. Stamens 2 in male flowers. Leaves undivided-- CUCUMERINAE.

Ovules pendulous. Flowers small usually in panicles. Stamens 5 in male flowers-- ZANONIEAE.

Tribe *Cucumerinae*

Anther cells flexuous or conduplicate--

Corolla rotate or if campanulate 5-partite to the base or petals free--

Petals fimbriate at their margins. Ovules and seeds numerous. Calyx-tube less than 7 cm. long-- TRICHOSANTHES.

Petals entire--

Calyx-tube of the male flower elongate; stamens inserted within and included in the calyx-tube or nearly so. Petiole eglandular, tendril 2-fid; fruit fibrous, deeply 3-valved, dry, seeds numerous, pendulous-- HERPETOSPERMUM.

Calyx-tube of the male flower short--

Stamens inserted at the mouth of the calyx-tube; filaments exserted, anthers free. Fruit dry, endocarp fiberous, dehiscent usually by stopple-- LUFFA.

Stamens inserted below the mouth of the calyx-tube; anthers more or less cohering--

Calyx with 2-3 scales at its base; male flowers with large enveloping bracts-- MOMORDICA.

Calyx without scales at the base; no bracts. Tendrils simple-- CUCUMIS.

Corolla campanulate, divided not more than half way down. Flowers white. Tendrils simple-- COCCINIA.

Anther cells straight or curved, not conduplicate--

Flowers large (10-15 mm. long), bright yellow; male racemes stout. Calyx-tube elongate (1.5-2cm); seeds 3-9-- EDGARIA.

Flowers small (5-10 mm.), greenish yellow in racemes or fascicles, not stout--

Male flowers in racemes, monoecious; corolla subrotate-- BRYONIA.

Male flowers in fascicles, dioecious; corolla campanulate-- BRYONOPSIS.

Flowers small (1–5 mm.), yellow, dull corymbose, umbellate or racemed. Stylar disc cup-shaped. Fruit not circumcised-- MELOTHRIA.

Tribe *Zanonieae*

Fruit trigonous, obovoid. Tendril 2-fid-- GOMPHOGYNE.

Fruit pea-like. Tendril simple-- GYNOSTEMMA.

The genus *ZEHNERIA* Benth. et Hook. f. is a synonym of *MELOTHRIA*, so also the genus *MUKIA* Benth. et Hook. f.

BEGONIACEAE

Mostly erect, creeping or acauliscent succulent herbs rarely low shrubs, stem jointed; leaves alternate, simple, mostly palmately nerved, often unequal-sided or oblique, stipulate, stipules free, caducous or decidious. Flowers monoecious zygomorphic or actinomorphic, mostly in axillary cymes, showy. Male flowers– sepals 2 rarely 5, petaloid, opposite, valvate; petals 2 or 5, imbricate or absent; stamens numerous, filaments free or connate, anthers continuous with the filaments; female flower–sepals and petals more or less as in the male flower or undifferentiated into sepals and petals; staminodes absent or very small; ovary inferior syncarpous (or free at the apex), 2-4 (rarely 1) locular, mostly angled and winged, placentation axile, simple or lobed, ovules many, styles 2-5, free or connate, stigmas often twisted and strongly papillose all over. Fruit a capsule or berry. (1 Genus.)

Analysis of the genus

Succulent herbs with rootstock tuberous. Flowers pink, 1-sexual in axillary stalked bracteate cymes. Sepals 3-5 in two series, unequal, coloured. Petals none. Male flowers with numerous stamens while female flowers with inferior 3-celled ovary-- BEGONIA.

DATISCACEAE

Perennial herbs or trees, sometimes lepidote; leaves alternate (simple or) pinnate, compound, exstipulate. Flowers unisexual, dioecious (rarely hermaphrodite), actinomorphic, small, spicate or racemose. Male flowers–calyx-lobes 3-9, short; petals (8- or) absent, small; stamens 4-25, rudimentary ovary sometimes present; female and bisexual

flowers-calyx-tube adnate to the ovary, petals absent; stamens similar to the male flower or reduced to staminodes; ovary inferior, 1-locular, carpels 3, placentas parietal, ovules numerous, styles 3, free, simple or branched. Fruit a capsule crowned by calyx-lobes and styles, opening at the top. (1 Genus.)

Analysis of the genus

Herbs with trisected or pinnate leaves, uppermost undivided. Flower dioecious; petals absent; anthers elongated, filaments short; style filiform, 2-partite-- DATISCA.

CACTACEAE

Succulent herbs and shrubs of diverse habit, often very spiny and usually with much reduced leaves. Flowers hermaphrodite, solitary, actinomorphic sometimes zygomorphic by the curvature of the perianth tube; calyx generally petaloid, superior; petals in several series, the innermost largest, sometimes coherent at the base, epigynous; stamens numerous, inserted at and free or adnate to the base of the petals; ovary inferior, syncarpous, 1-locular, placentas 3, ovules many, stigmas spreading or close. Fruit a berry often spiny and bristly, seeds immersed in the pulp (1 Genus.)

Analysis of the genus

Flowers large, flower-tube wanting. Petals spreading; filaments much shorter than the petals. Leaves wanting or minute and caducous. Plants very spiny-- OPUNTIA.

UMBELLIFERAE (Apiaceae)

Herbaceous biennial or perennial, very rarely somewhat woody, stems furrowed, pith soft; leaves alternate, mostly much divided sometimes heteromophic, sheathing at the base. Flowers hermaphrodite, rarely unisexual, actinomorphic, in simple or compound umbels or rarely capitate; calyx adnate to the ovary, 5 lobed, often reduced; petals 5 usually apically reflexed, valvate or slightly imbricate,

epigynous, free soon falling off; stamens 5, filaments mostly prominently ribbed and often with parallel resinous canals (vittae), ovules solitary in each loculus, pendulous, styles 2, thickened at the base and capping the ovary--stylopodium. Fruit schizocarpic, dividing into 2 mericarps.

(20 Genera.)

Analysis of the genera—

Umbels simple or irregularly compound. Vittae 0—

Leaves undivided, stipulate, Fruit laterally compressed—HYDROCOTYLE.*

Leaves spinous-toothed. Fruit ellipsoid, cylindric ERYANGIUM.

Leaves compound. Fruit covered with spines or hooked bristles, ovoid or slightly compressed laterally. Umbels subcorymbose SANICULA.

Umbels compound. Secondary ridges of the fruit inconspicious—

Fruit laterally compressed or at least constricted at the commissure, not or very obscurely winged

Carpels in outline ovate or oblong, not distinctly narrowed upwards, plane on the inner face—

---

* There is a certain amount of confusion between *HYDROCOTYLE* and *CENTELLA*, and in the published literature about Nepal Plants, it is the the genus *HYDROCOTYLE* which is mentioned. However, a key to distinguish the two genera is given --

Mericarps with 3 ridges, the commisural one obscure; flowers white; pericarp of seed thin--HYDROCOTYLE.

Mericarps with 7-9 ridges, the primary and secondary ones being similar; flowers red; pericarp thick -- CENTELLA.

Leaves entire. Flowers lurid or yellow. Primary ridges distinct, secondary 0; vittae usually 3 between the primary ridges BUPLEURUM.

Leavs pinnate. Flowers white. Primary ridges slender, vittae 1 CARUM.

Leaves pinnate or decompound. Flowers white or yellow; primary ridges slender; vittae 2—3 PIMPINELLA

Carpels in outline ovate or oblong, not distinctly narrowed upwards, excavated or concave on the inner face; seed grooved or concave on the inner face—

Bracteoles simple, linear VICATIA.

Bracteoles lobed or pinnate TRACHYDIUM

Carpels in outline elongate oblong, seed in horizontal section nearly circular—

Fruit attenuate at base, bristly, bristles scattered and minute OSMORRHIZA.

Fruit oblong, narrowed upwards distinctly glabrous CHAEROPHYLLUM.

Fruit widest at commusure, in horizontal section circular or somewhat dorsally compressed --

Primary ridges of the fruit more or less distinct; fruit not winged, but all the ridges equal. Calyx-teeth lanceolate, acute -- OENANTHE.

Primary ridges of the fruit more or less excurrent. Fruit winged --

Tall and stout plants. Leaves pinnately decompound. Ridges of the fruit all winged -- SELINUM.

Stemless or short. Ultimate leaf segments linear. Fruit much compressed dorsally, lateral ridges winged -- CORTIA.

Perennial or biennial herbs. Seeds grooved or concave on the inner face; primary ridges winged-- PLEUROSPERMUM.

Fruit much dorsally compressed, dorsal ridges slightly excurrent, lateral winged, wings of the opposite carpel closely applied face to face --

Ovary pubescent; stylopodium conical. Dorsal ribs of the fruit small or absent. Plants stout, biennial or perennial -- HERACLEUM.

Ovary glabrous; stylopodium flat or wanting. Dorsal ribs of the fruit filiform. Plants slender- ANETHUM.

Umbels compound. Secondary ridges of the fruit prominent, primary less prominent --

Fruit glabrous --

Flowers white. Fruit ovoid -- CORIANDRUM.

Flowers yellow. Fruit oblong -- FOENICULUM.

Fruit hirsute or setose; bracts linear; seed grooved on the inner face --

Calyx-teeth not persistent. Involucre 0 or 1-2, leafy, involucel 3-8, lanceolate, spreading - CAUCALIS.

Calyx-teeth persistent. Involucre 1-5, leafy, involucel 5-8, lanceolate, hairy -- TORILIS.

ARALIACEAE

Mostly woody trees and shrubs, rarely herbs, sometimes climbing by means of aerial roots or epiphytic; leaves alternate (or rarely opposite), simple commonly pinnate or digitate, petioles enlarged and thickened at the base, often with stellate indumentum, stipules either adnate to and scarcely distinguishable from the base of the petiole or intrapetiolar or rarely absent. Flowers hermaphrodite but commonly unisexual and polygamous or dioecious,

actinomorphic, racemose, umbellate or capitate; calyx superior, small, entire or toothed or lobed, 5, usually inconspicious; petals 3 or more often 5, free or united, valvate or slightly imbricate; stamens free, mostly the same number of as petals or many; disk on the top of the ovary; ovary inferior, 1 or more locular, ovules solitary in each loculus, pendulous, styles free or connate. Fruit a berry or drupe, (9 Genera)

Analysis of the genera --

Petals imbricate in the bud --

Trees or large scandent shrubs. Leaves 1 pinnate. Flowers racemose or umbellate. Ovary 5 (7-8); styles 5, more or less united -- PENTAPANAX.

Herbs. Leaves digitately compound. Ovary 2 (3) celled; styles 2-3, distinct -- PANAX.

Herbs (or small decidious trees). Leaves pinnate compound. Ovary 2-5 celled; styles 2-3, free ARALIA.

Petals valvate in the bud --

Ovary 4-12 celled --

Leaves simple or pinnately compound --

Shrub or small tree. Flowers 8-12 merous- TREVESIA.

Woody vines, climbing by means of serial roots. Flowers 5 merous -- HEDERA.

Leaves digitately compound --

Unarmed. Ovary 5-7 celled; styles united into a column or stigmas sessile -- SCHEFFLERA.

Prickly. Ovary 2 (3-5) celled; styles 2-5, distinct or connate at the base-- ACANTHOPANAX*

(* The genus *ACANTHOPANAX* falls under two heads.)

Ovary 1-2 celled, seldom 3 celled --

Leaves simple or palmately lobed or digitately compound --

Armed or unarmed trees or shrubs. Umbels in large compound panicles. Flowers mostly polygamous. Styles united into a column. Endosperm ruminate or uniform-- BRASSAIOPSIS.

Umbels solitary or few together or forming large terminal panicles. Flowers perfect or polygamous Style distinct or connate at the base only. Endosperm uniform -- ACANTHOPANAX*

Leaves pinnately compound or decompound -- HETEROPANAX

CORNACEAE

Trees (shrubs or rarely perennial herbs); leaves opposite or alternate, simple, entire, angular-lobed or seperate, exstipulate. Flowers hermaphrodite or unisexual then plants monoecious or dioecious, actinomorphic, small, white or yellow or lurid, in dichotomous or racemose panicles or in heads., sometimes with large showy bracts; calyx-tube adnate to the ovary, 4-5 lobed or subtruncate; petals 4-5, free rarely absent, valvate or imbricate; stamens the same number as the petals; disk fleshy, cushion-shaped, centrally situated in the male flowers and epigypous in the female flowers; ovary inferior, 1-4 locular, ovules solitary and pendulous in each loculus, style simple or lobed. Fruit a drupe or berry. (2 Genera)

Analysis of the genera --

Trees or shrubs; leaves opposite. Flowers small, bisexual, arranged in umbels or capitate within 4 herbaceous petaloid involucral bracts. Petals 4; stamens 4; ovary 2 (or 3) celled -- CORNUS.

(* The genus *ACANTHOPANAX* falls under two heads.)

Small tree. Flowers unisexual in large panicles; 5 merous; stamens 5; ovary 4 celled -- TORICELLIA.

ALANGIACEAE

Trees or shrubs, sometimes spiny; leaves alternate, simple, entire or lobed, unequal at the base, exstipulate. Flowers hermaphrodite, actinomorphic, white or yellowish-white, pedicels articulating, axillary cymes; calyx-tube adnate to the ovary, truncate or with 4-10 teeth; petals 4-10, mostly strap-shaped, free sometimes coherent at the base, valvate but at length recurved; stamens the same number as the petals or 2-4 times as many, filaments free or slightly connate at the base, more or less villous inside; disk cushion-like on the ovary; ovary inferior, 1-2 locular, ovule solitary, pendulous, style simple or lobed. Fruit drupaceous, 1-seeded, crowned by the calyx and disk. (1 Genus)

Analysis of the genus --

Shrubs or small trees. Leaves simple. Flowers hermaphrodite; calyx truncate; petals narrow and much elongated; stamens twice or thrice the petals; ovary inferior, 1-celled; ovule 1, pendulous. Cotyledons crumpled - ALANGIUM.

ADDENDA

(page 4, 12th. line)

Leaves opposite or whorled; flowers cymose, bisexual. HYPERICACEAE.

(page 20.)

TETRACENTRACEAE.

Tree with long and alternate short shoots. Leaves simple, alternate, deciduous, leaf-base broad and sheathing the bud. Inflorescence a slender catkin-like spike, shortly peadunculate. Flowers small, bisexual in clusters of 4, the clusters alternate. Calyx of 4 sepals in 2 series persistent in fruit. Corolla absent. Stamens 4, opposite the sepals, anthers with 4 pollen chambers, basifixed. Carples 4, alternate with sepals, coalescent, ovary superior, each carpel unilocular with 2 placentas, ovules several attached near the middle of the loculi, 4, styles connivent at first. Fruit composed of 4 laterally coalescent carpels.

(1 genus)

Analysis of the genus

Charecters of the family..... TETRACENTRON.

(page 21, 10th. line)

Carpels free, ripe carpels many, dry or berried. Petals bisesiate UVARIA.

(page 55, 6th line)

Flowers hermaphrodite; petals 4; ovary 3-6-celled, each cell 1-ovuled. Tendrils absent LEEA.

(page 55, 30th line)

Trees. Leaves pinnate. Flowers regular. Capsule pyriform, marked with 3-4 ribs, glabrate red.

MISCHOCARPUS.

Trees. Leaves pinnate. Flowers regular. Fruit indehiscent, smooth, fishy or coriaceous. SAPINDUS.

(page 74, 7th line)

Pistils with 3 fertile ovules, ovary 5-celled, styles 5-celled, connate and woolly below the middle. DOCYNIA.

(page 95, 4th line)

Unarmed small trees. Flowers polygamous pedicels jointed (continuous in *Brassaiopsis*) styles combined.

MACROPANAX.

(page 95, 28th line)

Undershrubs. Flowers unisexual in umbels, bracts absent. Petals valvate; stamens 3-5; ovary 3-4 celled.

HELWINGIA.

INDEX

ERRATA

The letters oc in this book should be read as the sign for indefinite (∝).

Page	line	incorrect	correct
Pre-face	8	photogeography	phytogeography
Intro-duc-tion	5	explaination	explanation
"	7	decession	decission
vii	6	prediliction	predilection
"	26	ommissions	omissions
4	12	recemose	racemose
5	10	ofter	often
5	11	EAEOCARPACEAE	ELAEOCARPACEAE
6	22	BALSAMINACAEE	BALSAMINACEAE
6	23	monadelaphous	monadelphous
9	15	papilionaceae	papilionaceous
9	31	with-out	without
10	30	stamans	stamens
12	12	MELASTOMATA-CEAE	MELASTOMACEAE
12	14	bongitudinally	longitudinally
18	4	decidious	deciduous
19	13	"	"
19	28	"	"
20	14	ranches	branches
22	15	TILACORA	TILIACORA

Page	line	incorrect	correct
24	9	decidious	deciduous
24	13	whieh	which
25	26	coherant	coherent
31	30	dialated	dilated
31	32	conspicious	conspicuous
34	3	decidious	deciduous
34	26	basaly	basally
36	12	dioceious	dioecious
39	26	decidious	deciduous
47	28	SIMAROUBACEAE	SIMARUBACEAE
50	26	ERTHYROPALUM	ERYTHROPALUM
51	11	diocious	dioecious
51	17	Flowes	Flowers
52	7	ining	lining
52	30	decidious	deciduous
53	26	equaling	equalling
54	7	puncate	punctate
54	18	dscoid	discoid
57	11	leave	leaves
57	24	coherant	coherent
62	28	anf	and
63	27	CROTOLARIA	CROTALARIA
64	1	Lees	Leaves
65	11	monoadelphous	monadelphous
65	13	Leaves exstipellate	This should be 14th line. i.e. Fresh para
66	3	OUGENIA	OUGEINIA
67	11	Conspicious	Conspicuous
67	22	"	"
68	7	SPANTHOLOBUS	SPATHOLOBUS
69	7	continous	continuous
73	2	receognised	recognised
73	19	conspicious	conspicuous
76	25	at	to

Page	line	incorrect	correct
79	2	terrestial	terrestrial
79	6	decidious	dedciduous
80	31	segreagrate	segregate
81	10	inconspicious	inconspicuous
82	10	MELASTOMATA-CEAE	MELASTOMACEAE
83	8	scorpoid	scorpioid
84	5	6-fd	6-fid
85	11	decidious	deciduous
88	4	fiberous	fibrous
89	8	decidious	deciduous
90	29	heteromophic	heteromorphic
91	12	ERYANGIUM	ERYNGIUM
91	17	inconspicious	inconspicuous
92	20	commusure	commissure
94	3	inconspicious	inconspicuous
94	16	decidious	deciduous
97	23	bisesiate	biseriate
98	13	28th.	29th.
Index	9	Actaeae	Actaea
"	22	Amora	Amoora
(b)	29	Brachystimma	Brachystemma
(c)	9	13, 29	3,29
(c)	16	Caryophyllus	Caryophyllales
(c)	21	Cayvatia	Cayratia
(d)	21	74,11	74
(d)	22	Crotolaria	Crotalaria
(d)	33	Decaisna	Decaisnea
(e)	12	Docinea	Docynia
(e)	17	Drupacea	Drupaceae
(e)	18	Drymeria	Drymaria
(e)	32	Erthropalum	Erythropalum
(e)	33	Eryangium	Eryngium
(f)	9	Ficiodales	Ficoidales

Page	line	incorrect	correct
(f)	20	Geranaiales	Geraniales
(g)	25	7,57	7,51
(h)	26	5,11,38	5,38
(h)	33	Melastomataceae	Melastomaceae
(h)	34	Melastome	Melastoma
(h)	35	Meliaceae	This line should be omitted.
(i)	16	97	98
(i)	33	Oenentha	Oenanthe
(i)	34	6,50	7,50
(j)	3	Oromosia	Ormosia
(j)	4	Osbekia	Osbeckia
(j)	6	Ougenia	Ougeinia
(j)	23	Passiflorae	Passiflorales
(k)	7	Polygonales	This line should be omitted.
(k)	11	Portulacae	Portulacaceae
(k)	16	33,72	72
(l)	23	Sdum	Sedum
(m)	4	Spantholobus	Spatholobus
(m)	15	Sterculiacea	Sterculiaceae
(m)	27	Tinospora	This line should be omitted.
(n)	2	Thlapsi	Thlaspi
(n)	4	Tilacora	Tiliacora
(n)	4	20	22
(n)	28	3,21	3,29
(n)	last	3,92	30

Printed at His Majesty's Government Press, in Nepal