













BURMA,  
ITS  
PEOPLE AND PRODUCTIONS.

— — —  
VOL. II.  
BOTANY.



BURMA,  
ITS  
PEOPLE AND PRODUCTIONS;  
OR,  
NOTES ON THE FAUNA, FLORA AND MINERALS  
OF  
TENASSERIM, PEGU AND BURMA.

BY  
REV. F. MASON, D.D., M.R.A.S.,  
CORRESPONDING MEMBER OF THE AMERICAN ORIENTAL SOCIETY, OF THE BOSTON SOCIETY OF  
NATURAL HISTORY, AND OF THE LYCEUM OF NATURAL HISTORY, NEW YORK.

VOL. II.  
BOTANY.

REWRITTEN AND ENLARGED  
BY  
W. THEOBALD,  
LATE DEPUTY-SUPERINTENDENT GEOLOGICAL SURVEY OF INDIA.

PUBLISHED BY ORDER OF THE CHIEF COMMISSIONER OF  
BRITISH BURMA,

BY  
STEPHEN AUSTIN & SONS, HERTFORD.

1883.

1138

1883

V. 2

STEPHEN AUSTIN AND SONS,



PRINTERS, HIRTFORD.

## CONTENTS OF VOLUME II.

	PAGE
Title, and Preface by the Editor . . . . .	i-xv

### BOTANY.

Introductory Remarks . . . . .	1-14
--------------------------------	------

#### CRYPTOGAMS, OR FLOWERLESS PLANTS.

THALLOGENS.—ALGÆ ( <i>Sea-weeds</i> ) . . . . .	15-31
FUNGI ( <i>Mushrooms</i> ) . . . . .	31-35
LICHENS . . . . .	35
ACROGENS.—MUSCI ( <i>Mosses</i> ) . . . . .	36-55
CHARACEÆ—EQUISETACEÆ—LYCOPODIACEÆ—MARSIACEÆ . . . . .	55-58
FILICES ( <i>Ferns</i> ) . . . . .	58-86
Systematic arrangement . . . . .	86-94

#### PHENOGAMS, OR FLOWERING PLANTS.

MONOCOTYLEDONS . . . . .	95
GLUMALES ( <i>Grasses, Reeds</i> ) . . . . .	95-122
RESTIALES . . . . .	122-123
COMMELYNALS . . . . .	123-124
PONTEDERALES . . . . .	124-125
LILIALES ( <i>Asparagus, Aloes</i> ) . . . . .	125-129
ARALES ( <i>Duckweed, Screw-pines</i> ) . . . . .	129-135
PALMALES ( <i>Palms, Canes</i> ) . . . . .	135-143
PODOMALES ( <i>Grass-wracks</i> ) . . . . .	143-144
DIOSCOREALES ( <i>Yams</i> ) . . . . .	144-146
NARCISSALES ( <i>Orrisroot, Crocus</i> ) . . . . .	146-147
TACCALES ( <i>Tahiti arrowroot</i> ) . . . . .	147-148

	PAGE
ORCHIDALES ( <i>Orchids</i> ) . . . . .	148-203
ANOMALES ( <i>Pine apples, Plantains</i> ) . . . . .	203-209
HYDRALES ( <i>Fallisneria</i> ) . . . . .	209-210
DICOTYLEDONS. . . . .	210
GYMNOSPERMS ( <i>Cycads, Conifers</i> ) . . . . .	210-219
ANGIOSPERMS . . . . .	219

## Division I. APETALOUS PLANTS.

SANTALES ( <i>Sandal-wood, Mistletoe</i> ) . . . . .	220-225
QUERNALES ( <i>Walnuts</i> ) . . . . .	225-227
ASTRALES ( <i>Rafflesia, Aristolochia</i> ) . . . . .	227-230
NEPENTHALES ( <i>Pitcher plants</i> ) . . . . .	230
PIPERALES ( <i>Peppers</i> ) . . . . .	230-231
EUPHORBIALES ( <i>Manihot, Box</i> ) . . . . .	232-256
AMENTALES ( <i>Willows</i> ) . . . . .	256-262
URTICALES ( <i>Nettles, Figs</i> ) . . . . .	262-280
DAPHNALES ( <i>Lign aloes</i> ) . . . . .	280-282
LAURALES ( <i>Nutmegs, Cinnamon</i> ) . . . . .	282-290
CHENOPODIALES ( <i>Nipal spinach</i> ) . . . . .	290-294

## Division II. MONOPETALOUS PLANTS.

LAMIALES ( <i>Teak, Sweet herbs, Verbena</i> ) . . . . .	294-307
PERSONALES ( <i>Sesamum, Mayodendron</i> ) . . . . .	307-324
SOLANALES ( <i>Potato, Tomato, Tobacco</i> ) . . . . .	324-327
POLEMONIALES ( <i>Convolvulus, Sweet potato</i> ) . . . . .	327-334
GENTIALES ( <i>Gratian, Jasmine, 'Soma' plant</i> ) . . . . .	334-354
EBENALES ( <i>Ebony, Gutta-percha</i> ) . . . . .	355-363
PRIMULALES . . . . .	363-370
ERICALES ( <i>Rhododendrons</i> ) . . . . .	370-373
CAMPANALES ( <i>Rampion</i> ) . . . . .	373-376
ASTERALES ( <i>Compositæ, Teasles</i> ) . . . . .	376-404
CATRIFOLIALES ( <i>Coffee, Cinchona</i> ) . . . . .	404-431

## Division III. POLYPETALOUS PLANTS.

UMBELLALES ( <i>Assafetida, Carrots, Hemlock</i> ) . . . . .	432-439
FICOIDALES ( <i>Cactus, Prickly pears</i> ) . . . . .	439-441
PASSIFLORALES ( <i>Cucurbitacæ, Passion-flowers, Papaws</i> ) . . . . .	441-453
MYRTALES ( <i>Singhara, or water-nuts, Lawsonia (henna), Pomegranates, Cloves, Guava, Rose-apples, Pimento, Mangroves</i> ) . . . . .	453-481
ROSALES ( <i>Roses, Apples, Apricots, Peaches, Almonds, Strawberries, Amherstia, and other Leguminosæ</i> ) . . . . .	481-547
SAPINDALES ( <i>Black varnish, Cashew nuts, Mango, Litchi</i> ) . . . . .	547-561
CELASTRALES ( <i>Vines</i> ) . . . . .	561-574
OLACALES ( <i>Phytocrene, or Traveller's creeper</i> ) . . . . .	574-580
GERANIALES ( <i>'Necm,' 'Toon,' Oranges, Limes, 'Bael,' Balsams</i> ) . . . . .	580-601

	PAGE
MALVALES ('Jute,' <i>Hibiscus</i> , <i>Cotton</i> , <i>Durians</i> , <i>Cacao</i> ). . . . .	601-625
GUTTIFERALS ( <i>Wood oil</i> , <i>Gamboge</i> , <i>Tra</i> , <i>Mangosteen</i> ). . . . .	625-639
CARYOPHYLLALES ( <i>Tamarisk</i> ) . . . . .	639-640
POLYGALALES . . . . .	640-643
PARIETALES ('Arnotto,' <i>Cruciferae</i> , <i>Opium</i> ). . . . .	643-654
RANALES ( <i>Water-lilies</i> , <i>Custard apples</i> ) . . . . .	654-671
APPENDIX A.—Part I. Addenda . . . . .	672-680
Part II. Notes . . . . .	681-692
Part III. Burmese Woods . . . . .	693-704
APPENDIX B.—Vernacular Names . . . . .	705-721
APPENDIX C.—Glossary of Botanical Terms . . . . .	722-729
ERRATA . . . . .	730
INDEX.—          Part I. Genera and Species . . . . .	731-756
Part II. Synonyms . . . . .	757-768
GENERAL INDEX TO VOLUMES I. II. . . . .	768



## PREFACE TO THE SECOND VOLUME.

---

IN the Preface to the First Volume I briefly alluded to the different arrangement of the present from previous editions of this work, one reason for which being the much larger number of species of animals and plants now enumerated. The difference in this respect, between the edition of 1860 and the present, may be thus contrasted :

	Edition of 1860.	1883.
ANIMALS—Invertebrata . . . . .	237	3694
..     Vertebrata . . . . .	786	1799
	<hr/>	<hr/>
Animals . . . . .	1023	5493
PLANTS—Cryptogams . . . . .	130	793
..     Monocotyledons . . . . .	291	880
..     Dicotyledons . . . . .	1207	3370
	<hr/>	<hr/>
Plants . . . . .	1631	5043
	<hr/>	<hr/>
Total Animals and Plants . . . . .	2654	10,536
	<hr/>	<hr/>

The above figures will serve to explain the great inequality in the treatment of some Classes of animals and plants. It would have been wholly out of the question within the limits at my disposal to have attempted the same amount of detail in all cases, that I have ventured on in some. With the Invertebrata for example, little has been attempted, beyond a list of species, and their distribution, without any attempt at descriptive notices. The number of species of Invertebrata now given is alone sufficient to show how impossible, in a work of this character, any attempt at

specific description would have been. On the other hand, in the matter of Fish, from the importance of the subject, an attempt has been made to give the more salient characters of the species hitherto recorded from Burma, though such abbreviated descriptions are never very satisfactory. To those, however, who have not access to the valuable works of Dr. Day on the Fish of Burma, it is hoped that even these scanty extracts may be of service.

In Botany, likewise, it will be noticed that some orders are very incomplete; but on the whole our knowledge of the Flora of Burma is more advanced than of its Fauna, except perhaps as regards the Vertebrata; and foremost among local workers, to whom we are indebted for a systematized knowledge of the Burmese Flora, stands out the name of the late S. Kurz, whose papers on the Burmese Flora in the Journal of the Asiatic Society of Bengal constitute the groundwork of the present volume.

Since writing the Preface of the First Volume, I have received a work which, as I have quoted it occasionally, I may as well here refer to: 'A Manual of Indian Timbers, by J. S. Gamble. Calcutta, 1881.' The manifest ability of this work needs no testimony from me, and it will doubtless be hailed as an acceptable contribution to Burmese botany from the forester's point of view. The names of Kurz and Brandis are of course prominent in it; but if a candid critic may venture to say so, its main defect seems to be its departmental character, as we are told that the descriptions were mostly "dictated by Dr. Brandis." This may, perhaps, have the recommendation of recording the experience and ideas of that veteran forester, but it is a plan destructive of originality, and by no means calculated to promote independent research, or that exposure of past errors, either scientific or departmental, which one not unreasonably looks for in a new work of this sort. To give a single instance, I may point out that though the rate of growth of Teak is treated at great length (I had nigh said *ad nauseam*), yet the important question of girdling, and its pernicious effect on the timber of trees so treated, is not so much as referred to. Naturally this view of the results of girdling is not likely to be prominently set forth in a work

largely dictated by the head of a Department which persists in maintaining that pernicious practice.<sup>1</sup>

Another work which all interested in the development of the industrial products of Burma would do well to peruse is entitled 'New Commercial Plants and Drugs,' Christy & Co., 155, Fenchurch Street, London, but the Botany has already reached to too great a length to permit more than a passing allusion to a topic which might almost claim a volume to itself.

I do not think I can better close than by quoting some remarks of Dr. Prior, in his introduction to the 'Popular Names of British Plants,' since, *mutatis mutandis*, they are doubtless as true of many of the plants of Asia, as those of Europe. After glancing at the neglect of the popular names of plants by scientific Botanists, Dr. Prior<sup>2</sup> goes on: "Besides, admitting to the full all that can be urged against them (popular names) from a purely botanical point of view, we still may derive both pleasure and instruction from tracing them back to their origin, and reading in them the habits and opinions of former ages. In following up such an analysis, we soon find that we are travelling far away from the humble occupation of the herbalist, and are entering upon a higher region of literature, the history of man's progress, and the gradual development of his civilization. Some of the plants that were familiar to our ancestors in Central Asia bear with us to this day the very names they bore there, and as distinctly intimate by them the uses to which they were applied, and the degree of culture which prevailed where they were given, as do those of the domestic affinities the various occupations of the primeval family. . . . The most interesting, in this respect, of the names that have come down to us, are those which date from a time antecedent to the settlement of the German race in England, names which are deducible from Anglo-Saxon roots, and identical, with allowance for dialectic peculiarities, in all the High and Low German and Scandinavian languages, and, what is particularly

<sup>1</sup> For further remarks on this subject, see Appendix A, Part II. p. 682.

<sup>2</sup> Introduction, *l.c.* p. x.

worthy of our attention, each of them expressive of some distinct meaning. These will prove, what with many readers is a fact ascertained upon other evidence, such as the contents of sepulchral mounds, traditionary laws, and various parallel researches, that the tribes which descended upon Britain had entered Europe, not as a set of savages, or wandering pastoral tribes, or mere pirates and warriors, but as colonists, who, rude as they may have been in dress and manners, yet, in essential points, were already a civilized people. It will be seen at the same time that they must have come from a colder country; for while these names comprehend the Oak, Beech, Birch, Hawthorn, and Sloe trees, that extend far into Northern Asia, they do not comprise the Elm, Chestnut, Maple, Walnut, Sycamore, Holly, or any evergreen, except of the Fir tribe, or Plum, Pear, Peach, or Cherry, or any other fruit-tree except the Apple. For all these latter they adopted Latin names, a proof that at the time when they first came in contact with the Roman provincials on the Lower Rhine, they were not the settled inhabitants of the country they were then occupying, but foreigners newly arrived there as colonists or conquerors, from a country where those trees were unknown. It is remarkable that the early Greek writers make no mention of any German tribes, but represent the Scythians as the next neighbours of the Celts, and this difference in the names of one set of trees and the other, and the names which they adopted being Roman and not Celtic, suggests that the Germans had come down from the north-east not long before the Christian era, and intruded themselves, as a wedge between those two more anciently recorded nations.

“There seems to be much misapprehension in respect to this great movement of the Eastern races which broke up the Roman empire. The subject is one into which it would here be out of place to enter fully, and it has been largely treated by J. Grimm in his admirable *Geschichte der Deutschen Sprache*. But even in the following vocabulary we shall see evidence of the continuous advance of a civilized race from the confines of India to these islands, and nothing indicative of a great rush from the North of wild hordes bent upon robbery and destruction, as it has been

usually represented to have been. The gradual drying of the Caspian Sea left the interior of Asia more and more barren, the knowledge of the useful metals facilitated the conquest of the savages of the West, and it is likely that predatory bands of Huns and Turks, and allied nomadic nations, accelerated the movement by rendering the labours of agriculture less remunerative. Thus the migration, being one that proceeded from constantly acting causes, extended over many centuries. Let us lay aside all prepossessions, and inquire what light is thrown by the following vocabulary upon the real state of the Germanic tribes at that period.

“In these mere names of plants, setting aside all other sources of information, we discover that these people came from their homes in the East with a knowledge of letters, and the useful metals, and with nearly all the domestic animals; that they cultivated Oats, Barley, Wheat, Rye, and Beans; built houses of timber, and thatched them, and, what is more important, as showing that their pasture and arable land was intermixed and acknowledged as private property, they hedged their fields, and fenced their gardens. Cæsar denies this; but the frontier tribes, with whom he was acquainted, were living under certain peculiar Mark laws, and were in fact little else than an army on its march. The unquestionable native, and not Latin or Celtic origin of such names as Beech and Hawthorn, or Oats and Wheat, proves that although our ancestors may have been indebted to the provincials of the empire for their fruit-trees, and some other luxuries, for a knowledge of the fine arts, and the Latin literature, and a debased Christianity, the more essential acquirements upon which their prosperity and progress as a nation depended were already in their possession.

“Like the scattered lights that a traveller from the wilderness sees here and there in a town that lies shrouded in the darkness of night in a valley beneath him, and the occasional indistinct and solitary voice of some domestic animal, that for a moment breaks the silence, these distant echoes of the past, these specks that glimmer from its obscurity, faint as they are, and few and far between, assure us that we are contemplating a scene of human industry, and peace, and civilization.

“In this respect the inquiry is one of the highest interest. In another it is probable that some who consult these pages will be disappointed. The names have usually been given to the plants from some use to which they were applied, and very few of them bear any trace of poetry or romance. In short our Sweet Alisons<sup>1</sup> and Herb True-loves,<sup>2</sup> our Heartseases,<sup>3</sup> Sweet Cicelies,<sup>4</sup> and Sweet Williams,<sup>5</sup> resolve themselves into sadly matter-of-fact terms, which arose from causes very different from the pretty thoughts with which they are now associated, and sometimes, as in the case of the Forget-me-not,<sup>6</sup> were suggestive of very disagreeable qualities.”

The above remarks are sufficient to indicate what a vast field is open to the industrious etymologist in Burma, though the Editor's ignorance of Burmese entirely forbids his following up the subject, but it is to be hoped that sufficient has been said to induce many properly qualified students to trace out and illustrate the origin and significance of the numerous curious Burmese names of plants, which seem so sadly to want explanation, as, for example, such names as ‘Myouk-meng-thwē-gay’ or ‘Po-theng-mā-myet-chonk.’

I must here also (in addition to my remarks elsewhere) record my grateful acknowledgments to the Rev. C. Parish, for the valuable assistance he has so ungrudgingly rendered, not only in preparing and revising the lists of Algæ, Mosses, Ferns, and Orchids, which would otherwise have been far less satisfactory, but also for much information and advice of a more general character, though I may add that for any errors or opinions expressed in any other parts of the work I am alone responsible, since, though my friend and coadjutor is a clergyman of a breadth and liberality of view, worthy of his scientific and literary attainments, he may justly claim not

<sup>1</sup> *Alison*, a corruption of *Alyssum* (*maritimum*, L.), a plant smelling of honey.

<sup>2</sup> True-love, properly Tru-love, *Paris quadrifolia*, L., from the Danish *tro* faith and *love* promise, and not from faith in love, with which it has no etymological connexion.

<sup>3</sup> Heart's-ease, *Viola tricolor*, L. Originally the clove (*Caryophyllum*), a warm cardiac medicine, therefore called ‘heart's ease,’ but subsequently transferred to the indigenous ‘gilliflower,’ *Dianthus caryophyllus*, L., and by a still wider deviation to the Wallflower, Pansy and Violet.

<sup>4</sup> Sweet Cicely, *Myrrhis odorata*, Scop., a corruption of the Greek name of the plant *σεσέλι*, *Seseli*!

<sup>5</sup> Sweet William, *Dianthus barbatus*, L., from the French *willot*, corrupted to *Willy* and thence to William.

<sup>6</sup> Forget-me-not, originally applied to *Ajuga Chamæpitys*, from the nauseous taste which it leaves in the mouth. For about fifty years, however, the name has been applied to *Myosotis palustris*, L., with the pretty legend of a drowned lover invented in association with this curious transfer.

to be identified with, nor held to approve of, all the sentiments and opinions expressed by myself in sundry passages throughout the work.

Sunt delicta tamen quibus ignovisse velimus:  
Nam neque chorda sonum reddit quem volt manus et mens  
Pœcentique gravem, persæpe remittit acutum.

*Horace ad Pisones.*

Capital letters following a name are abbreviations: *C.* Creeper, *E.S.* Evergreen shrub, *E.T.* Evergreen tree, *S.* Shrub, *W.C.* Woody creeper, *S.S.* Scandent shrub, *S.P.* Scandent palm, *T.* Tree, meaning a leaf-shedding, as opposed to an evergreen tree. \* before a plant signifies that it is cultivated or introduced and exotic.

A tolerably full list of vernacular names of plants is given in the Appendix, but many of these are somewhat doubtful, for the reasons adduced in the case of the vernacular names of animals, more especially from the variable and inconsistent modes of spelling and pronunciation adopted by different writers.

W. THEOBALD.

BEDFORD, 1883

The remark on page 147 of *Agave Americana* producing 'Socotrine aloes' is, of course, an error, and refers to 'Aloe Socotrina' on p. 128. The *Agave* is often called 'the Aloe' in India.



# BURMA, ITS PEOPLE AND PRODUCTIONS.

## BOTANY.

### INTRODUCTORY REMARKS.

**I**N a work professing to follow a natural arrangement, commencing with the lowest forms of life and terminating with the highest, it might at first sight seem as though Botany should precede Zoology; but in reality this is not so, as the two sister kingdoms occupy more of a twin relationship to each other than a merely sequential one, and it has been observed touching this parallelism:<sup>1</sup> "Hence the ingenious comparison of the Animal and Vegetable Kingdoms to two trees, of which the tops are far apart, while their roots interlace; or to two cones, the tops of which are occupied by the most perfect beings, while the juxtaposed bases are represented by a commingling of inferior organisms"; or, in the words of Linnaeus, "*Natura sociat plantas et animalia; hoc faciendo, non connectit perfectissimas plantas cum animalibus maxime imperfectis, sed imperfecta animalia et imperfectas plantas consociat. Naturæ regna conjunguntur in minimis.*" The above sentence is the verdict of science.

The more popular view is of course that the world was first clothed with vegetation, thereby becoming fitted for the support of animal life. This is the view set forth in the impressive record of Creation attributed to Moses, and of which the following paraphrase by Vincent Bourne is worth quoting for the delectation of the classical reader:—

"Obductas sed adhuc celabant æquora terras,  
Omnia pontus erant, jussit eum cedere fluctus  
Omnipotens Opifex, undisque immensa profunda  
Porrexit: jussu subito, velut agmine facto,  
Conglomerantur aquæ, madidum caput exerit undis  
Fundus, et in valles hinc se submittit apertas,  
Aërios illinc tollens ad sidera montes.  
Inclusus sævit minitanti murmure pontus  
Attollitque iras, et montes volvit aquarum.  
Frustra! perpetuas Naturæ providus auctor  
Opposuit moles, atque insuperabile litus.  
Sed sparsim latis errabant flumina campis,  
Manabant gelidi vario sinuamine fontes,  
Dulci per pronas trepidantes murmure ripas;  
Ne sitiens terra informes aperiret hiatus,  
Ne sterilis foret, atque ignavæ campus arenæ.

<sup>1</sup> Descriptive and Analytical Botany, by Le Maout and Decaisne, p. 981. Translated by Mrs. Hooker, and edited by J. D. Hooker, C.B.

Ecce! jubente Deo, flores et gramina terræ  
 Induitur facies, rident vernantia prata,  
 Arvaeque parturiunt nullos experta labores.  
 Exultat tellus, variâque ornata coronâ  
 Ridet, et ambrosios circum diffundit odores.  
 Scandunt umbrosæ suprema cacumina sylvæ,  
 Montisque ascensum superant funesta cupressus,  
 Et querens tectis, et pinus navibus aptæ.  
 Interea zephyri, et spirantes molliter auræ  
 Ludunt; dum rivi serpunt ad marginis oras,  
 Pinguis qui circum glebis alimenta ministrant.  
 Tunc hilares primum rubuerunt vitibus uvæ;  
 Tempora tunc diversa anni confusa videres:  
 Quicquid frugiferis profert auctumnus in horis,  
 Quicquid promittunt renovati tempora veris  
 Fructusque, et flores, fructus spes pulchra futuri,  
 Ornabant gemino curvatos pondere ramos.”<sup>1</sup>

Dr. Mason prefaces his account of the Botany of Burma by the following remarks:—

“Half a century ago. Dr. Buchanan, who accompanied Symes in his embassy to Ava, made a large collection of plants from the banks of the Irrawaddy. A dozen years afterwards Felix Carey, an English missionary, collected many curious and new plants indigenous to Burma, and sent them up to Roxburgh, at the Botanical Garden near Calcutta, who described them in his ‘Flora Indica.’

“After the first Burmese war Dr. Wallich went with Craufurd in his embassy to Ava, and his catalogue of plants, collected on this visit, contains 1650 species. Eight or ten years subsequent to Dr. Wallich’s visit, Dr. Griffith came to the

<sup>1</sup> Till now the waters hid the buried Earth,  
 And all was Sea, when He, th’ Omnipotent  
 Creator, gave command they should yield place,  
 And in their midst the plains of Earth outspread.  
 At once like serried ranks of ordered host  
 The seas together draw, whilst from their depth  
 Profound, the reeking Earth its bulk uprears,  
 And spreading wide, with vallies fair between,  
 The towering hills their rugged forms disclose.  
 The Ocean now with angry murmur chafes,  
 And gathering wrath, its billows onward rolls,  
 In mountains piled. In vain, forsooth! since He,  
 Th’ All-Provident, its certain barriers raised,  
 And fixed the limits of its utmost shore.  
 Now see! through spreading plains the rivers wind,  
 And streamlets murmur o’er their pebbly beds,  
 And many a grot its cooling fount distills.  
 So no fell drought might parch that smiling scene,  
 Nor Earth display a waste of barren sand.  
 Again behold, at God’s creative word  
 The meads with flowers, with trees the mountains clothed;  
 Whilst joyous Nature seems around to smile,  
 And many a flower exhales ambrosial store.  
 The mournful cypress on the mountain side  
 Its foliage dark displays, nor far removed  
 The sturdy Oaks their foodful shade extend,  
 And Pines, to serve the future Shipwright’s skill.  
 Meanwhile around the circling Zephyrs play,  
 Where grapes in swelling clusters load the vines.  
 No varying seasons then demarked the year,  
 But spring with autumn strove their gifts to blend.  
 Whate’er a renovated spring can show,  
 Whate’er rich autumn’s wont it is to yield,  
 Of flower or fruit, fair earnest yet of more,  
 In union strange combine to load the trees.

Tenasserim coast, and during a residence of fourteen months collected specimens of 1700 species of indigenous plants.

"Soon after the close of the second Burmese war, Dr. MacClelland was appointed Superintendent of Forests in Pegu, and in his Report on the Teak, notices all the principal timber trees in the country. More recently the Rev. C. Parish, Chaplain, Maulmain, has paid considerable attention to the botany of the country, and many of his collection have been described by Sir J. D. Hooker. He has given special attention to the ferns and mosses, which had previously been almost neglected." Thus wrote Dr. Mason in 1860, but since then, giant strides have been made in digesting and extending the labours of the earlier pioneers. Dr. MacClelland was followed by Dr. Brandis as Conservator of Forests of Burma, and in 1862 that officer published a "List of specimens of some of the woods of British Burma," embracing 113 species, of which about two-thirds were alone specifically determined. This, of course, was a hastily compiled list for the international exhibition, but it shows how little was known in those days of the resources of the Burmese forests, since the above number is only attained by including therein worthless woods such as Mōmakhā (*Salix*), Lapan (*Bombar*), Letkoh (*Stereulia*), Thapōn (*Ficus*), and some others, utterly without claim to rank among the useful timbers of the Province.

I refer therefore to them merely to show how vast and unexplored was the field that presented itself to the predecessors of the present race of Forest Officers, and how great was the task before them, of coping with the exuberant wealth of botanical products in that favoured region. This is no place to pass in review the labours of these men, but one among them, whose place knows him no longer, may be specified, as to him we owe, not only a full and well-digested account of the general Botany of Burma, but also the production of a work specially designed for use by Forest officers, and treating of the branch of botany more specially interesting to them. That man was Sulpiz Kurz, and the last-mentioned work was his "Forest Flora of British Burma," which, with his numerous contributions to the pages of the Journal of the Asiatic Society of Bengal, constitutes the source wherefrom the present account of the botany of Burma is mainly drawn.

Dr. Mason thus concludes his preparatory remarks on the Botany of Burma: "When more attention has been paid to the geographical distribution of plants, the Burmese flora will probably show that the climate of the plains on this coast corresponds to one on the hills several thousand feet high on the other coast (*i.e.* of continental India).

"Roxburgh says that a species of oak, *Quercus fenestra*, is a native of the mountains in the vicinity of Silhet; on this coast the same species grows indigenous not fifty feet above the level of the sea. A gamboge tree, *Garcinia pictoria*, grows, he says, 'on the highest parts of Wynaad,' but the same tree grows at the foot of the hills in Tavoy, which border on tide waters. A species of willow he describes as 'a native of banks of rivulets and moist places among the Circular mountains'; but we have a species of willow on this coast which is met on every stream before the influence of the tide ceases to be felt. The chestnut, *Castanea Indica*, he writes, 'is a native of the hilly frontier of Bengal,' but the chestnut of this country, *Castanea Martabanica*, grows nearly down to the sea-shore. Speaking of the wood-oil trees, Dr. Wright remarks: 'In this neighbourhood, Madras, several species are found, but all are natives of hilly tracts forming the Badaghaut. In Pegu, where they abound, they occupy the plains.' He refers all the species of *Fatica* to the mountains, but we have one that drops its curious winged fruit from cliffs that overhang the sea. *Ardisia humilis* is a common shrub at Tavoy, growing down to the plains, but its habitat on the other coast is 'the Eastern slopes of the Neilgherries in subalpine jungle.'

"*Wrightea Wallichii*, Wright states, is found 'on the slopes of the Neilgherries from about the middle of the ascent to the elevation of between 4000 and 5000 feet,' but 'the original specimens of this species were collected in the Tenasserim Province.' A species of whortleberry is found from Tavoy to Toung-ngoo, while all the other species in India are found on the mountains. The rhododendrons are peculiarly extra-tropical plants, yet Mr. Parish found one in Tavoy, Mr. Lobb

another in Maulmain, and a third abounds between Toung-ngoo and the Red Karen table land. The pine is nowhere found at high temperatures, yet it is a common denizen of our forests from Maulmain to Toung-ngoo. The common English brake has been found by Mr. Parish as low as one thousand feet above the sea. The silver fern of Kamptschatka grows on the fort walls of Toung-ngoo, and a moss that Mr. Parish gathered from a tree in Maulmain has been found on mountains four thousand feet high in New Grenada."

No doubt the reason of the difference here indicated between the altitudinal range of the same or cognate species of plants in Burma and continental India, is due mainly to the superior humidity of the former province, the heated and dry low lands of the latter country not sufficing for many plants, which are not therefore met with before a considerable rise above the sea-level has been made, with a corresponding increase of humidity in the atmosphere. Increased moisture is naturally correlated with an increase in the vegetable garb of the land, and both vegetation and moisture react on and promote each other.

I have been myself wonderfully struck with the illustration of this fact, and its bearings on the climate of the country, afforded by the strip of hilly country east of the Tsittoung, below the frontier. All the hills here, over a thousand feet in height or thereabouts, are covered with the familiar 'bracken,' and a glorious thing it is to tramp through this familiar plant of our childhood, in the distant East. The climate, of course, is found to correspond to the indication the presence of this fern gives, and at night I have felt none too warm under a blanket in the month of April, when not 20 miles off, a sheet was as much as could be comfortably borne, the difference in altitude at either place being not more say than 1500 feet. At first sight the reason of this wondrous change in climate directly we cross the Tsittoung is not obvious, but it really depends on the geological structure of the country, or, at all events, in those places where the contrast is most marked. West of the Tsittoung is the broad alluvial plain traversed by the river, bounded by the system of hills of the Pegu range, composed of Tertiary sandstone very little disturbed. East of the Tsittoung the hills are composed of crystalline rocks, traversed by many trap dykes. Now these dykes cut the subterranean drainage, and thereby throw up numerous springs, which irrigate the surface naturally and diffuse abundant moisture, with a corresponding increase in the density of the vegetation and decrease in the mean temperature. The quality of the soil produced by the decomposition of these crystalline rocks may, no doubt, have a share in the result I have described, but it is most largely due, I feel convinced, to increased humidity. Take, for example, a section of the same sandstone range—the Pegu range—across the valley. A London square does not offer a greater contrast to the "Palm house" at Kew (*mutatis mutandis*) than do the arid outer slopes of the range, for years scathed by jungle fires, clearings and cultivation, to similar hills towards the central ranges, which have escaped the axe of the nomad cultivator, and are still clad with virgin forest, with its perennial springs, unimpaired by ruthless clearance over vast areas of Nature's kindly garb. To pass out of the arid region of these outer hills, in the hot season, into the cool and moist retreats of the inner hills, is like passing from purgatory into paradise, and if the trees cannot say as much in words, they indubitably demonstrate the fact by their looks, growth, and development, and Dr. Mason was therefore enunciating a simple axiom when he wrote: "The Flora reads a lesson on the climate of the country, which cannot be mistaken; and, in accordance with it, where pines and rhododendrons are found in Toung-ngoo, hoar frost is seen in January."

The present is an appropriate place for reviewing the various descriptions of Forest, as recognised by the Forest Department, and the trees which characterise them, as so ably described by Kurz in his Forest Flora,<sup>1</sup> and I can only regret that so much doubt should attach to so many of the Burmese names enumerated therein.

<sup>1</sup> Forest Flora of British Burma, by S. Kurz. Calcutta, 1877.

## BURMESE FORESTS.

The forests of Burma are divided by Kurz into two classes, Evergreen and Deciduous, which again are subdivided as follows:

## A.—EVERGREEN FORESTS.

I. LITTORAL FORESTS.

III. TROPICAL FORESTS.

II. SWAMP FORESTS.

IV. HILL FORESTS.

## B.—DECIDUOUS FORESTS.

V. OPEN FORESTS.

VIII. SAND DUNE FORESTS.

VI. DRY FORESTS.

IX. BAMBOO JUNGLES AND SAVANNAHS.

VII. MIXED FORESTS.

X. DESERTED CLEARINGS.

Kurz's description of the above is as follows, the spelling of the vernacular names being slightly altered, in accordance with the spelling adopted in this edition, in cases where the intended pronunciation is known:

## A.—EVERGREEN FORESTS.

The evergreen forests consist of trees which are green all the year round, although a few of them shed their leaves after a certain number of years. In higher elevations of the Martaban and Tenasserim hills, they become intermixed with winter deciduous trees, but these latter are so scanty as not to affect the aspect.

## I. LITTORAL FORESTS.

These are low-land forests growing on the silty alluvial lands bordering the sea, but they ascend also the larger rivers as far as the tidal waves. Salt water is the modifying agent of these forests, and they differ in their aspect according to the saltiness of the water, as affected by the influx of fresh water from the rivers or from rain. Along the sea itself, and often far extending into it, occur Mangrove Forests, consisting chiefly of rhizophors, such as *Pyu* (*Rhizophora*, *Bruguiera*, etc.), *Kambala* (*Sonneratia apetala*), *La-mu* (*Sonneratia acida* and *S. Griffithii*), *Butayat* (*Excoecaria corniculata*), *Pyn-leh-ka-nā-zo* (*Carapa obovata*), and other small trees, like *Kandelia Rheedii*, *Ceriops*, *Lumnitzera racemosa*, *Scyphiphora hydrophyllacea*, and sometimes *Browderia lanceolata*. The ground is muddy in the extreme, and more or less destitute of vegetation.

Further inland, where the ground is inundated only during spring-tides, these mangrove forests pass into the so-called tidal forests, in which most of the above-named trees become more subordinate, while *Kambala* trees (*Sonneratia apetala*) and *Tha-mō* (*Arceuthobium tomentosum*) prevail, and with these are mingled *Thym-bān* (*Hibiscus tiliaceus*), *Thespesia populnea*, *Pyn-leh-ka-nā-zo* (*Heritiera minor*), *Thyn-wyn* (*Pongamia glabra*), *Tamarix Indica*, *Ta-yor* (*Ereacaria agallocha*), *Kyn-ba-lyn* (*Antidesma diandrum*), *Kōn-ka-thyt* (*Erythrina oratifolia*), *Yē-chin-yā* (*Dalbergia spinosa*), *Ka-lwa* (*Cerbera odallam*), *Tha-nāt* (*Cordia myra*), *Then-houng* (*Phoenix paludosa*), and several other conspicuous trees. Shrubs become much developed, of which the following may be mentioned: *Ka-ya* (*Acanthus ilicifolius*), *Pyn-leh-kyoung* (*Clerodendron inerme*), *Ka-yu* (*Pluchea Indica*), *Ta-mā-zōk* (*Glochidion multiloculare*), *Ægialitis annulata*, etc. These are often intertwined by *Mi-joung-nweh* (*Derris scandens*), *Derris uliginosa*, *Myouk-goung-nyin* (*Derris sinuata*), *Acanthus volubilis*, *Shway-nweh-pan* (*Cassytha filiformis*), asclepiads such as *Finlaysonia*, *Sarcobolus*, *Hoya*, etc., and some others. A fern (*Acrostichum aureum*) forms dense patches, and so do locally some coarse grasses, chiefly *Cyperus incurvatus*, and other species; *Pan-yen* (*Andropogon muricatus*), *Leptochloa Wrightii*, *Eragrostis procera*, *Scirpus pectinatus*, etc., along with a few herbs which spring up in more open localities. *Da-ni* (*Nipa fruticans*) and *Tha-kyet* (*Pandanus fetidus*) form locally dense bushes, especially the first named.

## II. SWAMP FORESTS.

These are inland forests which occupy the low-lands and depressions of the alluvial plains. They are usually situated along river-courses, or border the numerous lakes or 'engs.' The ground is nearly as muddy as in the mangrove swamps, but it is fresh water that influences the tree growth here. During the rains they are more or less inundated, often up to 4-5 feet, and possibly more. The trees are mostly different from those of the other forests near or around them, but many of them, if not all, are again found along marshy river-sides, or around jungle swamps in the midst of other forests. They are chiefly small-leaved kinds, such as Yōng (*Anogeissus acuminatus*, var.), Tha-yet (*Mangifera longipes*), Thyt-hpyu (*Xanthophyllum glaucum*), further *Memecylon plebeium*, *Elaeocarpus hygrophilus*, *Leora parviflora* and *L. nigricans*, *Gonocaryum Lobbianum*, Dhay-lay-ben (*Symplocos leucantha*), a species of *Xylosma* (probably *X. longifolium*), Yē-tha-byay (*Eugenia operculata*), Yē-gain (*Hymenocardia Wallichii* and *H. plicata*), *Morindopsis capillaris*, *Weberia myrtifolia*, Kych-ni (*Barringtonia acutangula*), *Garcinia succifolia*, and many kinds of shrubs, climbing as well as erect, are found here, e.g. *Capparis disticha*, Yē-ka-dat (*Cratereu hygrophila*), *Jasminum scandens*, *Gmelina Asiatica*, Ngā-hpyu (*Pachygone odorifera* and *Roydsia obtusifolia*), *Sphenodesma grossum*, a *Tetracera*, Ban-bwē-nweh (*Aneistrocladus Griffithii*), Sow-pein-nweh (*Combretum trifoliatum* and *C. tetragonocarpum*), *Derris elegans*, *uliginosa* and *scandens*, Su-yit (*Acacia pennata*) Herbage is scanty, but Thin-pen or Pin-pwā (*Phrynium dichotomum*) is abundant, and so are in places Za-yap (*Lasia*), and several kinds of sedge-gasses.

Palms or bamboos are absent. Orchids and ferns abound more or less on the trees.

## III. TROPICAL FORESTS.

A characteristic dense mass of trees covers the shady valleys and shady slopes of the hilly country, and, indeed, wherever shelter and a perennial supply of fresh water allows their development. These forests are highly developed from Martaban down to Tenasserim and the Andamans, and the Arakan Yo-mā and the mountainous parts of Ava show a preponderance of tropical forests. But in the lower Chittagong hills, and all along the Pegu Yo-mā, they retreat to the deep valleys; while they are almost absent in the drier districts of Prome and Ava. The variety of trees in these forests is so great as not to allow a comprehensively correct picture; for its constituents vary greatly in forest tracts close to each other. The lofty trees towering above the dense forest mass are chiefly leaf-shedders, especially Thyt-hpyu (*Sterculia scaphigera*), Let-kok (*Sterculia fetida*) and *Sterculia campanulata*, Thyt-pouk (*Tetraneles nudiflora*), Myouk-tan-yet (*Parkia leiophylla*), Maya-nheag (*Arcocarpus fraxinifolius*), Kō-kō (*Albizia Lebbek*) and Bon-me-zā (*Albizia stipulata*), Pyen-ka-do (*Xylia dolabriformis*), Thayet-san (*Swintonia Schwenckii*), Pa-douk (*Pterocarpus Indicus*), Myouk-gnō (*Duabanga sonneratioides*), Toung-peing-neh (*Artocarpus chaplasha* and *Art. rigida*), Myouk-lök (*Artocarpus Lacoocha*), Ka-thyt-kū (*Pentace Burmanica*), also a good many of lofty wood-oil trees, such as Kan-yin-hpyu (*Dipterocarpus alatus*), Kan-yin-ni (*Dipterocarpus laris* and *D. turbinatus*), Thyn-ga-du (*Parashorea stellata*), Thyn-gūn (*Hopea odorata*), Koung-mhu (*Anisoptera glabra*), further *Payena paralleloclonera*, Hmya-sait (*Antiaris toxicaria*), Htaip-kouk-pen (*Gualteria lateriflora*), and many others.

The number of less lofty trees is considerable, and includes such trees as Nyoung-ben (*Ficus luccifera*, and other species), *Mitrephora vandaflorea*, Ta-di (*Bursera serrata*), Khwē-douk (*Kurrimia robusta*), Chi-ben (*Semecarpus albescens*), Marlea, *Stereospermum fimbriatum*, Kyo-ben (*Vitex peduncularis*), Yawwē-gyi (*Adenanthera pavonina*), Thyt-ka-do (*Cedrela toona*), Pyen-mā-hpyu (*Lagerstramia calyculata*), Zoung-ka-lē (*Lagerstr. villosa*), Ley-zā (*Lagerstr. tomentosa*), Thayet (*Mangifera Indica*), Thyt-nyn (*Podocarpus polystachya*), Thyt-tō (*Sandoricum album*), Myoung-kyap (*Ficus obtusifolia*), Myoung-chin (*Ficus infectoria*), Myoung-peinē (*Ficus nervosa*), Thu-hpān (*Ficus glomerata*), especially along Choungs, Than-that (*Albizia lucida*), Ta-nyn (*Pithecolobium angulatum*), Thyt-ni (*Amoora Rokituka*), *Dysoxylon*, and other

*Meliaceæ*, *Diplospora singularis*, Yē-hmyot (*Trewia nudiflora*), Yuē-wun (*Hibiscus macrophyllus*), Shā-wā (*Stereulia ornata*, *Elaeocarpus*, etc.).

A host of small trees vegetate in the shade of the loftier trees, but I can mention only a few of them, such as Na-ji (*Pterospermum*, 2-3 species), Ma-dor (*Garcinia xanthochymus*), *Dalbergia cana*, several species of *Diospyros*, *Phoebe pubescens*, Na-lyn-kyor (*Cinnamomum*), several kinds of Ong-dōng (*Tetranthera*), and numerous other *Laurineæ*, Kar-lo-hsō (*Hydnocarpus heterophyllus*), Myonk-ok-shit (*Siphonodon celastrinus*), Ka-nā-zō (*Baccaurea sapida*), *Micromelum pubescens*, Touk-shā-mā (*Turpinia pomifera*), Sa-kwē (*Webera oppositifolia*), *Aglaiia*, *Holigarna Helferi*, *Masa ramentacea*, Se-than-ya (*Gelonium multiflorum*), Gyeng-ma-ōk (*Ardisia humilis* and *A. anceps*); numerous fig-trees like Hsen-tha-hpan (*Ficus regia* and *F. Roxburghii*), Khwē-tan-yin (*Millottia atropurpurea*), Yē-ka-thyt (*Erythrina lithosperma*) and along open choings, *Eugenia formosa*, and numerous other species, *Memecylon celastrinum*, Thyt-sat (*Aporosa villosula*) *Cepania*, *Cleistanthus myrianthus*, *Sambavia macrophylla*, *Cleidion Javanicum*, Toung-hpeh-wun (*Macaranga gumiflua*), Lē-lun-ben (*Excavaria bacata*), Thyt-chē (*Castanea Javanica*), *Cyathocalyx Martabanicus*, Toung-tha-leh (*Garcinia kydia*), *Garcinia cornea*, Tha-nāt-tor (*Garcinia heterandra*), Tsūk-chē (*Pancoria rubiginosa*), *Glycomis*, Tha-nāt-khā (*Murraya exotica*), *Picrasma Javanica*, Yō-da-yāh (*Ocoba Wallichii*), *Hopea trijuga*, *Eronymus*; several species of *Diospyros*, e.g. *D. oleifolia*, *variegata*, etc., Kyet-mouk (*Nephelium hypoleucum*), *Linociera terniflora*, Kin-ha-lyn (*Antidesma pubescens*), etc., Kya-thā (*Barringtonia racemosa* and *B. pterocarpa*), *Viter heterophylla*, several nutmegs like Za-deip-hpyu (*Myristica longifolia*), Thyt-tan (*Myristica corticosa*), *Myristica Irya*, *Lepisanthes Burmanica*, etc. Numerous other trees occur in this sort of forest on the Andamans, which are not found, or are very rare, on the continent, like Kap-pa-li-thyt (*Momusops littoralis*) restricted to the coasts, *Hemicyclia Andamanica*, *Dipterocarpus Griffithii*, Gān-gor (*Mesua ferrea*) *Terminalia procer*, *Lagerstramia hypoleuca*, Pa-gā-nyet-su (*Pometia tomentosa*), *Dracontomelon sylvestris*, Pān-ta-gū (*Calophyllum spectabile*), *Fagraea racemosa*, *Pandanus Andamanensis*, etc. As a rule, those tropical forests which grow on metamorphic rocks are richest in species, while those occurring on the soft sandstones and other sedimentary rocks are poorest in this respect.

The shrubby vegetation is densest along open water-courses in cleared spots and along the outskirts of the forest, and often disappears entirely in the depth of the damp interior. It consists of such a large variety that I cannot undertake to sum up the species. Not a few of them are very powerful climbers, ascending into the crowns of the loftiest trees and depending from them in various festoons, or intertwined, or creeping from tree to tree. Amongst these climbers occur numerous rattans like Yan-ma-hitē (*Calamus latifolius*), Yan-ma-hitē kyen (*Calamus paradoxus*), *Calamus tigrinus*, etc., and also a bamboo called Wā-nweh (*Dinorchloa Maclellandii*, on the Andamans replaced by *Din. Andamanica*). Bamboo often forms a conspicuous undergrowth, consisting of Wā-hpyu-gyi (*Gigantochloa macrostachya*), Wā-yā (*Dendrocalamus longispallus*), Kyā-thoung-wā (*Bambusa polymorpha*), and Wā-tha-hpwōt (*Pseudostachyum Helferi*); the gigantic Wā-hō (*Bambusa Brandisii*) grows up to a height of 90 to 100 feet. Palms and screw pines are dispersed through the forest, and sometimes form almost impenetrable thickets, especially Toung-ong (*Arenga saccharifera*), Kwam-thi (1 or 2 species of *Areca*), Yen-kān (*Zalacca Wallichii*), Min-bu (*Caryota sobolifera*), Tsā-lu-ben (*Licuala peltata*), and more especially Dha-noung (*Calamus arborescens*) and Thēn-thieing (*Calamus erectus*). Ferns of various sorts and *Scitamineæ*, and numerous other herbs, but hardly any grasses, mat the ground in places where the jungle is less dense and not so dark.

In some tracts, especially in the larger valleys of the Eastern slopes of the Pegu Yō-mā, tropical and mixed forests become to a certain degree fused, and form a more open but high grown forest. Owing to the free access of light, the ground becomes over-run with *Acanthaceæ*, *Clorodendron*, Ka-du (*Blumea*), and other *Compositæ*, Kat-se-nē (*Sida*), in short, with such herbage as we find again in the lower mixed forests. This sort of forest, which I distinguished as Open Tropical Forest, is merely a slight variety of the tropical forests, produced by the influence of light and by a more open terrain.

## IV. HILL FORESTS.

The Drier Hill Forests differ considerably from the damp ones, being composed of low grown, and higher up, often crooked trees, while the pines which here appear in force, remove our thoughts from tropical scenery. According to the prevalence of pines we might classify these hill forests thus:

## A.—LEAVED FORESTS.

1. *Damp Hill Forests.*
2. *Dry Hill Forests.*

## B.—CONIFEROUS FORESTS.

3. *Pine Forests.*

Further study of the hill forests may possibly cause a further subdivision, but, for the present purpose, I may restrict them to these three classes only.

*Damp Hill Forests.*

At higher elevations, say from 3000 or 3500 feet and upwards, the tropical forest becomes greatly influenced, not only by greater dampness, but also by a lower temperature. Tree growth is here prodigiously developed, and numerous trees appear which are not represented at lower levels, such as diverse species of oak (*Quercus*) and chestnuts, Kyan-zā (*Castanea tribuloides*, etc.), and other enpuliferous trees, *Trnstramia Japonica*, *Bucklandia populnea*; kinds of Tha-byē (*Eugenia*) different from those of the plains, temperate *Laurineæ*, *Ostodes paniculata*, Thyt-myn (*Podocarpus*), etc. Palms become less conspicuous, and there appear numerous small trees peculiar to this region. On the other hand, many trees numerous in the hot lowlands disappear now altogether, or become very scarce. These are principally members of *Dipterocarpeæ*, *Meliaceæ*, *Sapindaceæ* (except *Acer*), *Dilleniaceæ*, *Sterculiaceæ*, *Anacardiaceæ*, *Lythæareæ*, and *Sapotaceæ*. These forests, distinguished as the Damp Hill Forests, in contradistinction to the Drier Hill Forests, are the least explored in Burma, but they may be considered to form a transition from the true tropical forests to the Dry Hill Forests, which occupy the exposed ridges and sunny slopes of the hills.

*Dry Hill Forests.*

These drier hill forests form the nearest approach to the temperate forests of our northern zone, and many an old acquaintance (although specifically different) is met with in them. The trees are for the greatest part still evergreens, in which respect they differ greatly from the true temperate forests (which occur also on the Higher Alps of India, as on the Himalaya above 8000 to 9000 feet elevation). In aspect they agree with the forests found on the hills of Southern Europe, but are much more damp, and consist of a far greater variety of trees, much clothed with epiphytical plants. The demarcation, however, of this kind of forest from the neighbouring damp hill forests, and of this last class from the tropical forests, is often rather arbitrary.

The trees here represented are chiefly oaks and chestnuts, Kyan-zā or Thyt-chā, *Myrica sapida*, *Rhododendron* and *Vaccinia*, *Turpinia Nepalensis*, *Bucklandia populnea*, several species of *Symplocos*. Tor-let-pet (species of *Eurya*), *Anneslea monticola*, Pān-mā (*Schima Noronhæ*), two species of *Pyrenaria*, *Echinocarpus*, *Cornus oblonga*, *Diospyros mollis*, *Andromeda ovalifolia*, *Daphnidium caudatum*, *Aperula*, and several other laurels, *Helicia*, *Garcinia anomala*, *Pithecolobium montanum*. Bon-mē-zā (*Albizzia stipulata* ascended from below) *Dillenia aurea*, *Wendlandia ligustrina*, a few araliaceous trees, chiefly *Heptapleurum*, etc. A fan-palm (*Chamarops khasiana*) looks rather strange in such a society, and a climbing *Plectocomia* ascends upwards to

7000 feet elevation. Bamboo is still represented by a berry-bearing half-scandent kind (*Pseudostachyum glomeriflorum*), and higher up a small *Arundinaria* forms a very dense undergrowth, especially above 6000 feet elevation. The ground is clothed with grass and herbs wherever light has free access. Brackes (*Pteris aquilina*) *Rubus*, *Gentians*, *Galium Saussurea*, *Gnaphalium* and *Anaphalis*, Sun-dew, *Lobelia Senecioides*, *Bupleurum*, and some other umbellifers are some of the European plants which grow rather profusely on the pastures that occupy the exposed slopes. One or two violets, too, are frequently met with along streams in the valleys. Epiphytes, orchids, as well as ferns, *Cyrtandraceæ*, etc., interwoven with mosses and lichens, clothe the branches.

Along the more exposed ridges and unfavourably exposed slopes these forests become quite stunted, and the tree stems gnarled, and form then the class called Stunted Hill Forests. They form the upper limit of the hill forests in Burma, where (for example, below the top of the Nattoung) the *Arundinarias* and *Rhododendrons* become quite dwarfed and reduced.

#### *Pine Forests.*

The pine forests are either quite or nearly free of leafed trees, but the gullies and valleys that intersect them are usually more or less taken up by drier hill forests, or both pines and leafed trees are intermixed. They consist entirely of *Tyn-yu* (*Pinus Kasya*), and occupy the hilly parts of the Lushai country, Upper Ava and Martaban. The lowest limit to which they descend is about 3500 feet. In Upper Tenasserim another pine makes its appearance, viz. *Pinus Merkusii*, which occurs chiefly on the sandstone hills of the Thong-gyeen, in Upper Tenasserim, and reappears again on the hills of Sumatra. Forests of this pine are found at such low levels as 1500 feet, and single trees are locally found at only 500 feet elevation.

### B.—DECIDUOUS OR LEAF-SHEDDING FORESTS.

From a general point of view the deciduous forests divide into two large classes. The first one consists of trees which shed their leaves by the influence of cold, and are therefore leafless during the winter or cold season. But here again we have to distinguish between winter deciduous trees, *i.e.* trees which grow in regions or zones where snow falls, and cold season shedders, which are not subjected to the influence of a severe winter cold, but, for some reason or other, shed their leaves after the rains instead at the beginning of the hot season. This latter sort of tree occurs also in Burma, but these are here very subordinately dispersed through the forests. The second principal class of deciduous forests is composed of trees that shed their leaves on account of the dryness and excessive summer heat. It is with this class of forest that the forester in Burma has chiefly to do, for the most important timber trees are found in them. The variety of trees in all these forests is so much less than in the evergreen forests that it is more easy to master their constituents and to define their peculiarities.

#### V. OPEN FORESTS.

The open forests are restricted to the newer and low level or older and high level alluvium, and occur more especially on laterite, or soil of a lateritic character. Those growing in the hills show a transition to the drier hill forest; indeed, grow sometimes intermixed with them, especially when occupying the debris of metamorphic rocks, as is the case on the Martaban hills. Those growing on stiff clay and loam similarly blend with the lower mixed forests along the line of their contact. In their typical form, as Eng forest they occupy a lateritic or sandy area, and form a very marked vegetation. I distinguish therefore three varieties.

##### 1. *Eng or Laterite Forests.*

The principal constituents of this forest are Byn (*Dillenia pulcherrima*), Thi yā (*Shorea obtusa*), Eng-jyn (*Pentacme Siamensis*), Jio-bō (*Walsura villosa*), Muu-deing

(*Lophopetalum Wallichii*), Myouk-zī (*Zizyphus jujuba*), Lam-bō (*Buchanania latifolia*), Thyt-sī (*Melanorrhæa usitata*), Dan-yat (*Symplocos racemosa*), Tē (*Diospyros Birmanica*), Tā-shā (*Emblia officinalis*), Zi-hpyu (*Emblia macrocarpa*), En-gyen (*Aporosa macrophylla*), Ye-ma-nch (*Aporosa villosa*), Yin-daik (*Dalbergia cultrata*), *Wendlandia tinctoria*, Htounk-kyān (*Terminalia macrocarpa*), Bān-bwe (*Careya arborea*), Kōn-pyeng-mā (*Lagerstræmia macrocarpa*), Kha-boung (*Strychnos nux-vomica*), Na-bhē (*Odina woderi*), Yin-gāt (*Gardenia obtusifolia*), Tha-men-sā-ni (*Gardenia turgida*), Tha-byē-hpyu (*Eugenia jambolana*), *Sideroxylon parvifolium*, Nē-u-weh (*Flacourtia sapida*) and others. The Eng (*Dipterocarpus tuberculatus*) is the characteristic tree of this forest. Mu-daing (*Cycas Siamensis*) is plentiful in the Prome Forests. Palms are represented only by a stemless date palm (*Phoenix acaulis*), called Then-boung, and here and there by an erect much reduced rattan, called Kyen-khā (*Calamus gracilis*). Of bamboo are seen only My-in-wā (*Dendrocalamus strictus*), and less so Hti-wā (*Bambusa tulda*) along the outskirts of the forest. Climbing vegetation has almost disappeared. Ferns are rare, but orchids and some asclepiads are plentiful. The shrubs here are meagre and sparse, but still exhibit great variety of species, and the same may be said of the clothing of the ground. The display of gaudy flowers during the hot season on the trees, as well as on the ground, is often very striking. Where depressions occur, they are usually filled up with stiff clay inundated during the rains, and such places are more or less densely covered by thin dry grass and sedges.

## 2. Hill Eng Forests.

These forests occupy the ridges of the outer hill ranges of Martaban and Upper Tenasserim, where they luxuriate, either on laterite formed by decomposition of the underlying rock, or on debris of metamorphic rock. In general aspect they agree with the Eng forests of the plains, but numerous trees occur in them which are peculiar to them, or very rare in those of the plains. The Eng (*Dipterocarpus tuberculatus*) is still represented here; but is often replaced by, or intermixed with, two other wood-oil trees, viz. *Dipterocarpus costatus* and *D. obtusifolius*. Other conspicuous trees are *Engelhardtia villosa*, *Quercus Brandisiana* and *Q. Bancana*, Pan-mā (*Schima Bancana*), Thyt-sī (*Melanorrhæa glabra*), *Castanea tribuloides*, *Tristania Burmanica*, *Anneslea fragrans*, etc. Various trees of the true Eng forests, and of the drier hill forests sometimes associate, like Doung-tsat-pya (*Callicarpa arborea*), *Dillenia aurea*, *Rhus Javanica*, *Vernonia acuminata*, etc.

## 3. Low Forests.

These are only a modification of the true Eng forest, being, so to say, a mixture of trees from the lower mixed forests with Eng forest trees. The stiff clay on which they grow does not allow the Eng tree to flourish, and, indeed, all the laterite-loving trees, such as Thi-yā, Eng-jyn, and the like, disappear, while certain trees like Yen-daik (*Dalbergia cultrata*), Htounk-kyān (*Terminalia macrocarpa*), Kha-boung (*Strychnos nux-vomica*), and such like, often become very prevalent.

## VI. DRY FORESTS.

Travelling northwards, and leaving the alluvial and sandstone tracts, we enter in Prome peculiar forests, growing chiefly on calcareous sandstone, but often intermixed with, or passing into Eng forests, where gravelly or ferruginous deposits constitute the surface. These are the dry forests, characterized by a number of trees that are not found elsewhere, except on calcareous sub-strata, and many of which reappear in Hindustan. They are chiefly formed of Shā (*Acacia catechu*), Ta-noung (*Acacia leucophlea*), Eng-jyn (*Pentacme Siamensis*), *Sterculia versicolor* *Hiptage albicans*, Ta-pu-ben (*Harrisonia Bennettii*), Ta-ma-kha (*Melia Azedarach*), on the hills Yeng-mā or Yim-mā (*Chickrassia velutina*), Zi-ben (*Zizyphus jujuba*), Chōp-ben (*Diospyros montana*), Na-bu (*Combretum apetalum*),

Tha-leh (*Ulmus lancifolia*), on the hills Than tat (*Albizzia lucida*), Bē-hyā (*Cratogeomys merifolium*), Ta-nāt (*Tectona Hamiltonii*), locally Khu-sān (*Hymenodictyon thyrsiflorum*), Ta-pouk-ben (*Dalbergia paniculata*), Thyt-sa-nweng (*Dalbergia nigrescens*), Let-khōk-gyi (*Holarrhena antidysenterica*), Kha-boung (*Strychnos potatorum* and *S. nux-vomica*), Hpa-lan (*Bauhinia racemosa*), Bwē-cheng (*Bauhinia variegata*), Xe-n-weh (*Flacourtia sapida*), Ehretia laevis, Rhus paniculata, Morinda tomentosa, Nab-hē (*Olinia vodier*), Ta-shā (*Emblia officinalis*), Tha-byē-hpyu (*Eugenia jambolana*), Kyet-yō (*Vitex alata* and *V. limoniifolia*), Vitea canescens, Koung-khwā (*Capparis auricoma*), Premna riburnoides, Tha-khwōt-mā (*Spathodea Rheedei*), etc. With these associate numerous other trees from the Eng forests, as Eng (*Dipterocarpus tuberculatus*), here and there Thi-yā (*Shorea obtusa*), Lam-bo (*Buchanania latifolia*), Tē (*Diospyros Birmanica*), and such like: also from the mixed forests, Jio (*Schleichera trijuga*), Byn-gā (*Nuclea rotundifolia*), Pyn-ka-dō or Pyn-ka-dō (*Xylocarpus dolabriformis*), Kō-kō (*Albizzia Lebbek*), Thyt-pok (*Dalbergia purpurea*), Kywon-na-lyn (*Premna tomentosa*), Teak of inferior growth, Yong (*Anogeissus acuminatus*), Di-du or Let-pān (*Bombax*), Chin-yōk (*Garuga pinnata*), etc.

The shrubs are scanty and similar to those of the Eng forests, but of a more thorny or prickly nature. Several species of arboreal *Euphorbia* (*E. nivalis* and *E. antiquorum*), called Shā-zoung, attract the eye on account of their curious shape and growth. Palms and bamboos are the same as those observed in the Eng forests. The Shā (*Acacia catechu*) often gets the supremacy, and there are not a few almost pure Shā-forests in the Prome district. Higher on the ridges, above 2000 feet elevation, a small crooked tree (*Hiptage albicans*) appears in force, associating with similarly crooked low trees of Yen-daik (*Dalbergia cultrata*), Bwē-cheng (*Bauhinia variegata*), Di-du (*Bombax insignis*), Ta-shā (*Emblia officinalis*), Zyn-bwōn (*Dillenia pentagyna*) and others, and these form the Upper Dry Forest. Here also some temperate forms appear for the first time, such as a beautiful epiphytic *Vaccinium* (*V. verticillatum*), a large *Heracleum*, an epiphytic *Hymenopogon*, and a few others.

## VII. MIXED FORESTS.

These forests are, no doubt, the most important ones to the forester in Burma, and occupy at least two-thirds of the whole area of Pegu proper, Chittagong, and Arakan, while they are less developed in Martaban, Tenasserim, and the Andamans. I have adopted (with slight alterations) the divisions of these forests, as distinguished by Dr. Brandis, in his report on the Attaran Forests in 1860. They are, as a whole, well demarcated in all the tracts from Chittagong and Prome southwards as far as the Tsittoung; but east of that river, on the metamorphic strata, they become much masked by the surrounding forests. This is no doubt partially owing to the influence of the substratum, which is here so favourable to most kinds of trees, while alluvium and the soft sandstone excludes many kinds that are common enough on a substratum of metamorphic rocks. On the Andamans they are also less demarcated, although here growing on the same sandstone as that of Pegu; but here the more southerly latitude, and more especially the insular climate, has a share in this modification.

### 1. Upper Mixed Forests.

These are restricted to rocky and hilly situations, but differ somewhat in aspect accordingly as they grow on soft siliceous sandstone, or on metamorphic rocks. On the latter substratum, the trees are not so straight, neither do they grow so tall, and are accompanied by such trees as Pa-douk (*Pterocarpus*), several *Ternstroemia*, and certain *Meliaceae*. The chief trees are here Pyn-ka-dō (*Xylocarpus dolabriformis*), Teak or Kywon-ben (*Tectona grandis*), Tha-byē-hpyu (*Eugenia jambolana*), Di-du or Let-pān (*Bombax insignis*), with white and scarlet flowers, Shā-hpyu (*Sterculia versicolor*), *Sterculia foetida*, Shā-mi (*Sterculia villosa*), Na-ji (*Pterospermum semisagittatum*), Chyn-yōk (*Garuga pinnata*), Ta-di (*Bursera serrata*), Chē

(*Semecarpus panduratus*), Gwē (*Spondias mangifera*), Hpān-gā (*Terminalia tomentella*), Htōuk-kyān (*Terminalia crenulata*), Lēn (*Terminalia pyrifolia*), Thyt-sein (*Terminalia bellerica*), Yōng (*Anogeissus acuminatus*), Pyeng-mā or Pī-mā (*Lagerstræmia reginae*), Leh-zā (*Lagerstræmia tomentosa*), M̄yōuk-shor (*Homalium tomentosum*), Tscik-gyi (*Briedelia retusa*), Thyt-pa-gān (*Millettia Brandisii*), Tha-nāt (*Cordia grandis*), Yem-a-nē (*Gmelina arborea*), Thyt-pōk (*Dalbergia purpurea*), Hnor (*Nauclea cordifolia*), Byn-gā (*Nauclea rotundifolia*), Kyet-yō (*Vitex alata*), Thyn-wyn (*Millettia leucantha*), Ouk-chyn-zā (*Diospyros ehretioides*), Kywōn-na-leng (*Premna tomentosa*), Bē-byā (*Cratogeomys nerifolium*), Wet-shor (*Sterculia colorata*), Meh-za-li or Toung-meh-za-li (*Cassia siamea*), Ngu-theing (*Cassia nodosa*), Kha-boung (*Strychnos nux-vomica*), Nab-hē (*Ocotea woderi*), Dwā-ni (*Eriolacna Candollei*), Thyt-yin (*Croton oblongifolium*), Nē-u-weh (*Flacourtia cataphracta*), Ka-dwōt (*Ficus hispida*), Yē-kha-ōng (*Ficus cumia*), Khā-ōng (*Ficus conglomerata*), and others. Large-sized bamboo, Kyā-thoung-wā (*Bambusa polymorpha*), Tyn-wā (*Cephalostachyum pergracile*), and in drier situations Myin-wā (*Dendrocalamus strictus*), form the chief undergrowth, intermixed with such trees as Lyn-kyor (*Dillenia parviflora*), Lyn-bywōn (*Dillenia Pentagyna*), Ma-da-mā (*Dalbergia orate* and *D. glauca*), Pyn-tē-yor (*Grewia elastica*), Pyi-zin (*Antidesma Ghæsemilla*), Let-khōk-thein (*Holarrhena pubescens*), Khyoung-ya (*Calosanthus Indica*), Shā-mā (*Emblia albizzoides*), Ta-shā (*Emblia officinalis*), etc.

Palms are represented by Za-noung (*Wallichia*), Min-bu (*Caryota urens*), and a few Rattans. Shrubs are here few and meagre. Climbers, although mostly powerful ones, and therefore injurious to tree growth, play a subordinate rôle. The herbage is scattered, and the grey or yellowish soil is everywhere exposed during the dry season. The greater moisture and shade along favourably exposed slopes, and of deep valleys, permits the growth of wood-oil trees, as Kan-yin-hpyu (*Dipterocarpus alatus*), Kōk-kō (*Albizzia Lebbek*), Shor-ltu (*Beilschmiedia Roxburghii*), Kyoung-touk (*Paysonia multijuga*), Ma-ni-okkā (*Corallia integerrima*), Yē-thē-hpan (*Ficus glomerata*), Wā-yā (*Dendrocalamus longispatus*), and other shade-loving trees.

## 2. Lower Mixed Forests.

These forests occupy the alluvium and lowlands of the country, and principally consist of the same kind of trees that grow in the upper mixed forests. But their growth is much lower, and the undergrowth is, moreover, a different one. To those trees already mentioned as growing in the upper mixed forests must be added chiefly Htōuk-shā (*Vitex leucocylon*), Dwā-bōk (*Kydia calycina*), Di-du (*Bombax malabaricum*), Ma-lwā (*Spathodea stipulata*), Thu-kwot-mā (*Spathodea Rheedii*), Hpet-thān (*Heterophragma adenophylla*), Thyt-ma-ji (*Albizzia odoratissima*), Syt (*Albizzia procera*), Htein (*Nauclea diversifolia*), a few species of the section of *Urostigma*, of *Ficus*, especially *Ficus geniculata*, Ngu-gyi (*Casia fistula*), Chē-ni (*Barringtonia acutangula*), Hmān-hpyu (*Randia uliginosa*), Hsay-than-payā (*Randia longispina*), Hmān-ni (*Gardenia erythroclada*), Ma-ji-bok (*Gardenia sessiflora*), Ta-bwōt-gyi (*Milusa velutina*), Dwā-ni (*Eriolacna Candollei*), Myat-yā or Myaiyā (*Grewia microcos*), *Grewia laevigata*, *Casaria canziana*, Tā-chan-zā (*Heteropanax fragrans*), Thyt-hswē-lē (*Schrebera swietenoides*), Kyet-yō (*Vitex pubescens*), several kinds of Ta-mā-sōk (*Glochidion*), Na-lin-jyo (*Cinnamomum*), Bwē-zyn (*Bauhinia Malabarica*), Thyt-pyōung (*Nauclea sessifolia*), Anam or Anan-bo (*Crypteronia paniculata*), here and there Ka-nā-zo (*Baccaurea sapida*), *Derris robusta* and others. The bamboo here is chiefly Tyn-wā (*Cephalostachyum pergracile*), Wā-hpyu-ga-lē (*Gigantochloa albociliata*), and Ti-wā (*Bambusa Tulda*), but these are scattered in patches and do not form such an uninterrupted undergrowth as the bamboos on the hills. Climbers are numerous and of various descriptions, and I will mention only the more powerful or more common ones. These are Pouk-nweh (*Butea superba* and *B. parviflora*), Kon-nyin-nweh (*Entada scandens*), Tha-bwōt-nweh (*Ucuvia macrophylla*), Tor-zi-nweh (*Zizyphus ænoplia*), Khlwē-nweh (*Colubrina pubescens*), several vines, but chiefly Yen-lhoung-nweh (*Vitis Linnæi*), Chyn-douk-nweh-zouk (*Vitis latifolia*) Wun-u-nweh or Mych-zu-nweh (*Vitis erythroclada*), Yen-lhoung-peing-nweh (*Vitis avicoulata*) Kyi-ni or Kyi-che-nway (*Vitis lanceolaria*), further Da-mā-ngēh-nweh (*Millettia extensa*),

Nweh-bōk (*Pederia lanuginosa*), Kyoung-chet (*Mezoneuron cucullatum*), Kyoung-gyet-nweh (*Pterolobium macropterum*), Su-yit (*Acacia pennata*), Su-pwōt-ka-lā-nweh (*Acacia glaucescens*), Donk-ta-long (*Dalbergia stipularia*), Pueraria (*Candollei*), Kwē-leh-nweh (*Mucuna pruri*), Kwe-leh-bwōt-nweh (*Canavalia lucens*), Balu-let-wā (*Heptapleurum renulosum*), Hsen-ma-no-pyin (*Briedelia stipularis*), Nakeing-bō (*Mallotus repandus*), Tha-mā-khā-nweh (*C. ngeu tomentosa*), Nweh-sat-nweh (*Symphorema involutatum*), Kā nweh (*Symphorema unguiculatum*), several species of *Combretum*, like Kyet-tet-nweh (*Comb. squamosum*), Mo-ma-khā-nweh (*C. retensum*) and Tha-ma-ka-nway (*C. decandrum*), Kwōt-ne-nweh (*Calycopteris Roeburghii*), several Cucurbitaceae, Nweh-chō (*Thunbergia laurifolia*), Na-shā gyi (*Cryptolepis Buchanani*), *Pagera obovata*, some very showy flowered *Convolvulaceae* like U-myn (*Ipomoea Xanththa*), Kya-hin-ka-lē-nweh (*Ipomoea vitifolia*), Toung-ka-zun (*Argyrea capitata*), O-hmōn-nweh (*Argyrea barbigera*), O-nā-kōp-nweh (*Argyrea populifolia*) and others.

Herbage and shrubbery, although not dense, is more conspicuous, and in places even luxuriant, especially along cloungs. Parasitic *Loranthaceae*, all called Kyi-poung, and mistletoes, Thyt-long, of the Burmese, are here more plentiful than in any other forest, except in the Savannah forests, and in the cultivated plains. As might be expected, Teak is of inferior growth and more dispersed through the forest.

Towards the banks of the larger rivers coarse grasses (usually called elephant grass) overrun the ground, and the trees become here very scattered. The subsoil seems often to be here waterlogged more or less, and hence the trees become very short stemmed and stunted, for a subterranean sheet of water acts upon the roots like an impermeable stratum. The trees that can withstand such a condition are not numerous, and are chiefly Ok-neh (*Streblus asper*), Pouk (*Butea frondosa*), Htein (*Nauclea parvifolia*) Thyt-peong or Thy-kalā (*Nauclea sessilifolia*), Byn-gā (*Nauclea rotundifolia*) Tha-hpān (*Ficus Chittagonga*), Nyoung hpyn (*Ficus Rumphii*), Yen-daik (*Dalbergia cultrata*), Thyt-pōk (*Dalbergia purpurea*), Bām-bwē (*Careya arborea*), Pyeng-mā or Pī mā (*Lagrostidium flos-reginae*), Lēn (*Terminalia pyrifolia*), Kha-houng (*Strychnos nux-vomica*), Tonk-shā (*Vitex leucogylon*), Shā (*Acacia catechu*), Kywōn or Teak, Zi-ben (*Zizyphus jujuba*), Pyi-zyn (*Antidesma alacumbilla*), Nab-hē (*Odina uodior*), Hmān-hpyu (*Randia uliginosa*), Tamin-tsā-hpyu (*Gardenia sessiliflora*), Syt (*Albizia elata*), Ong-dong (*Tetranthera Roeburghii*), and others. Often only one or a few trees mentioned here are found scattered over large tracts of these Savannahs. The only bamboo occurring here is Kyā-khat-wā (*Bambusa arundinacea*).

#### VIII. DUNE FORESTS.

These forests offer many peculiarities, which make it desirable that they should be separated from the other forests. They partake, now more of an evergreen, now of a deciduous forest, and grow exclusively on the calcareous sand, consisting of the fine fragments of shells and corals thrown up on the sea-shore. Forests growing along the actual beach may be termed Beach Forests, but they only constitute a very slight variety of the true Dune Forest. This latter grows on the sand-dunes along the shore, formed by the calcareous sand blown inwards from the sea, and which Dunes are on many islands of the Malay Archipelago as extensive as are those of Holland. In Burma, only Beach Forests are found, except possibly in Tenasserim, West of Tavoy, where apparently extensive dunes, with typical dune forests (consisting mainly of *Casuarina*), seem to occur. They are greatly intersected by outrunning ridges and the silty debouchures of rivers. The cocoa-palm seems restricted to those of the Cocos Islands, and to a few places along the western coast of North Andaman. In those of Burma we find chiefly Thyn-wyn (*Pongamia glabra*), Pyn-leh-ka-thyt (*Erythrina Indica*), Di-du (*Bombax Malabaricum*), Thym-bān (*Hibiscus tiliaceus*), Tsāt-thah-hpyu (*Pandanus odoratissimus*), Myn-gā or Myeng-kā (*Cynometra bijuga*), *Guttarda speciosa*, Mong-taing (*Cycas Rumphii*), *Thespesia populnea*, Pyn-leh-tān (*Scaevola Kienigii*), *Terminalia catappa*, Tha-byē-hpyu (*Eugenia Javanica*), *Azelia bijuga*, Kye-h-gyi (*Barringtonia speciosa*), Pōng-nyet (*Calophyllum inophyllum*), *Atalantia macrophylla*, *Desmodium umbellatum*,

*Hernandia peltata*, *Sophora tomentosa*, Nab-hē (*Odina wodier*), *Ochrosia salubris*, *Cerbera odallum*, *Bridekia glauca*, and such-like trees. These forests are open and pretty sunny, and shrubs are here plentiful and often entangled with twiners, while creeping grasses (chiefly *Ischemum muticum*) and *Ipomæas*, especially *Pynleh-ka-zūn* (*Ipomæa pes-caprae*) cover the loose sand.

In addition to Forests, properly so called, may be further enumerated:

#### IX. BAMBOO JUNGLES AND SAVANNAHS.

These two varieties can hardly be reckoned amongst forests, although they certainly may be claimed as forest land, and as being the undergrowth of forests.

The Bamboo Jungles are characterized by the great uniformity of their aspect and by the poorness of their undergrowth, no doubt caused by the dense and injurious shade which the bamboo spreads all around. Seldom do we find more than two different kinds of bamboo in the same jungle; they may therefore be distinguished by the kind of bamboo of which they consist. So we have in Burma jungles of Myin-wā (*Dendrocalamus strictus*), Tyn-wā (*Cephalostachyum pergracile*), Kyā-thoung-wā (*Bambusa polymorpha*), Wā-hpyu-galē (*Gigantochloa albo-ciliata*) or Wā-ta-bwōt (*Pseudostachyum Heferi*), and others. Kyā-kāt-wā (*Bambusa arundinacea*) jungles are found often in the alluvial plains near large rivers. These bamboos flower all simultaneously, after a lapse of years, and then die off. Then numerous light-loving plants and shrubs and also tree seedlings spring up, and it is at such periods that one cannot predict with any certainty whether the next generation will be again a pure bamboo jungle, or whether the saplings of the trees will not get the supremacy, keeping down the young bamboos as undergrowth.

The Savannahs are the undergrowth of the Savannah forests and as such do not differ from these in any point except that they are void, or nearly so, of trees. They seem to owe their existence chiefly to inundation, at least their distribution along the rivers pretty well coincides with the area of regular inundation during the rains. The grasses are all coarse ones, so coarse indeed that the haulms of some become as woody as those of certain bamboos (*Arundinaria*) and grow up from 6 to 10 feet in height. By far the greater part consists of the Thakay-gyi (*Saccharum spontaneum*), Hponn-gā (*Saccharum procerum*), Myet-yā (*Polytoca heteroclita*), Kyu-na-byin (*Arundo Roxburghii*) and Kyu (*Arundo Madagascariensis*). Sometimes Thet-keh-nyin (*Imperata cylindrica*), a low grass, covers larger tracts. Towards the tidal zone Pan-yin (*Andropogon muricatus*) and wild sugar cane (*Saccharum spontaneum*) are the principal constituents intermixed with *Eragrostis procer*a, *Cyper*i, etc.

#### X. DESERTED CLEARINGS.

Large tracts of forest are yearly felled by the natives for the cultivation of rice. As soon as the harvest of the first, second, or third year is over, these lands are deserted and form *toungya pinzoh* or briefly *pinzohs*, i.e. deserted culture land. Weak herbs of cultivation, chiefly light-loving *Compositæ*, *Malvaceæ*, etc., spring up in dense masses, which soon must give way to coarse grasses and shrubs, amongst which tree seedlings struggle for existence. Often (especially on the hills) coarse grasses soon occupy the whole surface and form a sort of hill savannah consisting usually of Ta-ma-zaing or Tamyn-sain-ben (*Panicum acariferum*), and Myet-ya (*Polytoca heteroclita*), rarely of Thet-keh-nyin (*Imperata cylindrica*). In other localities, where bamboos around such clearings flowered, bamboo-seedlings spring up and choke all other vegetation except light-loving quick-growing sapling trees. Local relations chiefly regulate the nature of the coming jungle, but, as a rule, such deserted clearings revert into forests similar to, or identical with those that pre-existed on them."

## BOTANY.

## ERRATA TO ALGÆ, MUSCI, FILICES, AND ORCHIDEÆ.

## VOL. II.

- Page 19, line 1, for *CHELOPTORACEÆ*, read *CHELOPHORACEÆ*.  
 „ 19, „ 6, for *CHELOPHORA*, read *CHELOPHORA*.  
 „ 33, „ 25, for *CINNABARINUS*, read *CINNABARINUS*.  
 „ 34, „ 35, for *BRASILIANUS*, read *BRASILIANUS*.  
 „ 34, „ 39, for *ARCYNIA*, read *ARCYNIA*.  
 „ 35, line third from foot, for *USNIA*, read *USNEA*.  
 „ 37, „ 5, for *Stereodon*, read *Stereodon*.  
 „ 37, „ 15, for *ophylla*, read *aphylla*.  
 „ 39, line fifth from foot, for *σῆζα*, read *σῆζα*.  
 „ 71, „ 34, for *TENUIFRONS*, read *TENERIFRONS*.  
 „ 81, „ 15, for *PILOSEDOIDES*, read *PILOSELLOIDES*.  
 „ 157, „ 34, for 5-8 feet, read 5-8-flowered.  
 „ 161, „ 46, for *VESTILA*, read *VESTITA*.  
 „ 162, „ 9, for *VESTILA*, read *VESTITA*.  
 „ 186, „ 13, for flowered, read fruited.

or 'Cohorts,' and much general information are directly derived from that work. The generic characters, however (where given), are based on descriptions by Kurz, and for the bulk of the specific determinations and habitats Kurz is also the principal authority, and as he had before him all Dr. Mason's materials, no further special acknowledgment is necessary, save in the few instances where a species is given by Mason, but not included by Kurz in his list. The valuable assistance so freely given by the Rev. C. Parish has been already elsewhere acknowledged. The initials *K.*, *M.*, *P.*, respectively stand for Kurz, Mason, Parish.

*Hernandia peltata*, *Sophora tomentosa*, Nab-hē (*Odina woder*), *Ochrosia salubris*, *Cerbera odallum*, *Bridelia glauca*, and such-like trees. These forests are open and pretty sunny, and shrubs are here plentiful and often entangled with twiners, while creeping grasses (chiefly *Ischæmum muticum*) and *Ipomæas*, especially Pynleh-ka-zūn (*Ipomœa pes-capræ*) cover the loose sand.

In addition to Forests, properly so called, may be further enumerated :

#### IX. BAMBOO JUNGLES AND SAVANNAHS.

These two varieties can hardly be reckoned amongst forests, although they

Local relations clearly require in such deserted clearings revert into forests similar to, or identical with those that pre-existed on them."

## B O T A N Y .

Plants are divided into two great divisions: PHANEROGAMS or plants bearing more or less complete flowers and producing perfect seeds wherein an embryo is contained; and CRYPTOGRAMS or flowerless plants, which have no true seed, but are propagated by spores consisting of minute or microscopic cells.<sup>1</sup>

### Sub-Kingdom I. CRYPTOGRAMS, ACOTYLEDONOUS, OR FLOWERLESS PLANTS.

Stamens and ovaries none. Propagation by means of homogeneous spores, consisting of a single cell.

### CLASS I. THALLOGENS.

AXIS OF GROWTH INDETERMINATE, GROWTH TAKING PLACE CHIEFLY PERIPHERICALLY AND HORIZONTALLY. PLANTS WHOLLY COMPOSED OF CELLULAR TISSUE. REPRODUCTIVE ORGANS VARIOUS. SPORES NOT DEVELOPING A PROTHALLUS IN GERMINATION.

Thallogens are divided into Algæ, Fungi, and Lichens.

#### ALGALES.

Usually highly-coloured plants, aquatic, or natives of damp rocks, walls, etc., sometimes frondose, at others reduced to a few cells or a single cell. Fructification monœcious or diœcious, sometimes of special cells of two sexes, sometimes of simple mobile spores, sometimes of antheridia and sporangia, which are free or inclosed in capsules.

The lists of the Burmese Algæ, Fungi, and Lichens are thus given by the Rev. C. Parish.

<sup>1</sup> The arrangement of the Botanical portion of this work is generally that of 'Maout and Decaisne' (Descriptive and Analytical Botany, Longmans, Green and Co., 1876), modified to suit the English student by Sir J. D. Hooker, and the brief characters appended to the Group of Orders or 'Cohorts,' and much general information are directly derived from that work. The generic characters, however (where given), are based on descriptions by Kurz, and for the bulk of the specific determinations and habitats Kurz is also the principal authority, and as he had before him all Dr. Mason's materials, no further special acknowledgment is necessary, save in the few instances where a species is given by Mason, but not included by Kurz in his list. The valuable assistance so freely given by the Rev. C. Parish has been already elsewhere acknowledged. The initials *K.*, *M.*, *P.*, respectively stand for Kurz, Mason, Parish.

## ALGÆ, OR THE ALGAL ALLIANCE.

The term *Alga* is one of very wide signification, including not only those plants commonly known as *seaweeds*, but also a large number of aquatic cryptogams, among which are to be found the lowest and most minute forms of vegetable life.

The following remarks are from Mr. Berkeley, in *Treasury of Botany*:—

"There is no English word which will comprise the whole. Algæ are divided into three great classes, each of which contains a number of very distinct groups. These three classes are characterized by the colour of their seeds, which correspond for the greater part with the general tint of the plants.

" I. Melanospermæ, or Olive-spored.

" II. Rhodospermæ, or Rose-spored.

" III. Chlorospermæ, or Green-spored.

"The first of these comprises the olive-coloured species, which, from their size and abundance, are so conspicuous on the sea-shore, or which float in dense masses, sometimes many leagues in extent, on the surface of the ocean. On the coasts of Great Britain they attain the length of twenty feet or more, and in the genus *Laminaria* individuals are sometimes large enough to be a load for a man. But this is nothing to the size they attain in the Southern Seas, or even in some parts of the Northern hemisphere. Individuals of the genus *Macrocystis* attain a length of a hundred feet or more; and *Lessonia* forms submarine forests, the stems resembling trunks of trees. Some of the lower species have nothing like leaves, and are reduced to mere inarticulated threads, or a shapeless mass.

"The second class comprises those charming seaweeds, remarkable for their elegance of form, delicacy of texture, and brilliancy of colour, which attract the attention of all wanderers along the coast. These are often very abundant, but they seldom attain any considerable size, and some of them are as delicate as moulds.

"The third class contains most of the smaller species, in which the frond seldom assumes the form of a membrane, but is more frequently reduced to a mere thread, or even to single articulations."

There is a great dearth of "*Seaweed*" on the Burmese coasts, that is to say, of those large leathery olive-coloured kinds with which our British shores are strewn. One may walk for miles along the sandy shores of Tenasserim and not find one. Nor are the rocks, which the receding tide leaves exposed, clothed with the smaller and more beautiful kinds—rose or green-coloured—to the extent they are at home.

In the place of seaweed, the rocks are covered with corals, sponges, sea-anemones and shells, the marvellous variety and beauty of which (especially in the Andaman Islands) enchant the lover of nature, as he wades among the rocks at low water, or looks down from his boat into the clear depths beneath him. Seaweeds, certainly, do not form a conspicuous feature in the Botany of Burma.

But although "*Seaweeds*," as the word is commonly understood, are very scarce, "*Algæ*," in the wider sense which science gives to this term, as including both sea and fresh-water weeds, are sufficiently numerous.

The following catalogue of species (mostly fresh-water weeds and some of them extremely minute objects) goes to confirm this statement. The species here named were all collected by the late Mr. Sulpiz Kurz, and were determined for him by Professors Martens and Zeller.

Among the lower Algæ are found the smallest forms, and what indeed appear to be, the first germs of vegetable life. It is here that the limits of the animal and vegetable kingdom are by some thought to be confounded.

*Confervaceæ* are, to the naked eye, merely green slimes; but, under the microscope, they are seen to consist of threads of extreme tenuity filled with green granular matter, which is sometimes arranged in definite patterns.

*Desmidiaceæ* are microscopic plants, also of a green colour, with a gelatinous exterior and of very variable form. They are reproduced by division after conjugation.

*Diatomaceæ* are minute organisms consisting of joints or frustules of a siliceous texture, variously combined in a gelatinous medium, and generally brown in colour. These siliceous frustules are among the most beautiful of microscopic objects. But,

though individually so minute, immense beds of rock, many feet in thickness, are found to consist, mainly if not entirely, of the persistent remains of these wonderful organisms. Some species, as *Bacillaria*, have an apparently spontaneous motion, being seen to move backwards and forwards, in a jerky manner, in the field of the microscope. Hence their claim, in the opinion of some, to a place in the animal kingdom; "but," observes Mr. Berkeley, "it is now well known that even active motion is not incompatible with the nature of vegetables"; and, "Mr. Ralf's discovery of the formation of spores by conjugation in several genera has effectually put an end to controversy."

Stagnant pools, ditches, running streams, the trunks of trees, wet stones and rocks, damp paths and walls, and the surface of mud are all habitats of Diatomaceæ.

The duration as living *species* and the ubiquity of the lower as compared with the higher forms of vegetable life is a remarkable peculiarity. While no remains (I believe I am correct in saying) of Phanogamous plants, nor of the higher cryptogams, specifically identical with forms now existing, have been discovered in a fossil state, except in strata of very recent formation; on the other hand, many of the siliceous skeletons of Diatomaceæ, of which the Tripoli of Bilin in Bohemia is mainly composed, are found to be identical with those of species now living on the earth; and this rock is referable to the Eocene period. The *specific* life of some of the minutest vegetable organisms is thus proved to be of immense duration. So of their ubiquity. The area within which the same species of any Phanogamous plant is found growing indigenously, though greater or less according to circumstance, is markedly limited; but cryptogamous plants, specifically identical, are found contemporaneously in the most distant parts of the world, and under the most different climatic conditions.

No tree, or shrub, or herbaceous plant is found at once in Britain and in Burmah: kindred forms may indeed be found, but not identical forms: we have, for instance, *Habenarias* among Orchids, in both countries, but they are specifically distinct. It is otherwise, however, when we leave flowering plants and descend to non-flowering plants. On coming to Ferns, we at once find identity of species; and, as we descend to lower and still more lowly organized forms, the instances of identity increase in number. For example (to confine illustrations to Burma), among ferns, *Hymenophyllum Tunbridgense*, *Adiantum Capillus Veneris*, *Pteris aquilina* and *Aspidium aculeatum* may be gathered both in England and in Tenasserim: while another fern, *Agiopteris erecta*, a Burmese species, ranges from Japan to Madagascar, and grows also in the islands of the Pacific Ocean.

Among mosses, I have gathered the following British species in Burma: *Weissia tenuirostris* (= *Tortula cylindrica*), *Fanaria hygrometrica*, *Bryum roseum*, *Fissidens bryoides*, *Pogonatum aloides*, and *Sphagnum acutifolium*: and there are doubtless many more to be added to the number, when the mosses of the country come to be thoroughly investigated. Besides the above-mentioned British species, there may be gathered, within a mile of Maulmain, a small moss, *Schistomitrium Gardnerianum*, first found on the Andes of Quito!

To come to the Algæ. In the list of the species collected by Mr. S. Kurz, I recognize as British, *Spirogyra* (*Zyguema*) *quinina* and *S. decimina* (these two species are frequent in clear pools on commons and similar places in England); *Euastrum ampullaceum* and *ansatum*; *Closterium striolatum*: to which may be added *Laurencia obtusa*; *Catenella opuntia*; *Euteromorpha compressa* and *intestinalis*; *Lyngbya majuscula*; probably, also, many more, which, from my slight acquaintance with the subject, I am unable to specify.<sup>1</sup>

<sup>1</sup> After the above remarks were written, and while turning over the leaves of Lyell's Principles of Geology to verify the correctness of my statement that 'Tripoli' is referable to the Eocene period, I came, singularly enough (Vol. II. p. 390), upon the following observations:—

"The fact of the ubiquitous character of cryptogamous plants deserves special attention. Linnæus observed that, as the germs of plants of this class, such as mosses, fungi, and lichens, consist of an impalpable powder, the particles of which are scarcely visible to the naked eye, there is no difficulty in accounting for their being dispersed through the atmosphere, and carried to every point of the globe where there is a station for them." And the examples given by him are these—"No less than 200

A few words are needed here by way of apology for the confused arrangement of this group of plants. I collected no Algae whilst in Burma, and my knowledge of this Order is extremely slight. The species here enumerated and arranged were, as stated above, all collected by the late Mr. Sulpiz Kurz. He appears to have made two distinct collections, and to have sent the first to M. Martens for determination; but the second (in consequence of that gentleman's death in the interim) to M. Zeller for the same purpose. The two separate papers by Martens<sup>1</sup> and Zeller<sup>2</sup> were made over to me by Mr. Theobald for combination, and were found to be arranged on two different systems. Being acquainted with neither, I referred to such botanical works as I had, but failed to discover any one system with which I could bring them into agreement. In fact, no two authors appear to agree upon the method of arrangement. In addition to this, I failed to find even the names of some genera of Messrs. Martens and Zeller. It remained for me to combine the two varying catalogues to the best of my ability, guided by such aid as I could find. This, accordingly, I have done. The difficulty of this task must serve as an apology for the very unsatisfactory character of the result.—C.P.

#### Order DIATOMACEÆ. (Brittleworts.)

A family of Confervoid Algae. Crystalline fragmentary bodies, angular, brittle, flat, usually nestling in slime, uniting into various forms and separating again; multiplying by their spontaneous separation. (Lindley.)

##### Sub-order DESMIDIEÆ.

EUASTRUM, Ehrenberg.

E. AMPULLACEUM, Ralf.

E. ANSATUM, Ralf.

PLEUROTENIUM.

P. TRABECULA, Ng.

P. BACULUM, de Bary.

CLOSTERIUM, Nitzsch.

C. STRIOLATUM, Ehr.

##### Sub-order CYMBELÆ. (DIATOMACEÆ), Zeller.

PODOSIRA, Ehrenberg.

P. KURZII, Zell.

Akyab, on sea-covered rocks.

#### Order CONFERVACEÆ. (Confervas.)

"An Order of Algae. Vesicular, filamentary or membranous bodies, multiplied by zoospores generated in the interior, at the expense of their green matter."

"Waterplants, commonly of a green colour, but occasionally olive, violet or red; inhabiting the ocean in some instances, but commonly found in fresh water; some of them even belonging to both kinds of fluid; some found in mud, others floating freely; most attached, in some way, on rocks as parasites."—Lindley, Veg. Kingdom.

species of lichen were brought home from the Southern hemisphere by the Antarctic expedition under Sir James Ross, and almost every one of these was ascertained to be also an inhabitant of the Northern hemisphere, and most of them European," p. 391. Again: "It is a remarkable fact that Dr. [now Sir Joseph] Hooker has been able to identify no less than a fifth part of Antarctic algae (excluding the New Zealand and Tasmanian groups) with British species. Yet there is a much smaller proportion of cosmopolite species among the Algae than among the terrestrial cellular cryptogams, such as lichens, mosses, and Hepaticæ." The correctness of this last observation, I think, may be doubted.—C.P.

<sup>1</sup> List of Algae collected by Mr. S. Kurz, in Burma and adjacent islands, by Dr. G. v. Martens, in Stuttgart, J.A.S.B. 1871, Part II. p. 461.

<sup>2</sup> Algae collected by Mr. S. Kurz in Arrakan and British Burma, determined and systematically arranged by Dr. G. Zeller, High Councillor in Finance in Stuttgart, J.A.S.B. 1873, Part II. p. 175.

Sub-order *CHETOPTORACEÆ*, Zeller.

## GONGOSIRA.

- G. ONUSTA, Zeller. Elephant Point, on old trees.  
 G. PYGMEA, Ktz. Rangoon, on submerged bricks.  
 Forma *tenuis*, non ultra 1 180 lin. crassa.

## CHELOPHORA, Schrenk.

- C. STRICTA, Ktz. Kadeng-choung, near Natmadhi, on submerged dead trees, and on stones in a rivulet at Khyee-thay, near Prome.  
 C. TUBERCULOSA, Ktz. Swamp between Phoungyee and Kha-ya-tsu.  
 C. RADIAN, Ktz. On stems in Kyā eng, Pegu.  
 C. PISIFORMIS, Ag. Swamp near Phoungyee and the Myit-ma-kha-choung, near Prome.

## STIGEOCLINUM, Kützling.

- S. TENUE, H. On stalks of *Polygonum*, in Byndor Eng.  
 var. *T. gracile*, Ktz.  
 S. RANGOONICUM, Zell. A cistern in Rangoon.

Sub-order *CHROOLEPIDEÆ*, Zeller.

## CHROOLEPUS, Agardh.

- C. TENUE, Zell. Elephant Point, on *Sonneratia apetala*.  
 C. KUEZII, Zell. On leaves in evergreen forests along the Choung-mench Valley, Toung-ngoo, especially on *Alsodeia*.  
 C. FUSCO-ATRUM, Zell. Same locality as last.  
 C. ELONGATUM, Zell. On trees in evergreen forests on the Yē-tho stream of the Pegu range.  
 C. CALAMICOLA, Zell. On leaves of *Calamus* near Rangoon.  
 C. BOITRYOIDES, Ktz. On trees in the Pegu range.  
 C. UMBRINUM, Ktz. On trees along the Ye-tho stream.  
*Protococcus crustaceus*, Ktz.  
 C. LAGENIIFERUM, Hildebrand. Rangoon lake, on *Conferva inaequalis*.  
 C. FLAVUM, Ktz. On bamboo leaves, Central (Pegu?) range,  
 var. *filis tenuioribus*, articulis longioribus, *Chr. flavi et elongati* intermedium.  
 Yo-mā, ad arborum corticem frequens.  
 C. VILLOSUM, Ktz. On trees in hills east of the Tsittoung at 2000 to 3000 feet.

Sub-order *ULOTHRICHEÆ*, Zeller.

## ULOTHRIX, Kützling.

- U. SUBTILIS, Ktz. Eng-ga-na, Pegu.

## SCHIZOGONIUM, Kützling.

- S. TENUISSIMUM, Zell. Chineona plantations of Martaban at 3500 feet, at Shan-toung-gyee.

Sub-order *CONFERVÆÆ*, Zeller and Martens.

## COMPSOPOGON, Montagne.

- C. HOOKERI, Mont. Akyab, in rivulets.

CLADOPHORA, *Kützling*.

- C. MINUTISSIMA, Zell. Elephant Point.  
 Perhaps only the young state of some other *Cladophora*.  
 C. (ÆGAGROPHILA) CONTORTA, Zell. On a boat's bottom in the Tsittoung.  
 C. EXIGUA, Zell. On *Paludinas* at Balaehoung, Pegu.  
 C. CODIOLA, Zell. On trees in Eng-shwē, Pegu.  
 C. TRANQUEBARIENSIS, Roth. Floating in Tē-choung. Central range.  
 C. SCITULA, Schr. On seaweeds on Boronga Island.  
 C. STREPENS, Ktz. Khayeng-mathay-choung, Pegu.  
 C. JAVANICA, Ktz. Kadeng-choung, at Natmadhi.  
 C. CALICOMA, Ktz. Same locality as last.

RHIZOCLINIUM, *Kützling*.

- R. OCCIDENTALE, Ktz. Mangrove swamps along the Koladyn River.  
 R. ARBOREUM, Ktz. Elephant Point, or *Sonneratia apetala*,  
 especially on side facing the west.  
 R. HOOKERI, Ktz. Elephant Point, on mud.

CHLATOMORPHA, *Kützling*.

- C. INDICA, Ktz. On seaweeds on Boronga Island.

CONFERVA, *Linnaeus*.

- C. FUGACISSIMA, Roth. South Andaman in fresh water.  
 C. BOMBYCINA, Ktz. Same locality as last.  
     var. *subæqualis*.  
 C. INÆQUALIS, Rab. Rangoon.  
 C. UTRICULOSA, Ktz. Khayeng-mathay-choung.  
 C. BURMANICA, Zell. Yenay-eng. Irrawaddy Valley.  
 C. SUBSETACEA, Ktz. Akyab, in brackish water.  
 C. RHYTOPHILA, Ktz. Eng-swē and Irrawaddy Banks.  
 C. FUNKII, Ktz. Phoung-gyi.

Sub-order DIPLOSTROMIÆ, *Zeller*.DIPLOSTROMIUM, *Kützling*.

- D. TENTISSIMUM, Ktz. Elephant Point, on mangrove roots.

Sub-order ULVACEÆ, *Zeller and Martens*.PHYCOSEKIS, *Kützling*.

- P. BURMANICA, Zell. Elephant Point, on mangrove roots.  
 P. LOBATA, Ktz. South Andaman, on rocks at Camping Bay.

ISODERMA, *Kützling*. (PHOTODEMIACEÆ, *Martens*.)

- I. FONTANUM, Ktz. Andamans, Labyrinth Archipelago, on  
 Termoklee Island, in sweet-water pools  
 of dried-up creeks.

ENTEROMORPHA, *Linklater*.

- E. COMPRESSA, Lk. Arakan, frequent on the sandstone banks of  
 Boronga Island. Akyab and Elephant  
 Point.  
 E. POLYCLADOS, Ktz. Andamans, Ross Island and Middle Straits,  
 on rocks.  
 E. COMPLANATA, Ktz. South Andaman, Ross Island, on rocks;  
 also Arakan, Boronga Island.  
 E. INTESTINALIS, Lk. South Andaman, in brackish swamps of the  
     var. *A. capillaris*, Ktz. mangrove jungles.

## Sub-order ZYGNEACEÆ, Zeller and Martens.

## STATROSPERMUM, Thomson.

- S. FRAGILE, Zell. Rangoon lake, Kaleng-choung at Natmadhi and along Irrawaddy River.

## MESOCARPUS, Hassall.

- M. SCALARIS, Hass. Eng-ga-nā, Pegu. And below Karen hamlet, Mui-hau. Southern (Pegu ?) range.  
M. INTRICATUS, Hass. In swamp between Ok-khan and Tsan-choung.

## ZYGNEA, Agardh.

- Z. AMPLUM, Zell. Pool between Phoung-gyi and Kha-ya-tsu.  
Z. VAUCHERII, Ag. Kyā-eng, Pegu.  
Z. STILLINUM, Ag. Tonk-yan, near the Bala-choung.

## SPIROGYRA, Agardh.

- S. TROPICA, Ktz. Akyab, in brackish water.  
S. QUININA, Ktz. Akyab, in brackish water.  
var.  $\beta$  *inaequalis*, Næg. Beeling. Kadeng-choung, near Kway-ma-kheing, Pegu.  
S. DECIMINA, Ktz. Toung-naweng-choung, Prome, on rocks in the Irrawaddy. Myoma. Kha-ya-ton in brackish, and Akyab in sweet water.

A very common *Alga* in Burma, especially on river flats.

Forma *crassior*, filis sterilibus ad 1/38 lin. crassis. Pegu, in montibus Yomæ centralis, Wā-tha-bwōt-choung, in fluvio frequens.

## S. MARGINALIS, Ktz.

## S. ELONGATA.

Kyi Tay, on the Irrawaddy, Prome, and Akyab in stagnant or sluggish waters.

## S. MAJUSCULA, Ktz.

A marsh near Thoun-gyi.

## S. JUGALIS, Ktz.

Kyā-eng and Akyab, with *Oscillaria viridis*.

## S. CRASSA, Ktz.

A lake near Rangoon.

## S. IRREGULARIS, Næg.

Khay-eng-mathay-choung, Pegu range, and in brackish creeks, near Rangoon.

## S. ADNATA, Ktz.

Po zwōn-doung. Bala-choung. Pegu.

## S. NIIDA, Dillw.

In a marsh between Ok-khan and Thean-choung, Pegu; also at Khyi-tay near Prome, and stagnant water along the Koladyne Valley.

## S. SUBÆQUA, Ktz.

Arakan, Koladyne Valley, in stagnant waters.

## RHYNCHONEMA, Zeller (?).

## R. KURZII, Zell.

Eng-ga-nā, Pegu.

## Sub-order PALMELLACEÆ, Zeller and Martens.

## GLEOCAPSA, Kützing.

## G. LUTEO-FUSCA, Mart.

Dry bed of the Med-za-li-choung, Pegu.

## PALMELLA, Lyngbye.

## P. SUBSALSA, Mart.

On brackish flats along the Koladyne R.

## MICROCYSTIS, Kützing.

## M. FRUGINOSA, Ktz.

In a freshwater pool near the Koladyne R.

## PLEUROCOCCUS, Meneghini.

- P. (PROTOCOCCUS) VULGARIS, Menegh. Walls of Circuit House, Rangoon.

Sub-order *SIROSIPHONACEÆ*, Zeller.*SIROSIPHON*, Zeller.

- S. PARASITICUS*, Zell. Evergreen forests on the Choung-mench stream, Pegu range. On leaves.

Sub-order *SCYTOMENACEÆ*, Zeller.*SCYTONEMA*, Agardh.

- S. AUREUM*, Menegh. Elephant Point, between Rangoon and San-ji-wā and the Kayeng-mathay Stream.
- S. CINEREUM*, Menegh. On old Pagodas about Pegu and Kyā-eng.  
var.  $\beta$  *Julianum*, Rab. (*Drilosiphon Julianus*, Ktz.). Pegu. Central Ranges.
- S. GRACILE*, Ktz. On Irrawaddy Flats, and a cistern at Palay-kweng.
- S. TOMENTOSUM*, Ktz. Rangoon, on trees.
- S. PEGUANUM*, Martens. Pegu, and Phoung-gyi, on trees.
- S. VARHUM*, Ktz. Choung-mench stream and Wā-choung, at Pazwōn-doung.
- S. VIEILLARDI*, Mart. Akyab, in dried-up brackish marshes.
- S. FULVUM*, Zell. Rangoon, on leaves of *Calamus*, and on trees in the hills.
- S. FUSCUM*, Zell. San-u-way, near Rangoon, in rice fields and in Choung-mench and Wā-choung.
- S. KURZIANUM*, Zell. On trees on the Pegu Range.
- S. MURALE*, Zell. On walls of Circuit House, Rangoon.
- S. OLIVACEUM*, Zell. Cracks in sandstone on the Zaymeni-choung.
- S. PARVULUM*, Zell. On sandstone in the Pegu Range.
- S. (SYMPHOSIPHON) RHIZOPHORE*, Zell. On trees, especially *Sonneratia apetala*, in mangrove swamps at Elephant Point.
- S. SUBCLAVATUM*, Zell. On old brickwork in Henzada.
- S. VIOLASCENS*, Zell. On clay along the Choung-mench Stream.

Sub-order *MASTIGOTHRICHEÆ*, Zeller.*SCHIZOSIPHON*, Kützling.

- S. PARIETINUS*, Næg. Akyab, on the walls of the old lighthouse.

*MASTIGOTHRIS*, Kützling.

- M. ERUGINEA*, Ktz. On dead trees in Yenay-eng, Pegu.

Sub-order *RIVULARICEÆ*, Zeller.*RIVULARIA*, Reth.

- R. PEGUANA*, Zell. On submerged dead trees in Kadeng-choung, near Natmadhi.

*GLEOTRICHIA*, J. Agardh.

- G. KURZIANA*, Zell. Akyab, on freshwater plants.

Sub-order *SPERMOSIRIEÆ*, Zeller.*CYLINDROSPERMUM*, Kützling.

- C. HUMICOLA*, Ktz. On river mud at Khyoung-gyi on the Irrawaddy.
- C. MACROSPORUM*, Ktz. Floating in the Kadeng-choung near Natmadhi.

ANABAINA, *Ad. Jussieu.*

- A. BULLOSA, Ktz. Tsittoung Valley. Toung-ngoo. Po-zwōn-choung, and in mud at Bala-choung.  
 A. FLOS-AQUÆ, Ktz. Hlein River, between Byn-dor Hscāt and The-ong-choung.  
 A. STAGNALIS, Ktz. In the Hlein River near Byn-dor Eng, and Khyoung-gyi on the Irrawaddy.  
 A. SUBTILISSIMA, Ktz. On mud of tidal creeks, Rangoon.  
 A. INDICA, Zell. Akyab, on brackish mud and sand of Yē-tho-choung, and streams in the Pegu range.

Sub-order NOSTOCHEÆ, *Zeller.*NOSTOC, *Fauchro.*

- N. (HORMOSIPHON) ELLIPSOPODUM, Rab. Whay-do stream, Pegu range.  
     *var. Vaginis achromaticis.*  
 N. GRANULARE, Rab. Elephant Point, in stagnant freshwater.  
 N. PURPURASCENS, Ktz. Floating in Kadeng-choung, near Natmadhi.  
     *N. rufescens, Ag., forma purpurascens.*  
 N. RIVULARE, Ktz. Moist rocks in Kōn-choung, Pegu range.  
 N. HETEROTHRIX, Zell. Po-zwōn-choung; Bala-choung; Khyoung-gyi.  
     *An Hormisiphon heterothrix, Ktz.?*  
 N. KURZIANUM, Zell. West slopes on Wā-thia-bwōt-choung, Pegu range.  
 N. LIMOSUM, Zell. River flats on the Irrawaddy and Hleing.  
 N. SAXATILE, Zell. Moist rocks on the Kayeng-mathey-choung, Pegu range.

Sub-order OSCILLARIEÆ, *Zeller.*SYMPLOCA, *Kützling.*

- S. KURZIANA, Zell. On the bottom of a boat on the Myit-nan stream, at Thabyē-gōn.  
 S. LUTESCENS, Zell. Irrawaddy flats, and bottom of boats in the Hleing River.

SIROCOLEUM, *Zeller.*

- S. INDICUM, Zell. On sea-washed rocks, Akyab.

HYDROCOLEUM, *Kützling.*

- H. MENECHINIUM, Ktz. Elephant Point, in mangrove swamps.  
 H. STRIATUM, Zell. Swampy stream at San-jī-wā, near Rangoon.

LYNGBYA, *Agardh.*

- L. PALLIDA, Zell. On submerged rocks, Wathay-bwōt-choung, Pegu range.  
 L. MAJUSCULA, Dillw. Hill streams, east of Toung-ngoo.

CHTHONOBLASTUS, *Kützling.*

- C. KURZII, Zell. Elephant Point, in mangrove swamps, and adhering to the larger sea-weeds.  
 C. BURMANICUS, Zell. On the walls of a cistern, near Henzadah.  
 C. LYNGBYEI, Ktz. Akyab, on sea-washed rocks.

PHORMIDIUM, *Kütz.*

- P. ARENARIUM, Rab.  
*P. thinoderma*, Ktz. Akyab, on brackish mud.  
 P. INUNDATUM, Ktz. On the wall of a cistern, near Henzadah.  
 P. PAPHINUM, Ktz. Hill streams of Arakan and in freshwater  
 on Boronga Island.  
 P. ORYZETORUM, Mart. Floating in tanks and rice fields in Arakan.

OSCILLARIA, *Bor.*

- O. ANTILLARUM, Ktz. Akyab, in brackish swamps.  
 O. BREVIS, Ktz. Kadeng-choung, near Natmadhi, and near  
 Kyā-eng, in freshwater.  
 O. CHALYBEA, Martens. Marshy spots between Wā-choung and  
 Kha-ya-tsu.  
 O. GRATELOUPII, Bory. Elephant Point, in freshwater, and Akyab.  
 O. SANCTA, Ktz. On wet walls of a cistern, near Henzadah.  
 O. VIOLACEA, Wallr. On freshwater mud, Rangoon.  
*O. fenestralis*, Ktz. On freshwater mud, Rangoon.  
 O. VIRIDULA, Zell. Htoun-kyā-gat, east of Tsittoung River in the  
 Hpet-wun-choung, covering the stones  
 in dense dark green patches.  
 O. GRANULOSA, Martens. In freshwater, Akyab.  
 O. VIRIDIS, Vauch.  
*O. tenuis*, Ag.

Sub-order LEPTOTHURICHEÆ, *Zeller.*LEPTOTHRIX, *Kütz.*

- L. OCHRACEA, Ktz. Pegu Range, in various spots. Kha-deng,  
 Thayet and Wā-choung.

HYPHOTHRIX, *Kütz.*

- H. ERUGINEA, Rabenh. In spring near Kyn-ba-li-choung Pegu.  
 H. CALCICOLA, Ag. On an old brick wall at Henzadah.  
 H. (LEPTOTHRIX) SUBTILISSIMA, Rab. Damp walls near Henzadah.  
 H. VIRIDULA, Zell. Marsh at Wanēt, Pegu.

Sub-order CHROOCOCCEÆ, *Zeller.*CHROOCOCCUS, *Kütz.*

- C. (PROTOCOCCUS) MINOR, Ktz. Elephant Point, on *Sonneratia apetala*.  
 C. INDICUS, Zell. Forest swamp, Prome.  
 C. GRANULOSUS, Zell. Dry river bed near Thabyē-gōn.

SYNECHOCOCCUS, *Zeller.*

- S. FUSCUS, Zell. Thyt-kouk Stream, Hpet-wun-choung.

APHANOCAPSA, *Næg.*

- A. ALBIDA, Zell. Floating in putrescent salt swamps, Akyab.

It is only of late years that the extraordinary importance in the order of nature of several minute Algæ is beginning to be fully realized, but it is now pretty well established that various diseases are the result of the development in the body, of particular species of minute organisms, each species producing its appropriate effects

in the body wherein it is developed.<sup>1</sup> The organisms in question are referred by Cohn to the genus *Micrococcus*, whose cells increase by catenate subdivision or division in one direction only, and the cells of the different species are so similar that specific characters have to be sought for, in the chemical reaction they produce on substances brought in contact with them. The following species are enumerated in the paper quoted.

*MICROCOCCTUS (MONAS) PRODIGIOSUS*, Ehrenburgh.

Colourless cells imbedded by thousands of millions in a gelatinous mass, at first rose-red, deepening to blood-red, and alternately turning pallid. The colouring matter is soluble in alcohol, but not in water, and when separated, is orange-red, turned carmine by acids, and yellow by alkalies. In the spectroscope it shows a broad absorption band in the green.

This red jelly grows on nitrogenous substances, as cooked potatoes, meat, bread, eggs, paste, and such like, and is known as 'blood rain.'

*M. (BACTERIDIUM) LUTEUS*, Schröter.

On solid substances this forms yellow globules the size of a poppy seed, increasing to that of half a peppercorn, and drying up into flat umbilicate disks. On fluids it forms a thick yellow skin. Colouring matter insoluble in water, and unchanged by sulphuric acid or alkalies.

*M. (BACTERIDIUM) AURANTIACUS*, Schröter.

On solids, as on cooked potatoes and eggs, this forms orange-coloured drops, and on fluids a golden-yellow skin. Colouring matter soluble in water.

*M. FULVUS*, Cohn.

Rusty-coloured drops which expand into gelatinous masses. Grows on horse dung.

*M. CHLORINUS*, Cohn.

Green or yellowish-green masses on cooked eggs, or in fluids forming sap-green layers, which by degrees colour the whole fluid yellow-green. The colouring matter is soluble in water and not reddened by acids.

*M. (BACTERIDIUM) CYANEUS*, Schröter.

Forms blue patches on cooked potatoes. In fluids, at first it turns them greenish and then blue. The colouring matter is soluble in water, at first verdigris-green and then clear blue, turned by acids to intense carmine.

*M. (BACTERIDIUM) VIOLACEUS*, Schröter.

Forms on cooked potatoes violet-coloured gelatinous drops.

The following species are important and interesting from the part they play in the production of fermentation and disease.

*M. UREÆ*, Cohn.

Forms a film on urine. Fresh urine allowed to stand at a temperature of 30° Centigrade, in a few days loses its acid reaction, becomes neutral, and ultimately alkaline. The *Urea* disappears and is replaced by carbonate of ammonia, and the alkaline *Urates* and *Phosphates* of ammonia are eliminated. These changes only take place when the *M. ureæ* is present.

*M. (MONAS) CREPUSCULUM*, Ehr.

Common on putrefying fluids.

*M. CANDIDUS*, Cohn.

Forms snow-white spots on cooked potatoes.

*M. (MICROSPHERA) VACCINÆ*, Cohn.

This organism is undoubtedly the active principle in vaccine lymph. It exists

<sup>1</sup> See Science Gossip for July, 1882, for a popular account of these organisms, extracted from "Kryptogamen Flora," by Dr. L. Rabenhorst.

in fresh vaccine lymph of either man or animals, and also in the matter of true small-pox. If vaccine lymph is strained or filtered to eliminate the *Micrococcus* cells or corpuscles, the lymph loses its power of producing cow-pock. The lymph also loses its power by putrefaction, during which process the *Micrococcus* disappears under the action of the putrefactive *Bacteria*. This species is a true animal ferment, and is probably only one of a numerous class of similar organisms which constitute the true origin of various diseases.

*M. DIPHTHERITICUS*, Cohn.

This species is developed on wounds, and also on the various mucous surfaces in *Diphtheria*. Once established, it spreads rapidly by means of the lymphatic vessels, and produces the most destructive and fatal results.

*M. (MICROSPORON) SEPTICUS*, Klebs.

Developes on suppurating wounds and putrefying surfaces, and is the active agent in producing *pyæmia* and *septicæmia* in man and animals.

*M. (MICROZYMA) BOMBYCIS*, Béchamp.

This species is developed in the intestines of silk-worms, causing a fatal and contagious plague in those insects.

Such are some of the enemies by which animals are surrounded and threatened, but there is little doubt that to other similar species of minute vegetable organisms are due the most formidable diseases which threaten man—Leprosy, Consumption, Typhus, and many others.

Order FUCACEÆ. (Sea-wracks.)

“Olive-coloured inarticulate sea-weeds, whose reproductive organs are borne in stalked sacs upon the walls of the spherical cavities excavated in the substance of the frond. Fructification. *Sporangia* or spore-sacs and *Antheridia*. The spores of *Fucus* divide into two, four, or eight within the sac; those of other genera remain undivided. The Antheridia are filled with spermatozoids (or antherozoids), which in *Fucus* have been seen to fertilize the spores.”—Griffith and Hentfrey.

“Cellular or tubular unsymmetrical bodies, multiplied by simple spores formed externally.”—Lindley.

Sub-order ENTOCARPEÆ, *Martens*.

SPHACELARIA, *Lyngbye*.

*S. FURCIGERA*, Ktz.

South Andaman, Camping Bay.

Parasitic on *Sargassum aquifolium*.

Sub-order GALAXAUREÆ, *Martens*.

GALAXAURA, *Lamouroux*.

*G. PLICATA*, Ktz.

South Andaman. Frequent on coral reefs, and often thrown up on the beach.

*G. MARGINATA*, Lx.

South Andaman, Ross Island.

*G. TOMENTOSA*, Ktz.

South Andaman, at Camping Bay.

*G. OBLONGATA*, Lx.

South Andaman, Ross Island.

Sub-order SARGASSEÆ, *Martens*.

SARGASSUM, *Agardh*.

*S. MICROCYSTUM*, Ktz. (?)

South Andaman, and along the coast.

Kurz remarks that he was unable to find this species full grown.

*S. AQUIFOLIUM*, Ag.

South Andaman, Camping Bay.

*S. WIGHTII*, Grev.

South Andaman, South Corbyn's Cove.

CARPACANTHUS, *Kütz.*

- C. ILICIFOLIUS, Turner. Andamans. Labyrinth Archipelago, near Termoklee Island, in deep water.

TURBINARIA, *Bory.*

- T. TRIQUETRA, Y. Ag. Nicobars. South Andaman, at South Corbyn's Cove.  
T. CONDENSATA, Sonder. South Andaman, at South Corbyn's Cove.

Sub-order *HILDENBRANDTIACEÆ*, *Zeller.*HILDENBRANDTIA, *Kütz.*

- H. ARAKANA, Zeller. Akyab, on sea-washed rocks.

Sub-order *DICTYOTACEÆ*, *Martens.*ZONARIA, *Agardh.*

- Z. FRASERI, Grev. South Andaman and Arakan coast on rocks, and marine sandstone banks.

Sub-order *BATRACHOSPERMEÆ*, *Martens and Zeller.*BATRACHOSPERMUM, *Roth.*

- B. GUIANENSE, Montg. South Andaman, above Watering Cove.  
B. MONILIFORME, Roth. Hill streams near Kyā-eng, and marsh near Phoungyi, Pegu.

Sub-order *CHANTRANSIÆ*, *Zeller.*CHANTRANSIA, *Fries.*

- C. ROSEOLA, Zell. On stems of *Polygonum*, in Bynder Eng, Pegu.

Sub-order *ÆDOGONACEÆ*, *Zeller.*ÆDOGONIA, *Linklater.*

- Æ. KURZII, Zell. Marsh near Wanet, Pegu.  
Æ. VESICATUM, Link. Zamayi-choung, and Eng-ya-na, Pegu.  
var. *G. fuscescens*, Ktz. On roots of plants in Kyā-eng, Pegu.  
Æ. TENELLUM, Ktz. In swamps and ditches, near Htoukyān-gyi, Rangoon.  
Æ. SCUTATUM, Ktz. On roots of plants in Kyā-eng, Pegu.  
Æ. ROTHII, Bréb. Floating on the 'Lake,' Rangoon.  
Æ. LANDSBOROUGHII, Ktz. Htoukyān, near Rangoon.  
Æ. GRACILE, Ktz. On trees at Eng-shwē, below Henzada.  
Æ. BRAUNII, Ktz. Eng-shwē, and Kadeng-choung, near Natmadhi.  
Æ. APOPHYSATUM, A. Br. Kyā-eng, Pegu.

BULBOCHETE, *Agardh.*

- B. PEGUANA, de Bory. On rocks in Kam-balu-toung, Pegu range.  
B. INTERMEDIA, Zell. Kyā-eng, Pegu.

Sub-order *VAUCHERIEÆ*, *Martens and Zeller.*VAUCHERIA, *De Candolle.*

- V. SUBMARINA, Berkeley. Koladyne River, in brackish water, clothing the rocks in dense green patches.  
V. SESSILIS, D.C. Htou-kyā-gat, in streams.  
V. CLAVATA, D.C. Andaman Islands, in sweet waters.

HALYMEDA, *Lamouroux*.

- H. CUNEATA, Ktz. Andamans, Termoklee Island, Labyrinth Archipelago.  
 H. OPUNTIE, LX. South Andaman, Diamond Island.  
 H. DISCOIDEA, Bene. South Andaman, etc. Frequent on coral reefs all along the coast.

BRYOPSIS, *Lamouroux*.

- B. PACHYNEMA, Mart. South Andaman, in mangrove swamps towards Birdnest Cape.  
*Faloniu confervoides*, Harv.  
 B. TENUSSIMA, Notaris. Camping Bay, South Andaman, on sandstone.

## Order CERAMIACEÆ. (Rose-tangles.)

"Rose-red or purple sea-weeds, with a filiform frond, consisting of an articulated, branching filament, composed of a string of cells, sometimes coated with a stratum of small cells. Fructification: 1. *Berry-like receptacles*, with a membranous coat, containing numerous spores. 2. *Tetraspores* attached to the ramuli or more or less immersed in the substance of the branches, scattered. 3. *Antheridia*, produced in the same situations as the spores."—Griffith and Henfrey.

"Cellular or tubular unsymmetrical bodies, multiplied by tetraspores."—Lindley.

Sub-Order DELESSERIEÆ, *Zeller and Martens*.AGLAOPHYLLUM, *Montagne*.

- A. MULTIPARTITUM, Ktz. South Andaman.

HYPOGLOSSUM, *Kützling*.

- H. BENGALENSE, Mart. Elephant Point, on trees.  
 H. LEPRIEURII, Ktz. Elephant Point, in mangrove swamps.  
 H. VIEILLARDI, Ktz. Arakan, frequent on sandstone rocks and old branches, or on the submerged mangrove stems, not only in the tidal channels of Koladyne River, but also along the sea coast.  
 Perhaps only a juvenile state of  
*H. Leprieurii*.

Sub-order LAURENCIEÆ, *Martens*.LAURENCIA, *Martens*.

- L. OBTUSA, LX. Arakan, on marine sandstone banks of Boronga Island.

BOSTRYCHIA, *Montagne*.

- B. INTRICATA, Mont. Elephant Point, in mangrove swamps.  
 B. RIVULARIS, Harvey. Elephant Point, in mangrove swamps.

Sub-order POLYSIPHONEÆ, *Martens and Zeller*.POLYSIPHONIA, *Greville*.

- P. SUBADENCA, Ktz. Elephant Point, in mangrove swamps.  
 var. MAJOR, "ramis crebrioribus minus strictis."  
 P. RUFO-LANOSA, Harvey. Akyab, on grasses.

Sub-order TYLOCARPEÆ, *Martens*.GYMNOGONGRUS, *Martens*.

- G. PYGMÆUS, Grev. Arakan, on marine sandstone banks of Boronga Island.

Sub-order *SPHEROCOCCEÆ*, *Martens*.*SPHEROCOCCUS*, *Linnaeus*.

- S. MULTIPARTITUS*, Ag. South Andaman.  
 var. *lichenoides*, Often washed up by the sea.  
*Fucus aruginosus*, Turner.  
*S. LICHENOIDES*, L. South Andaman and Termoklee Island.  
 An edible species often thrown up by the sea.  
*S. LEMANIA*, Ktz. Arakan, on marine sandstone banks.  
*S. CONFEROIDES*, Ag. On rocky shores of Boronga Island.  
*S. PUMOSUS*, Ktz. On marine sandstone banks of Boronga Island.

Sub-order *GELIDEÆ*, *Martens and Zeller*.*ACROCARPUS*, *Kützinger*.

- A. INTRICATUS*, Ktz. Akyab, on sea-washed rocks. South Andaman and Termoklee Island, on submerged mangrove stems.  
*A. PUSILLUS*, Ktz. On marine sandstone banks of Boronga Island.

*HYPNEA*, *Lamouroux*.

- H. SPINELLA*, J. Ag. Diamond Island and Arakan.  
*H. MUSCIFORMIS*, LX. Diamond Island.  
*H. DIVARICATA*, Grev. Diamond Island.

Sub order *GIGARTINEÆ*, *Martens*.*GIGARTINA*, *Lamouroux*.

- G. (EUCHEMA) SPINOSA*, Ag. Andamans, Termoklee Island.  
*Fucus lichenoides*, Willd. non. L.

*CHONDROCOCCUS*, *Kützinger*.

- C. SPINULOSUS*, Ktz. South Andaman and Ross Island.

*GRATELOUPA*, *Agardh*.

- G. FURCATA*, Ktz. Arakan, marine sandstone banks of Boronga Island.

Sub-order *GYMNOPHLOÆACEÆ*, *Martens*; *HALYMENIÆÆ*, *Zeller*.*HALYMENIA*, *Agardh*.

- H. TENUISPINA*, Ktz. Andamans, Labyrinth Archipelago, Termoklee Island, ejected from the sea, parasitic on other sea-weeds.

Kütz remarks: "*Dumontia robusta*, *β. Wrightii*, J. Ag., was found by Wichura, in the Bay of Bengal, and most likely occurs also in Burmese waters."

*CATENELLA*, *Greville*.

- C. OPUNTIA*, Grev. Elephant Point, on stumps in swamps.

Sub-order *CORALLINEÆ*, *Martens*.*JANIA*, *Lamouroux*.

- J. ADHERENS*, LX. South Andaman, coral reefs at Camping Bay.  
*J. FASTIGIATA*, Harvey. South Andaman, at Camping Bay, and at South Corbyn's Cove.

AMPHIROA, *Lamourour*.

- A. TRIBULUS, Lx. Thrown up on Diamond Island, hitherto known only from St. Croix, Antilles.  
 A. FRAGILISSIMA, Lx. South Andaman, at Camping Bay.

Sub-order CERAMIEE, *Martens and Zeller*.HERMOCERAS, *Kützinger*.

- II. FLACCIDUM, Harvey. In crevices of rocks on Boronga Island.

GONGROCERAS, *Kützinger*.

- G. RADICANS, Zell. Elephant Point, in mangrove swamps.

Of the edible seaweeds Kurz remarks: "The seaweeds commonly eaten by the Burmans are *Gigartina spinosa*, GREY. (*agar agar* of the Malays), and *Spharococcus lichenoides*, AG. (Ceylon moss of commerce). These are usually called by the Burmese *Kyauk puen*."

The latter of these is, I presume, the species alluded to by Dr. Mason under the name *Plocaria candida*, and which seems to be superior to most other species, in being free from the bitter principle, which renders most species so nauseous.

According to an analysis by Dr. O. Shaugnessy, this seaweed is composed of

Vegetable jelly..	..	..	..	..	54	5
Starch ..	..	..	..	..	15	0
Woody fibre ..	..	..	..	..	18	0
Gum ..	..	..	..	..	4	0
Sulphate and muriate of soda ..	..	..	..	..	6	5
Sulphate and phosphate of lime	..	..	..	..	1	0
					99	0

Of the best method of preparing it, Dr. O'Shaugnessy remarks: "In the first place, from the tendency of *pectin* or vegetable jelly to form insoluble compounds with saline and earthy bases, it is necessary to steep this fungus for a few hours in cold rain-water as the first step in its preparation. This removes a large portion of the sulphate of soda, leaving all the gelatine and starch. It should next be dried by the sun's rays and ground to a fine powder. Cutting or pounding, however diligently or minutely performed, still leaves the amylaceous globules so mechanically protected, and so closely involved in an external sheath of tough ligneous fibre, that scarcely a particle of the starch can be extracted by boiling, even though the decoction is prolonged for several hours. When ground to powder, boiling for twenty-five minutes or half an hour dissolves all the starch and gelatine. The solution while hot should be passed through muslin or calico, and thus the ligneous fibre is removed; lastly, the strained fluid should be boiled down till a drop placed on a cold surface gelatinizes sufficiently." The product thus strained may then be eaten with milk and sugar and flavoured with lemon juice and sherry. According to Balfour's *Cyclopædia of India* (see *Agar Agar*), the quantity annually shipped from Singapore averages 10,000 piculs or rather less than 400 tons, and all this goes to China, where it is used in place of size, for dressing cotton goods, and the finer varieties are also employed to make a jelly or sweetmeat, called in Canton *Wong-leung-fan*. It is an article of export that deserves more attention than it has received, as likely to prove of use in the arts in Europe if once introduced to notice, much as it is in China. The selling price of the first quality is sixteen shillings a hundredweight, and of the second ten shillings. It is said, when used as a paste, not to be liable to the attacks of insects, but this, if it is, as described, an edible amylaceous compound, seems hardly probable.

The economic value, however, on the whole, of seaweeds is not great. The ashes of seaweeds yield soda and iodine, and the weed itself is used near the coast

for manure, and even it is said for food for cattle, who perhaps in some places may acquire a taste for it. It was once supposed that the 'edible bird's nest' was formed of a species of gelatinous seaweed, but it is now well known that it is composed of interlacing threads of salivary mucus, developed periodically in varying amount, by several species of *Collocalia*. Laver, once so much esteemed by people of scrofulous habit, is a seaweed (*Porphyra vulgaris*), but the use of seaweed as a medicinal agent, together with burnt sponge, has fallen out of fashion since the discovery of the active ingredient in both, *iodine*, to which their efficacy in scrofulous complaints was due. A revival has however taken place of late in the form of a nostrum barbarously named 'anti-fat,' which is believed to mainly consist of a preparation of the common bladder-weed of the English coast. That there is urgent need of some such medicine is unquestionable, since from the vast number of quack medicines advertised in the most blatant fashion in every periodical, it is certain that the number of persons who support such a system and consume such trash must be enormous, a fact which affords the strongest evidence of in how many cases, the undesirable adiposity of their muscular system must have spread to and permeated their brains as well.

## FUNGI.

Cellular flowerless plants, deriving nourishment through their spawn or *mycelium*, which consists of a mass of loose, delicate, branched and interlacing threads of a cottony texture (readily seen in earth which contains what is called "mushroom spawn"), and propagated by means of minute spores. Fructification various.

"A large class of cryptogams distinguished from Algae, more by habit than by general character. They agree with them in their cellular structure, which is void of anything like vascular tissue, except in very few cases, while they differ in their scarcely ever being aquatic, in deriving nutriment from the substance on which they grow, and in the far lower degree of development of the organs of impregnation." "The uses of Fungi are various. They afford excellent and stimulating food, valuable medicine, besides less important assistance in domestic economy. Their office in the organized world is to check exuberant growth, to facilitate decomposition, to regulate the balance of the component elements of the atmosphere, to promote fertility, and to nourish myriads of the smaller members of the animal kingdom. They occur in every part of the world where the cold is not too intense to destroy their spawn, or where there is sufficient moisture, though they abound most in moist temperate regions where the summer is warm."—*Berkeley*.

The species named in the following catalogue are, for the most part, those collected by the late Mr. Sulpiz Kurz, as named and described by the late Frederick Currey, F.R.S., in the Linnean Society's Transactions, from which they have been copied. The greater number were collected in Burma; a few in Bengal. These last I have left standing in the list, as, in all probability, they will one day be found in Burma also. A few species, collected by myself, and recently named for me by Mr. M. C. Cooke, have been added to the list, and inserted in their proper places. They are distinguished by the initial P.

## Agaricini.

AGARICUS (LEPIOTA) CONTINUUS, Berk.	Maulmain, P.
A. (PSALLIOTA) CAMPESTRIS, L.	Maulmain, P.

This, the genuine English Mushroom, used to make its appearance in my compound in Maulmain, during the rainy season, on rare occasions and after long intervals, very much to my surprise. I can recollect only three or four such in the course of some twenty years. On each occasion it was in or near the same spot, at the foot of a tree and at the bottom of a steep bank where, year after year, I used to heap up all the fallen leaves I could collect to make vegetable mould. Suddenly, on some day in the rains, two or three mushrooms of a small size would appear in the gravel path near the decayed leaves; but my hopes of a succession were always disappointed, as

after that one day's display, there would be no more perhaps for two or three or six years! I never saw any on or near the stable dung, where one might more naturally have expected to find them; nor did I ever hear of any other person having found them; that is to say—if they were observed also by others, as they may well have been, I never heard of it.

"Some persons have inferred, from the springing up of mushrooms whenever particular soils and decomposed organic matter are mixed together, that the production of Fungi is accidental" (spontaneous?) "and not analogous to that of perfect plants. But Fries, whose authority on these questions is entitled to the highest respect, has shown the fallacy of this argument in favour of the doctrine of equivocal generation. 'The sporules of Fungi,' says this naturalist, 'are so infinite that in a single individual of *Reticularia maxima*, I have counted above ten millions, and so subtle as to be scarcely visible, often resembling thin smoke; so light that they may perhaps be raised by evaporation into the atmosphere, and dispersed in so many ways by the attraction of the sun, by insects, wind, elasticity, adhesion, etc., that it is difficult to conceive a place from which they may be excluded.'"<sup>1</sup>

If we grant full weight to this statement, it still remains a most remarkable and in many ways unaccountable fact, that the mushrooms in my compound should have come up after intervals of several years, in the very same place, and (as far as my observation went) nowhere else; especially as, being gathered by me as soon as seen, they had no opportunity of ripening and shedding their sporules. After their first arrival on the spot, it must be presumed that their vitality lay dormant in the *Mycelium* underground.

A. (HYPHOLOMA) APPENDICULATUS, Fr.	Maulmain, P.
LENTINUS COADUNATUS, Hook. fil.	Maulmain, P.
L. CAPRONATUS, Fr.	Myo-dwyn, Pegu.
L. DESCENDENS, Fr.	Htou-kye-gat, Pegu.
L. FURFUREOSUS, Fr.	Pegu Yo-mā Range.
L. VELUTINUS, Fr.	Pegu Yo-mā Range.
L. GLABRATUS, Mont.	N. Rajmahal Hills, Bengal.
L. SAJOR CAJU, Fr.	S. Andaman.
(Malay name for the plant).	
L. EXILIS, Fr.	Htou-kye-gat, Nakawa. Pegu.
L. INGUINANS, Berk.	Kemendine, Rangoon.
L. KURZIANUS, Currey.	Pegu Yo-mā Range.
L. CÆSPITOSUS, Currey.	Pegu.
L. IRREGULARIS, Currey.	Pine forests, Karen country.
MARASMIUS PARISHII, Cooke.	My compound, Maulmain, P.
M. BURMENSIS, Cooke. <sup>2</sup>	My compound, Maulmain. P.
SCHIZOPHYLLUM COMMUNE, Fr.	Botanic garden, Calcutta. Ross Island, Andamans.
LEUZITES ALBIDA, Fr.	Htou-kye-gat, Pegu. K. Maulmain. P.
L. PALISOTI, Fr.	Htou-kye-gat, Pegu.
L. OCHROPHYLLA, Berk.	Seven Pagodas, Toung-ngoo. Htou-kye-gat. Maulmain. P.

### Polyporei.

POLYPORES (MESOPUS) PERENNIS, Fr.	Sent by Dr. Stoliczka from Penang.
P. (MESOPUS) XANTHOPUS.	Nakawa. Htou-kye-gat. Tsittoung Valley. Yo-mā. S. Andamans. K. Maulmain. P.
P. (MESOPUS) FLORIDEUS, Berk. <sup>3</sup>	Pegu. Bookce, Karen Hills.
P. (MESOPUS) HYPOBLASTUS, Berk.	Howrah, Calcutta, on bamboo.
P. (MESOPUS) CRASSIPES, Currey.	Pegu Yo-mā.
"Only a young state of <i>P. xanthopus</i> ," Cooke.	

<sup>1</sup> Whole passage extracted from Lyell, Principles of Geology, vol. ii. p. 391.

<sup>2</sup> Allied to *M. ramentis*, but certainly not the same.—Cooke.

<sup>3</sup> First found by Spruce at Panurú, Amazon, S. Am.

- P. (MESOPUS) ANTHELMINTICUS, Berk. At the base of old bamboos. Used as an anthelmintic.  
 Burm. *Thau-mo*.  
 P. (PLEUROPUS) SANGUINEUS, Fr. Matlah, Lower Bengal, Kurz, Maulmain. P.  
 P. (PLEUROPUS) MODESTUS, Yo-mā Range.  
 P. (PLEUROPUS) FLABELLIFORMIS, Kl. Yo-mā Range.  
 P. (PLEUROPUS) AFFINIS, Fr. Yo-mā Range. Bookee, Karen Hills.  
 P. (PLEUROPUS) PICIPES, Fr. Botanic Garden, Calcutta.  
 P. (PLEUROPUS) LUCIDUS, Fr. Botanic Garden, Calcutta.  
 P. (PLEUROPUS) AMBOINENSIS, Fr. Pegu, Karen Country.  
 P. (PLEUROPUS) SPLITGERBERI, Mont. Nat-toung, Toung-ngoo.  
 P. (PLEUROPUS) BRUNNEO-PICTUS, Berk. Arakan, on old wood.

### Anodermei.

- P. (APUS) FUNALIS, Fr. Lower Bengal.  
 P. (APUS) RUBIDUS, Berk. Pegu.  
 P. (APUS) PEGUANUS, Mont. Maulmain. P.  
 P. INCERTUS, Currey. Loc. ?

### Placodermei.

- P. APPLANATUS, Fr. Htou-kye-gat, Toung-ngoo.  
 P. MARGINATUS, Fr. Pine Forests, Bookee.  
 P. PERSOONII, Fr. Pegu, Kurz. Maulmain. P.  
 P. HOLOSCLERUS, Berk. Yo-mā Range, Myo-dwyn.  
 P. PARISHII, Berk. Maulmain. P.  
 P. CINEREO-FUSCUS, Currey. Nakawa, Pegu.

### Inodermei.

- P. CUINABARINUS, Fr. Botanic Garden, Calcutta.  
 P. SCRUPOSUS, Fr. Martaban Hills.  
 P. FECI, Fr. Pegu Yo-mā.  
 P. VERSICOLOR, Fr. Sikkim, Himalaya.  
 P. PINISITUS, Fr. Nat-toung, Toung-ngoo.  
 P. ANEBUS, Berk. Htou-kye-gat, Pellowa.  
 P. XEROPHYLLACEUS, Berk.<sup>1</sup> Botanic Garden, Calcutta.  
 TRAMETES LOBATUS, Berk. Sikkim Terai, on old logs.  
 T. UMBRINUS, Currey. Nakawa. Htou-kye-gat, Pegu.  
 T. OCCIDENTALIS, Fr. Botanic Garden, Calcutta, on old logs.  
 T. CINGULATUS, Berk. Pegu Yo-mā.  
 DEDALIA TENUIS, Berk. Pegu Yo-mā.  
 D. DISCOLOR, Fr. Pegu Yo-mā.  
 D. ZONATA, Fr. Pellowa. Htou-kye-gat, Pegu.  
 HEXAGONIA POLYGRAMMA, Mont. Pellowa. Htou-kye-gat.  
 H. KUIZII, Currey. Matlah, Bengal.

### Hydnei.

- HYDNUM UDEM, Fr. Matlah, Calcutta.  
 TREMULODON GELATINOSUM, Fr. Sikkim Himalaya.  
 IMPEX FLAVUS, Kl. Arakan. Baronga Island.  
 I. PALLESCENS, Fr. Pegu Yo-mā.  
 GRANDINIA GRANULOSA, Fr. Pellowa. Htou-kye-gat, Pegu.

### Auricularini.

- THELEPHORA PUSILLA, Currey. Sikkim Himalaya.  
 T. PALMATA, Fr. Botanic Garden, Calcutta.

<sup>1</sup> "Not this species, but *P. Currii*, Berk." (Cooke).

LACHNOCLADIUM BRASILIENSE, Berk.	Calcutta.
SPHEREUM ELEGANS, Fr.	Lower Pegu.
S. OSTREA.	Sikkim Himalaya.
S. LOBATUM, Fr.	Htou-kye-gat. Seven Pagodas.
S. SCYTALÆ, Berk.	Pegu. Bookee, Karen Hills.
S. ADUSTUM, Lev.	Southern Yo-mā. Pegu.
S. PAPYRINUM, Mont.	Pegu. Timeokee.
S. MEDICUM, Currey.	Sikkim.
S. CYATHIFORME, Currey.	Bookee, Karen Hills.
CORTICIUM VIOLACEO-LIVIDUM, Fr.	Pegu Yo-mā.
C. LEVIGATUM, Fr.	Pegu Yo-mā.
C. MOUGEOTII, Fr.	Sikkim.
GUEPINIA RAMOSA, Currey.	Howrah, Calcutta. Arakan.

**Clavariiei.**

CALOCERA VISCOSA, Fr.	Seebpore, Lower Bengal.
TYPHULA FUSCIPES, Fr.	Sikkim.

**Tremellini.**

TREMELLA FOLIACEA, Fr. P.	Sikkim.
HINNEOLA AURICULA-JUDÆ, Fr.	Nakawa. Hton-kye-gat.
H. AURICULA-CANIS, Fr.	Pegu. Northern Yo-mā.

**Phalloidei.**

PHALLUS DÆMONUM, Rumph.	My compound, Maulmain. P.
-------------------------	---------------------------

On one or two occasions I gathered this curious and very elegant fungus, in my compound, among the decayed leaves. The stem, which is about the thickness of one's thumb, and some four or five inches high, is white in colour, fibrous, brittle, and hollow. The pileus, which is also white, is reticulated and hangs down over the stem like a beautiful lace veil. The whole structure is so frail as hardly to bear handling. It is, however, pleasanter in the sight, than in the handling, as, like all the genus, it emits a very offensive odour.

**Nidulariacei.**

CYNTHUS INTERMEDIUS, Mont.	Seebpore, Bengal, Kurz. Maulmain, P.
----------------------------	--------------------------------------

**Lycoperdacei.**

LYCOPERDON GEMMATUM, Fr.	Sikkim.
L. PUSILLUM, Fr.	Lower Pegu.
L. BRASILIENSIS, Fr.	Nakawa, Hton-kye-gat.

**Trichodermacei.**

TRICHOCOMA PARADOXUM, Jungh.	Sikkim Himalaya.
TRICHIA PYRIFORMIS, Hoffm.	Loc. ?
ARCYNIA UMBRINA, Fr.	Pellowa, Hton-kye-gat.

**Helvellacei.**

PEZIZA AURANTIA, Pers.	Sikkim.
P. RUTILANS, Fr.	Hton-kye-gat.
HELOTIUM CITRINUM, Fr.	Sikkim.

**Sporocybacei.**

STILBUM INCONSPICUUM, Currey.	Seebpore, Bengal.
S. I RYTHROCEPHALUM, Dittm. var.	Bot. Gard., Calcutta.

## Sphæriacei.

XYLARIA DIGITATA, Grev.	Bot. Gard., Calcutta.
X. TABACINA.	Sikkim.
X. GUYANENSIS, Mont.	Htou-kye-gat.
X. POLYMORPHA, Grev.	Bot. Gard., Calcutta.
X. HYPOXYLON, Grev.	Bot. Gard., Calcutta. Arakan.
X. KURZIANA, Currey.	Bot. Gard., Calcutta.
X. FLAGELLIFORMIS, Currey.	Tsittoung Valley.
X. MUTABILIS, Currey.	Bot. Gard., Calcutta. <sup>1</sup>
HYPOXYLON SUBORBICULARE, Welw. and Currey.	Bot. Gard., Calcutta.
II. CONCENTRICUM, Bolt.	Bot. Gard., Calcutta.
II. MARGINATUM, Schw.	Pegu.
DIATRYPE RUGOSA, Currey.	Pegu Yo-mā.
HYPOCREA VARIABILIS, Currey.	On living leaves of bamboo. Pegu Yo-mā.
SPILERIA PHASELINA, Mont.	Nakawa, Htou-kye-gat.
S. SUBLIMATA, D.R. and Mont.	Kambala-toung.
PORONIA FILEIFORMIS, Berk.	Maulmain. P.
MICROPELTIS APPLANATA, Mont.	Mangrove Bay, South Andaman.
FUMAGO SALICINA, Tal. Sel. Fung.	
Carp. Vol. II. p. 280.	Wā-choung. Pegu Yo-mā.
NECTRIA EUGENLE, Currey.	On leaves of Eugenia. Pegu Yo-mā.
GRAPHIOLA PHENICIS, Poit.	On leaves of <i>Phanie paludosa</i> , Calcutta. P.

## LICHENS.

Cellular flowerless plants, deriving nourishment through their whole surface from the medium in which they live, the air : propagated by spores.

"A large tribe of cryptogams belonging to the Fungal alliance, and distinguished from Fungi by their not deriving nutriment in general from the substance on which they grow, but from the surrounding medium ; by their slow development and long endurance ; and, technically, by their producing within their substance granules distinct from the general tissue, called *gonidia*, which in certain conditions are reproductive. Lichens are in some cases useful as articles of food and medicine ; but their principal economical value consists in their properties as dyes."—Berkeley.

*Cenomyces rangiferina*, commonly called *reindeer moss*, is the chief food of the reindeer, when other food cannot be obtained. *Cetraria islandica*—the *Iceland moss* of the shops—is a well-known article of nourishment. And Tripe de Roche, on which Canadian hunters are sometimes reduced to subsist, is furnished by lichens of the genus *Gyrophora* and others.

I have not heard of any collection of Lichens having been made by the late Mr. Sulpiz Kurz ; I am, therefore, reduced to offer the following meagre list of a few species casually gathered by myself on the hills of Martaban and Tenasserim.

They have been named (through Dr. M. C. Cooke) by the Rev. J. M. Crombie.

PYXINE, sp. ?	
CLADONIA DECORTICATA, Fr.	
COCCOCARPIA MOLYBDÆA, Nyl.	
PARMELIA KAMTSCHADALIS, Ach.	On rocks.
P. LATISSIMA, Fée.	On rocks.
P. LEVIGATA, Ach.	On rocks.
USNIA DASYTOGON, Fée.	On trees.
U. FLORIDA (STRIGOSA), Fée.	On trees.
U. CERATINA, Ach.	On trees.

<sup>1</sup> This is certainly *X. ischaroides* of Berk. (Cooke).

## CLASS II. ACROGENS.

AXIS OF GROWTH DISTINCT, GROWING FROM THE APEX, WITH USUALLY NO PROVISION FOR SUBSEQUENT INCREASE IN DIAMETER, AND WITH FREQUENTLY DISTINCT FOLIAGE. REPRODUCTION BY THE ACTION OF *Antherozoids* ON *Archegonia*.

### MUSCALES.

Plants composed of cellular tissue only. *Archegonia* or *Antheridia*, or both formed on the stem or branches of a new plant, that is developed from the *spore* on its germination.<sup>1</sup>

### MUSCALES. THE MOSS ALLIANCE.

#### MOSESSES.

The word *Moss* has been used by unscientific persons in a very loose and indefinite manner, being applied to almost any plant of a small, caespitose and compact habit of growth. For instance, Reindeer-moss (so called) is, strictly speaking, a lichen; Carrageen-moss is a seaweed; and Spanish moss is a Bromeliaceous plant, or of the same order as the Pine-apple! As a Botanist speaks, however, "*moss*" has a limited and thoroughly well-defined application.

True mosses, technically speaking, are cellular Acrogens, *i.e.* plants whose tissue (with some exceptions) is composed of cells and not of vessels, and which grow at the end. They are, for the most part, small lowly plants of thin delicate texture, generally gregarious, and choosing for their habitats, trees, rocks and walls, or clay banks and bogs, but hardly disdaining any locality which will provide them with their chief sustenance, moisture. Some mosses are very singular in their choice of a habitat. One very remarkable and beautiful genus (*Splachnum*) chooses the decayed dung of animals, though it does not refuse to grow on an old hat or an old shoe. Another moss—*Funaria hygrometrica*—affects bare patches of ground, especially where there are any charred remains. This peculiar habit seems to accompany the plant in every part of the world: for it was on just such a patch of burnt ground, that, on crossing a deserted Toung-ya in the mountains, I found this common British species.

Mosses differ exceedingly in size, colour, and texture,—also, as a consequence, in general outward aspect. Some *Phasea*, including roots, stem and fruit, vary from a line to one-eighth of an inch in total length; while *Polytrichum commune* (a single plant) will sometimes attain the length of two feet, so that hassocks and mats are made of it. The urn alone, or sporangium, of the latter is capable of holding concealed within it a very large number of fully developed plants of the former. Many species of *Metcorium* and *Neckera* clothe the branches of damp forest trees with a drooping drapery many inches in length. *Polytrichum* and *Pogonatum* furnish

<sup>1</sup> [The following remarks are from the pen of the Rev. C. Parish, who has kindly contributed the catalogue here given, the only alteration in which being the interpolation in its place of the order *Characeae*, in accordance with the scheme of classification followed in this edition.]

exceptions to the uniformity of the cellular tissue of mosses, for they develop vascular tissue; also to their generally delicate and translucent texture, for they are firm, tough, and dry. Nor are all mosses green, though that is the prevailing colour. Some are nearly white, as *Leucobryum* and *Octoblepharum*; others nearly black, as *Andraea*; others, again, are of a beautiful golden yellow, as *Stereodon pramollis* and *Trachypus* (*Neckera*) *crispatula*, Burmese plants. And many others, such as *Stereodon* and *Meteorium*, present a beautiful admixture of various shades of brown and yellow. Trees and rocks owe, indeed, much of their rich colouring to the mosses which adorn their surface.

Mosses, like ferns and orchids, are either terrestrial or epiphytal; they are erect, creeping, or pendulous, simple or branched. They are covered with small leaves, commonly growing uniformly round the central axis, so as to make the plant appear cylindrical, but not unfrequently they are more or less bifariouly disposed, which gives the moss a flattened appearance. In one (I believe, solitary) instance, that of a rare European moss called "*Barbarmia ophylla*," a moss may be said to be leafless, for to all intents and purposes it is so, presenting to the eye nothing but a single seta or stem about half an inch high surmounted by a rather large *sporangium*; rudimentary leaves have, however, been discovered. But, however mosses may differ from each other in their general appearance, the fructification, when once seen or understood, affords an unfailing mark by which to distinguish the class.

Accordingly, leaving the male and female organs of reproduction, which are concealed and microscopic, we will now describe what is alone visible to the naked eye and is commonly called the fruit of a moss. This (I except here the small and partially distinct group, *Andraea*), is in the form of a hollow capsule, called the *theca* or *sporangium*, which is either sessile among the leaflets, or elevated on a rigid bristle-like support or stalk, called the *seta*. This spore-case is more or less globose or cylindrical, or sometimes even square. It contains the spores and opens in various ways to allow of their escape. In every case, in an early stage, before the *sporangium* is fully ripe, it is surmounted by a sort of cap or veil, which is called the *calyptra*. This small appendage either covers the spore-case uniformly like an extinguisher, when it is said to be *nitiform*; or it is ruptured laterally, and sticks jauntily on one side like a Normandy cap; or, if one may draw a comparison from the country, like that remarkable sort of night-cap which Tamil boys wear when they go to school; it is then called *dimidiata*. This *calyptra*, or hood, or veil (as it is variously called), is sometimes large enough (relatively to the size of the spore-case) to be a conspicuous object upon it, but oftener it is small and very fugitive. When this hood has fallen off or been removed carefully by a pair of pincers, the spore-case is laid bare, and in some few mosses, as in *Phascum*, it is seen to be entire, though it shows a small beak or point, and the spores can only escape by its decay and irregular rupture. In the great majority of cases, however, the *sporangium* is furnished with a lid, or operculum, which is nearly flat, or conical, or lengthened into a slender curved point. This lid, when the *sporangium* is fully matured, falls off (or it may be pulled off shortly before maturity), disclosing either a naked mouth, as in *Sphagnum* and *Gymnostomum*, or—much oftener—a single or double row of *cilia*, or teeth, as they are commonly called, which form an exquisitely beautiful fringe to the mouth of the *sporangium*. These teeth expand and contract in a lively manner, according as moisture is applied or withheld. Inside the urn, or *sporangium*, the innumerable green spores may now be seen. No one, except those who have seen these fringes of teeth, or *peristomes*, as they are called, can form any idea of their exquisite variety and beauty. They are among the loveliest objects which the microscope has ever revealed.

Apart, however, from their beauty, the most singular feature about these teeth, or cilia, is their number. In some (comparatively few) mosses, as we have seen, they are wholly wanting; but where they are present, they are always four, or some multiple of four, *i.e.* they are 4, 8, 16, 32 or 64. No other number is known; nor, as far as I have seen or heard, are they ever fewer or more numerous by so much as one, through abortion, or chance malformation, or sport, as often happens with the stamens or other parts of flowering plants; so exquisitely perfect are they in their minute organization.

There are other parts of mosses which have technical names, such as the smaller leaves about the base of the *seta*, certain swellings in the *sporangium*, etc., but into these lesser points, as well as into the various forms which the *peristome* assumes, I forbear to enter. For those who wish to pursue the study farther, there is no lack of books, though, indeed, I know not any *one* which shall give a description of all known mosses.

Of the uses of mosses, looked at from man's ordinary point of view, as furnishing something specially beneficial to himself, I fear there is little or nothing to say. They appear indeed, in this respect, to rank below even the "inutilis alga." But in the economy of nature they are of the highest importance. They go far towards giving the earth her first coating of vegetation, and form a soil in which other plants innumerable are enabled to establish themselves, and find at once support and nourishment, besides protection from the extremes of heat and cold. Moss-spores are Nature's pioneers in the Vegetable Kingdom. She scatters them broadcast on the winds and sows their fertilizing dust over the earth. They fly forth on their errand, invisible, and venture where nothing else as yet can. They climb the precipitous mountain's side and seize on each coign of vantage, settling on every tiny ledge, and creeping into every crevice. They penetrate the deep shade of the forest and pour their myriads over the tree-trunks. They wander over the bleak moor and gather about its fountain heads, fostering the young springs, and throwing over the granite boulders the only garment they will endure. They dive into the recesses of caverns and make the roofs and sides glisten with their translucent atoms.<sup>1</sup> They grasp the roughness of the barren wall, and cling tenaciously to the smooth roof-tile, and lay the foundation of a garden upon the house-top. They will even fly across Africa's arid wastes, and by their bright and unexpected presence instil hope into the sinking heart of the lonely traveller.<sup>2</sup> So, as by magic, they spread their green mantle over the face of the earth, the present home of insect life, and the harbinger to other animals and to man himself of flower and fruit and sustenance.

We come now to Order and Arrangement.

No one system appears to have met with the general approval of Bryologists. That adopted in the old *Muscologia Britannica* had the merit of simplicity and tolerable facility in the discovery of genera, which perhaps, after all, is the chief object aimed at.

The main divisions were made wholly to depend on the character of the fruit, little or no regard being paid to vegetative differences. The first Division contained that small group whose spore-case splits into valves: the second that with entire spore-cases: the third included those mosses whose spore-cases open with a lid, but have no peristome; the fourth those which have a single peristome; the fifth those with a double peristome; while the generic characters turned on the position of the fruit, the form of the calyptra, and the number and form of the teeth of the peristome; while, yet again, the specific differences lay mainly in the disposition and form of the leaves. This arrangement has been abandoned in newer works, as it was thought to link together groups of plants which had not sufficient natural affinity; and others have been adopted with a view, if possible, of grouping the species together more naturally.

Whether or not this object has been attained in any sufficient measure by any one of the existing systems may well be doubted if we judge from the words of the Rev. M. J. Berkeley, who is "facile princeps" in Cryptogamic Botany; he says, "On the whole, the state of Bryology must be considered as extremely imperfect. The entire subject clearly wants the revision of some master-mind."—*Handbook of British Mosses*, 1863, Preface, p. 45.

The arrangement which he himself adopts in the *Handbook* "was (he says)

<sup>1</sup> *Schistostega pennata* or *osmundacea* "occurs in several parts of England in caverns which are illuminated by a golden-green light from the refractive property of its conerva-like shoots."—M. J. B. in "Treasury of Botany."

<sup>2</sup> Mungo Park. This celebrated traveller is said to have taken courage at the sight of *Fissidens bryoides*, a small British moss, when in the heart of Africa.

drawn up with a view to the mosses of the British Isles alone;" it is therefore precluded from adoption here. I am compelled, therefore, to adopt the arrangement followed by Mr. William Mitten in his enumeration of "The Mosses of the East Indies," Vol. I. of "The Proceedings of the Linnean Society," Botany, Supplement. If the expression used should appear to imply any idea of regret at the use of this arrangement, that regret has reference solely to my inability to offer an easier and more familiar arrangement here, and one more suited to the character of the work. For, however great may be the merits of the arrangement, as an approach to a natural grouping of the species (and Mr. Mitten's great experience of this Order of Plants and his acknowledged authority should be a sufficient guarantee that they are so), looked at artificially it certainly appears to be complicated and difficult, so that I altogether despair of making it intelligible. As, however, my small collection was incorporated in this arrangement some years ago by Mr. Mitten himself, and as he has now further kindly undertaken to do the same with a catalogue of mosses collected by the late Mr. Kurz, and named by a German Bryologist (which I found impossible to make agree with my own), I can but use his arrangement simply as it is and unexplained, or with such slight explanations as are in my power to give; and this I now accordingly do.

## MUSCI.

### \* I. HOMODICTYA.

Leaf-cells uniform in structure.

#### + SCHISTOCARPI.

Fruit splitting into valves.

Group *ANDRÆACEÆ*.

#### ‡ STEGOCARPI.

Fruit having a lid.

#### § ARTHRODONTI.

Groups.

- |                           |                           |
|---------------------------|---------------------------|
| 1. <i>DICRANÆÆ</i> .      | 9. <i>BRYÆÆ</i> .         |
| 2. <i>LEUCOBRYÆÆ</i> .    | 10. <i>HYPNÆÆ</i> .       |
| 3. <i>TRICHOSTOMÆÆ</i> .  | 11. <i>NECKERÆÆ</i> .     |
| 4. <i>GRIMMÆÆ</i> .       | 12. <i>LEUCODONTÆÆ</i> .  |
| 5. <i>ORTHOTRICHEÆÆ</i> . | 13. <i>LESKEÆÆ</i> .      |
| 6. <i>FUNARIÆÆ</i> .      | 14. <i>MNIÆÆ</i> .        |
| 7. <i>SPLACHNÆÆ</i> .     | 15. <i>HYPOTERYGIÆÆ</i> . |
| 8. <i>BARTRAMIEÆÆ</i> .   |                           |

### ¶ NEMATODONTI.

Groups.

- |                        |                          |
|------------------------|--------------------------|
| 1. <i>BUXBAUMIÆÆ</i> . | 2. <i>POLYTRICHEÆÆ</i> . |
|------------------------|--------------------------|

### • II. HETERODICTYA.

Leaf-cells diverse in structure.

#### 1. *SPLAGNÆÆ*.

- \* οὐὸς 'like' and ἐκτερον 'a net.' † σῆξω, σκατὸς 'split' and καρπὸς 'fruit.'  
 ‡ στέγος 'a covering' and καρπὸς 'fruit.'  
 § ἄρθρον 'a limb or joint' and ὀδὸν-ὀντος 'a tooth.'  
 || νῆμα 'a thread' and ὀδὸν-ὀντος 'a tooth.'  
 • ἕτερος 'other or different' and ἐκτερον 'a net.'

<sup>1</sup> One of the objections to the Analytical key above given seems to me, if I may be allowed to offer an opinion, to lie in the choice of words and terms. The first requirement in an analytical

## ANDREA, Ehrenberg.

This genus is the only one among mosses which has what has already been partially described as a *Schistocarpous sporangium*, or spore-case. It consists of very few species, four of which are natives of Great Britain, the rest being found in various parts of the world, but (with one or two remarkable exceptions for which geology has to account) always in Alpine or sub-Alpine countries. They are lowly-tufted plants, rarely exceeding two inches in length, with very minute leaves of a dark reddish-brown colour, in the mass looking almost black. I believe they are invariably found on granite or quartzose rocks. The *sporangium*, which is about the size of a small pin's head, is terminal and sessile. It has a mitriform *calyptra*, which becomes ruptured irregularly. The striking peculiarity of the genus, in which it differs from every other, is that, when ripe, the spore-case bursts into 4 (or 6-8, Berkeley) distinct valves, which, however, cohere at the summit. In this division of the spore-case into four valves, although these valves do not ultimately expand, *Andraea* approaches *Jungermannia*, of which we shall speak in due course.

*Andraea rupestris* (*petrophila*, Ehr.), with two or three more species, is found in the Himalayas, though, of course, only at a considerable elevation. I have not found it on our Burmese mountains, where it may possibly grow, though I doubt if they attain a sufficient height for it, their maximum being about 8000 feet. The exceptional locality for *Andraea*, above alluded to, is the plains of Germany, where, on granite rocks, Mr. Berkeley says, *A. Rothii* is found, with other Alpine mosses.

I have gathered this species on the granite rocks of Dartmoor in Devonshire. The genus receives its name from Andrea, a Hanoverian doctor.

Those who never visit the mountains of Burma are not very likely to have their attention drawn to the mosses of the country. They will, probably indeed, wonder where they are. In the hot weather they are completely dried up, and even in the rainy season, the number to be found in the plains is very small, and they are

title is, surely, that its terms be sharply antithetical; the second, that they shall convey, through their derivatives, the meaning which is meant to be conveyed by them, *clearly*; and, if possible, cover the whole meaning. Some of the terms above given do not answer to these conditions. Those for the primary division (supposing the division itself to be a good one, though it has the inconvenience of leaving nearly the whole of the Order on one side) are excellent; they are at once sharply opposed, and express exactly what it is meant they should, neither more nor less: viz. "leaf-cells uniform" and "leaf-cells not uniform."

We come now to the first subdivision and the word *Schistocarpi*, an excellent term in itself, as well expressing the distinctive character of the Group "*Andraceae*;" but its next opposite, *Stegocarpi*, labours under the difficulty, first, of not being clearly antithetical, and secondly, of being used to cover more than its meaning warrants. It means "fruit with a lid," and the recognized opposite to it, used in other systems, is "*Cleistocarpi*" "fruit closed," or "*fruit without a lid*." But this term finds no place here. The explanation given in the Preface is: "The *Chistocarpous* Order has been suppressed, because its component groups are referable to families of higher development." Doubtless this is so *naturally*, but being so, the term "*Stegocarpi*" should surely have been changed or omitted. It has no antithetical term, strictly speaking, and though its meaning is "with a lid," it is used to include those mosses which are without one! A simple change of term, such, for instance, as *Holocarpi*, or *whole-fruited*, would fairly have covered both those with a lid and those without one, and would at the same time have been sharply opposed to *Schistocarpi* or *split-fruited*.

To come to the farther subdivisions *Arthrodoniti* and *Xenutodonti*, the simple meaning of these two terms is "teeth-jointed" and "teeth like spun thread;" but they are explained to mean, the first: "Peristome with teeth built up of a triple series of agglutinated cells; the two outer series coloured, and often united in one; the inner, broader and thinner in texture, transparent, forming little transverse bars." The second: "Peristome composed of several layers of threads, free, or the inner ones united into a woven membrane; or, adhering by the points of their tooth-like processes to the edge of a drum-like membrane."

Now all this is a great deal more than the terms used can possibly signify; besides, the points or peculiarities described are far from being easy or simple.

Lastly, no explanation is afforded of the principles on which the very large groups of genera have been founded, farther than this, that "they are founded upon a difference in the mode of growth, or in the structure of the leaves."

It will, I think, be admitted that, however *natural* this Order or arrangement may be, coming in as an *artificial* system in aid of the natural, it does not commend itself for its facility to a beginner. This is the reason why, if it were possible, I would gladly have substituted some more simple system here.

for the most part minute and inconspicuous. *Garekea phascoides* (*Grimmia flexuosa* of Griff. Notulæ), with *Didymodon glaucus* and *Tortula cylindracea* (which Mitten says is a form of our common British *Weissia tenuirostris*), may be looked for on clay banks. *Bryum coronatum* is rather common on walls and old Pagodas. A small *Hypnum* or two, *H. Wrightii* and *H. Taroyense*, with *Steloma microcarpon* and *caudatum*, may be found frequently on trees; *Leskea investis* and two or three more on rocks and stones; but these are all small and scanty, hardly large enough to attract attention. The only two plants, perhaps, which are found in the neighbourhood of the towns worthy of description, are—

OCTOBLEPHARUM ALBIDUM, Hedwig.

This is one of the very few mosses which has eight teeth in the peristome. None are found with this number in Great Britain, nor, I believe, in Europe. We have a moss with four teeth—*Tetraphis*; but this too is a rare number, sixteen being by far the commonest, in fact the prevailing number, either in a single or double series.

*O. albidum* grows in small dense tufts of a glaucous colour, i.e. a very pale green, approaching to white. The individual plants are about a quarter of an inch high; stem simple; leaves linear, suddenly acuminate, nerveless, fleshy, spreading on all sides, not curled when dry. Spore-case terminal, ovate:—*peristome* consisting of eight broad teeth with an interval between them, and a line down the centre. *Operculum* beaked; *calyptra* dimidiate. Rather common on trees; easily detected by its whitish colour.

SCHISTOMITRIUM GARDNERIANUM, Mitten.

This is another small caespitose moss of a glaucous hue, smaller even than the last. Stem simple or nearly so, one-eighth of an inch high; leaves densely imbricated, lanceolate, pointed, nerveless. Spore-case on a very short stalk, cup-shaped or turbinate; *operculum* conical, long, straight, subulate; *calyptra* exceedingly long and subulate (awl-shaped), jagged and laciniated at the base, dimidiate; *peristome* none. The fruit is almost hid among the leaves. It forms large conspicuous patches, always, as found by me, immediately at the foot of large trees. Young-wine, near Maulmain.

This curious little moss is found nearly all over the world: in Nepaul, Madras, Hong-Kong, in Brazil (where Gardner first discovered it), and in Mexico at 3000 feet of elevation.

As mosses, though ubiquitous in small quantities, have their proper home in the temperate regions of the earth, where they reach their highest development, it is necessary to ascend the mountains, if our finer Burmese species would be found. There the fine branched *Hypna*, and the pendulous species of *Meteorium*, and others, may be found in fair profusion on the ground and festooning the trees.

Besides forms peculiarly Tropical, we find, there, at considerable elevations, a sprinkling of European species, such as *Sphagnum cuspidatum*, *Funaria hygrometrica*, and *Polytrichum* (*Pogonatum*) *aloides*.

As a detailed description of species is more than is contemplated in this work, also more than is likely to be required by the rising Bryologists of Burma, I shall bring this short sketch of the Order to a close with a brief description of the three European species last mentioned; and this I shall borrow chiefly from Mr. Berkeley.

SPHAGNUM, Ehrenberg.

*Sporangium* globose; *receptacle* elongated, fleshy; *peristome* none; lid convex, nearly flat; *calyptra* irregularly torn; leaf-cells of two kinds (*Heterodietya*), the one large, containing a spiral thread, the walls perforated between the spirals; the other linear, surrounding the first.

*S. cuspidatum*: Stem elongated, branches fasciculate (crowded at the end), attenuated, some deflexed, closely adpressed. Stem leaves ovate, acute, spreading; branch-leaves lanceolate, tapering; margin undulated when dry. Extremely variable.

*Sphagnum* is commonly known as "bog-moss;" it forms, as it decays, the principal ingredient in peat. There is but one genus of this group. "The species are difficult of definition, and are probably far less numerous than is supposed."

FUNARIA, *Hedwig*.

*Sporangium* obliquely pyriform, thick, subventricose; *apophysis* (a peculiar goitre-like swelling at the base of the sporangium of some mosses, absent from others), tapering into the foot-stalk, even, or furrowed when dry. *Ring* (round the base of the *peristome* in some mosses, detaching itself when the lid falls off), when present, large; *peristome* double, outer of 16 oblique teeth, connected at their tips by a small reticulated circular disk; inner a membrane divided into 16 lanceolate processes, opposite to the outer teeth, and slightly adherent at the base; *lid* plano-convex; *calyptra* swollen at the base, subulate above, at length split on one side.

*F. hygrometrica*: Upper leaves crowded, forming a bud-like mass, ovato-oblong, acuminate; nerve reaching to the apex; sporangium pyriform, incurved, deeply furrowed when dry; ring broad, at length revolute; fruit-stalk flexuous, and highly hygrometric. When in fruit, about one inch high. Extremely common, and found in most parts of the world.

POGONATUM, *Bridel*.

*Sporangium* oval or oblong, not angular (as in *Polytrichum*): *calyptra* densely hairy; teeth 32 united by their tips to a tympanoid (drum-skin like) membrane; leaves densely lamellate (having numerous lamellæ or thin plates on either side of the mid-rib).

*P. aloides*: Stem short, leaves lengthened, lanceolate, from a sheathing base, toothed, thick, pointed; sporangium soft, oblong; lid conical, acuminate. One to two inches high. Forming loose patches; affecting dry sandy places.



## SYSTEMATIC LIST OF BURMESE MOSSES.

## I. HOMODICTYA.

## SCHISTOCARPI.

ANDREA, *Ehrenberg*.  
(none yet discovered in Burma).

## \*STEGOCARPI ARTHRODONTI.

## DICRANEÆ.

GARCKEA, *Bridel*.

G. PHASCOIDES, C. Müll. Clay banks, Maulmain.

LEPTOTRICHUM, *Hampe*.

L. REINWARDTII, Mitt. On trees, Moollee-it, 6000 to 7000 feet.

TREMATODON, *Richard*.

T. SABULOSUS, Griff. On the ground, mountains.

LEUCOLOMA, *Bridel*.

L. TAYLORI, Mitt. On trees, plains.

L. TENERUM, Mitt. sp. nov. Maulmain.

L. EROSCUM, Mitt. sp. nov. Maulmain.

L. LUCINERVE, Mitt. sp. nov. Moollee-it.

DICRANUM, *Hedwig*.

D. SUBULATUM, Mitt. On the ground, mountains. No-a-la-bo,  
Tavoy, and Moollee-it.

D. UNCINATUM, Harv. Moollee-it.

DIDYMOBON, *Hooker*.

D. FLACCIDUS, Mitt. On the ground, Maulmain.

HOLOMITRIUM, *Bridel*.

H. CUCULLATUM, Mitt. sp. nov. Mountains.

## LEUCOBRYEÆ.

OCTOBLEPHARUM, *Hedwig*.

O. ALBIDUM, Hedw. Trees, common, Maulmain.

O. SERRATUM = TAYLORIA INDICA. Among moss, on rocks, mountains.

LEUCOBRYUM, *Hampe*.

L. JAVENSE, Mitt. Moollee-it. No-a-la-bo (Ox's hump).

L. WIGHTII, Mitt. On rocks, Maulmain.

SCHISTOMITRIUM, *Dozy and Molkenboer*.

S. GARDNERIANUM, Mitt. Foot of trees, Young-wine, Maulmain.

## TRICHOSTOMEÆ.

TORTULA, *Hedwig.*

- T. CYLINDRICA, Mitt. Maulmain.  
*Weissia tenuirostris.*  
 T. INDURATA, Mitt. sp. nov. Mountains.

HYMENOSTYLIUM, *Bridel.*

- H. INTERRUPTUM, Mitt. sp. nov. Mountains.

SYRRHOPODON, *Hooker and Greville.*

- S. FASTIGIATUS, Dozy and Molk. Mountains.

CALYMPERES, *Swartz.*

- C. SEMILIBERUM, Mitt. sp. nov. Trees. Tavoy.  
 C. PARISHII, Mitt. sp. nov. Tavoy.  
 C. PROBOSCIDIÆ, Mitt. Tavoy.  
 C. VARIUM, Mitt. sp. nov. Tavoy.

## GRIMMIEÆ.

GRIMMIA, *Ehrenberg.*

- G. CANESCENS, Mitt. Moollee-it.

## ORTHOTRICHEÆ.

MACROMITRIUM, *Bridel.*

- M. NIPALENSE, Mitt. Schw. Tavoy.  
 M. PARISHII, Mitt. sp. nov. Tavoy.  
 M. CALYMPEROIDEUM, Mitt. sp. nov. Tavoy.  
 M. MOORCROFTII, Schw. Mountains.  
 M. SULCATUM, Brid. Moollee-it.  
 M. INTRICATUM, Mitt. sp. nov. Moollee-it. Tavoy.

## FUNARIEÆ.

ENTOSTHOION, *Schweinitz.*

- E. WALLICHII, Mitt. Crevices of granite, Moollee-it.

FUNARIA, *Schreber.*

- F. HYGROMETRICA, Dill. On the ground, in Toung-yas.

## SPLACHNEÆ.

TAYLORIA, *Hooker.*

- T. INDICA, Mitt. On rocks between Kau-kereet and Mya-wa-dee.

## BRYEÆ.

BRYUM, *Dillenius.*

- B. ROSEUM. On the ground, Moollee-it.  
 B. FILIFORME, Mitt. Mountains.  
 B. CORONATUM, Schw. Walls, old pagodas, Maulmain.  
 B. RUBENS? Mitt. Mountains.  
 B. NIPALENSE, Mitt. On the ground, Ta ôk, 4000 feet.

## HYPNEÆ.

HYPNUM, *Dillenius.*

- H. TAVOYENSE, Hook. Common on trees about Maulmain.  
 H. WIGHTII. On trees, Maulmain.

METEORIUM, *Bridel*.

M. WIGHTII, Mitt.	On trees, mountainous districts.
M. ARBUSCULUM, M. sp. nov.	On trees, mountainous districts.
M. SPARSUM, M.	On trees, pendulous, mountainous districts.
M. DIVERGENS, M.	On trees, pendulous, mountainous districts.
M. SQUARROSUM, M.	On trees in damp shady jungles.
M. MEDIUM, M.	On trees, mountains.
M. CORDATUM, M.	On trees, mountains.
M. MOLLISSIMUM, M.	On trees, pendulous, mountains.

STEREOBON, *Bridel*.

S. JULIFORMIS, M.	On decayed wood, Maulmain.
S. INFLEXUS, M.	On trees, Maulmain.
S. CAPILLACEUS, M.	At 6-7000 feet, very scarce.
S. CURVIROSTRIS, M.	Trees, ?
S. BUTENZORGH, M.	On trees, mountains.
S. COMPRESSIFOLIUS, M. sp. nov.	Moolee-it.
S. CYPEROIDES, M.	Dauna-toung, 4-5000 ft.
S. APPRESSUS, M.	On trees, Maulmain.
S. NIPALENSIS, M.	Maulmain and Martaban.
S. ORTHOTHECIUS, M.	On trees, mountains.
S. ROSTRATUS, M.	Trees, ?
S. LIGNICOLA, M.	On trees, Maulmain.
S. ALBESCENS, M. a minute species, mixed with <i>Octoblepharum albidum</i> .	
S. PREMOLLIS, C. Müll.	Moolee-it.
S. ACUTIRAMEUS, M.	Mountains.
S. Plicatus, M.	Mountains.
S. ERINACEUS, M.	On trees, pendulous, mountains.
S. ERRATICUS, M.	On trees, mountains.
S. MACROCARPUS, M.	Rocks and trees, mountains.
S. TENUIS, M.	Rocks and trees, mountains.
S. UNCFOLIUS, Mitt. sp. nov.	On trees, pendulous, mountains.
S. GLAUCOCARPUS, Mitt.	On trees, mountains.
S. RUGICUSPIDATUS, Mitt. sp. nov.	Mountains.
S. CESPITULOSUS, Mitt. sp. nov.	Mountains.
S. TRACHYCARPUS, Mitt. sp. nov.	Mountains, mixed with <i>S. crinaceus</i> .

SAULOMA, *Hook. fil. and Wilson*.

S. MICROCARPON, Mitt.	On Jack-tree in my garden, Maulmain, P.
S. CAUDATUM, Mitt. sp. nov.	On trees, Maulmain.

## NECKERELLA.

NECKERA, *Hedwig*.

N. FLABELLATA, Mitt.	loc. ?
N. VITTATA, Mitt.	loc. ?
N. RECTIFOLIA, Mitt.	On trees, mountains.
N. ACUTATA, Mitt.	On trees, mountains 5000 to 6000 feet.
N. PARISHII, Mitt. sp. nov.	On trees, mountains 5000 to 6000 feet.
N. PROCLADA, Mitt.	On trees, mountains.
N. ALOPECUROIDES, Mitt.	On trees, mountains.

## LESKEA.

TRACHYPUS, *Schweinitz*.

T. BICOLOR, Schw.	On trees, mountains.
T. FUSCESCENS, Mitt.	On trees, mountains, pendulous.
T. CRISPATULUS, Mitt.	On trees, mountains, pendulous.



## I. JUNGERMANNIACEÆ (Scale Mosses).

"Creeping moss-like plants, either with imbricated, very cellular leaves surrounding a central axis, or with leaves and axis fused into a common leafy expansion, *i.e.* either leafy or frondose. Spore-cases 1, 2 or 4 valved, erect, with elaters."—Lindley.

By far the larger portion of the plants of this Order have distinct leaves of a very moss-like character, though arranged on a different plan from those of mosses—they are also more delicate in texture and are lobed and cut into an endless variety of forms, and are always nerveless. Their chief character, however, by which they may be at once known from mosses, is the spore-case, which is globose, elevated on an exceedingly delicate and translucent stalk, and, when ripe, bursts open into four distinct and expanded valves, having its green spores mixed with separate *elaters*, or double thread-like spiral bodies which assist in their dispersion.

A very much smaller portion has a frondose thallus (or simple leafy expansion) and a single valved spore-case split on one side, or a 2-valved one, with a central columella.

The word *Hepatica* or *Liverwort* is really only applicable to those plants of this group which have such a flat frondose thallus; the name having been applied, in the first instance, I believe, to *Marchantia polymorpha*, a common British plant of just such a character, from a fancied resemblance, or supposed medicinal virtue.

## I. FOLIOSÆ.

1. *Leaves succubous*.<sup>1</sup>

JUNGERMANNIA, *Linnaeus*.

J. (PLECTOCOLIA, Mitt.) POLYRRHIZA, Hook.

J. (PLECTOCOLIA, Mitt.) ABIADNE, Taylor.

J. (ANTHELLA, Dumont) HIRIELLA, Weber.

PLAGIOCHILA, *Nees von Esenbeck*.

P. NIPALENSIS, Ldbg.

P. FRUTICOSA, Mitt.

P. FLABELLATA, Mitt.

P. PARVIFOLIA, Ldbg.

P. MICRODONTA, Mitt.

CHILOSCYPHUS, *Corda*.

C. COALITUS, *Nees*.

C. ARGUTUS, *Nees*.

2. *Leaves incubous*.<sup>1</sup>

PHYSOTIUM, *Nees von Esenbeck*.

P. SPHAGNOIDES, *Nees*.

P. ACINOSUM, Mitt.

SENDTNERA, *Endlicher*. (SEHISMA, Dumont).

S. JUNEPERINA, *Nees*.

S. DICRANA, Taylor.

LEPIDOZIA, *Nees von Esenbeck*.

L. FLEXUOSA, Mitt.

MASTIGOBRYUM, *Nees*. (BAZZANIA, Gray).

M. PRÆRUPTUM, *Nees*.

M. TRIDENS, *Nees*.

M. CONCAVULA, Lind.

<sup>1</sup> *Succubous* = imbricated in such a manner that the upper edge of each leaflet *underlies* that next to it in succession. *Incubous* = the upper edge of each *overlying* that next to it.

PTYCANTHUS, *Nees von Esenbeck.*P. STRIATUS, *Nees.*LEJEUNIA, *Gottsche and Ldbg.*L. (PHRAGMICOMA, *Dumont*) UNDULATA, *Mitt.*L. (PHRAGMICOMA) REPLETA, *Taylor.*L. (PHRAGMICOMA) ADPLANATA, *Nees.*L. FLEXUOSA, *Mitt.*FRULLANIA, *Raddi.*F. GRACILIS, *Nees.*

## II. FRONDOSÆ.

SYNHYMENIUM, *Griffith.*S. AUREO-NITENS, *Griff.*ANTHOCEROS, *Micheli.*A. LEVIS, ? *Hook.*MONOCLEA, *Hooker.*M. CRISPATA, *Hook.*

## II. MARCHANTIACEÆ (Liverworts proper).

“Spore-cases valvate, seated on the underside of a stalked target-shaped disk. Spores mixed with elaters.”—M. J. Berkeley.

Green frondose expansions growing on damp ground.

DUMORTIERA, *Nees von Esenbeck.*D. NIPALENSIS, *Nees.*

## III. RICCIACEÆ (Crystal Worts).

“Spore-cases valveless, either sunk in the frond or seated on its surface. Spores not mixed with elaters.”—M. J. B.

Although I have not gathered any plants of this order, for want of attention to it, it cannot be reasonably doubted but that some are to be found in Burma.—P.

MUSCI.<sup>1</sup>

## COMBINED LIST OF BURMESE MOSSES.

## DICRANEÆ.

ARCHIDIUM, *Bridel.*A. INDICUM, *Hampe.*A. BIRMANICUM, *Mitten.*

<sup>1</sup> The reason for giving two distinct lists of mosses is this:—Mr. Theobald sent me a list of mosses collected by the late Mr. Kurz and named by two German Bryologists—Müller and Hampe—for combination with my own. On comparing the two, I was struck by the remarkable fact that in no single instance were the names identical! It naturally forced itself upon my mind that, at least in some cases, different names must have been given to the same plants. As I was quite unable to combine the two lists, I had recourse to my old friend Mr. Mitten (already mentioned), who kindly undertook the task. After a delay of some weeks, this second list, as here presented, combining Mr. Kurz's collection and mine, was returned to me. But—such appears to be the unsettled nomenclature of Bryology—I was unable to recognize many of my old friends in their new dress! In many instances, the old familiar names had vanished, and new and unfamiliar names were substituted. The order, moreover, and arrangement were seen to be different. Therefore, as my remarks on this family of Plants were already written, I have thought it best to give my own list, as originally arranged by Mr. Mitten himself some years ago; and, next, the combined list according to the new arrangement. By way of accounting, in some measure, for the remarkable discrepancy between Mr. Kurz's mosses and mine, I may mention, that mine were wholly collected in the Tenasserim Provinces, and Mr. Kurz's in Pegu and Upper Burma.—P.

G. PHASCOIDES, Hook.  
GARCKEA, *C. Mueller.*

DICRANELLA, *C. Mueller.*  
D. (LEPTOTRICHUM) KHASIANA, Mitt.  
D. SUBCOARCTATA, C. Muell.

TRIMATODON, *Rich.*  
T. CONFORMIS, Mitt.  
T. KURZII, Hampe.  
*Indicus*, Mitt.

CERATODON, *Bridel.*  
C. STENOCARPUS, Mont.

SYMBLEPHARIS, *Montagne.*  
S. (DICRANUM) REINWARDTII, Dozy and Molke.

HOLOMITRIUM, *Bridel.*  
H. CUCULLATUM, Mitt.

DICRANODONTIUM, *Schimper.*  
D. (THYRSOMITRIUM) INCINATUM, Harvey.  
(*Didictyon*, Hampe.)

DICRANUM, *Hedwig.*  
D. SUBREFLEXUM, C. Muell.

CAMPYLOPUS, *Bridel.*  
C. ERICOIDES, Griff.  
C. GOUGHII, Mitt.  
C. KURZII, Hampe.  
C. RIGIDISSIMUS, C. Muell.  
C. SUBULTEUS, Mitt.

PLECILOPHYLLUM, *Mitten.*  
(*Leucoloma*, *Bridel.*)  
P. (SYRRHOPODON) TAYLORI, Schr.  
P. TENERUM, Mitt.  
P. EROSUM, Mitt.

LEUCOBRYEÆ.  
OCHROBRYUM, *Mitten.*  
O. KURZIANUM, Hampe.  
O. SUBULATUM, Hampe.  
O. (SCHISTOMITRIUM) GARDNERIANUM, C. Muell.

OCTOBLEPHARUM, *Hedwig.*  
O. ALBIDUM, Hedw.

LEUCOBRYUM, *Hampe.*  
L. EXSERTUM, Hampe.

PEGOPHYLLUM, *Mitten.*  
P. JAVENSE, Brid.  
P. WIGHTII, Mitt.

GRIMMIEÆ.  
GRIMMIA, *Ehrenberg.*  
G. CANESCENS, Hoffm.

## SYRRHOPODONTÉE.

SYRRHOPODON, *Schweinitz*.

S. FASTIGIATUS, Doz. and Molk.

S. KURZII, Muell.

THYRIDIDIUM, *Mitten*.

T. GRACILE, Mitt.

CALYMPERES.

C. SEMILIBERUM, Mitt.

C. VARIUM, Mitt.

C. PARISHII, Mitt.

C. MOLUCCENSIS, Schw.

## TORTULÉE.

TAPEINODON, *Mitten*.

T. (WEISSIA) FLACCIDUS, Harv.

HYMENOSTYLUM, *Bridel*.

H. VERRUCOSUM, Mitt.

H. INTERRUPTUM, Mitt.

TORTULA, *Hedwig*.

T. (WEISSIA) CYLINDRICA, Bruch.

T. INDURATA, Mitt.

T. TENASSERIMICA, Mitt.

T. (TRICHSTOMUM) TOPOPHACEA, Brid.

T. (TRICH.) ORIENTALE, Willd.

T. (BARBULA) BORONGENSIS, Hampe.

T. (BARB.) ACUTISSIMA, C. Muell.

T. (BARB.) SELENOCARPA, C. Muell.

T. GANGETICA, C. Muell.

HYOPHILA, *C. Mueller*.

H. BURMENSIS, Hampe.

H. HARVEYANA, Hampe.

## ORTHOTRICHÉE.

MACROMITRIUM, *Bridel*.

M. NIPALENSE, Hook.

M. PARISHII, Mitt.

M. CALYMPEROIDEUM, Mitt.

M. MOORCROFTII, Schw.

M. SULCATUM, Hook.

M. INTRICATUM, Mitt.

M. DENSUM, Mitt.

M. ELLIPTICUM, Hampe.

CRYPTOCARPUS, *Dozy and Molkenboër*.

C. MARGINATULUS, C. Müell.

## FUNARIEE.

PHYSCOMITRIUM, *Bridel*.

P. PULCHELLUM, Griff.

EXTOSTHODON, *Schweinitz*.

E. WALLICHII, Mitt.

FUNARIA, *Schreber*.

F. LEPTOPODA, Griff.

F. HYGROMETRICA, Hedw.

## SPLACHNEÆ.

TAYLORIA, *Hooker.*

T. INDICA, Mitt.

## BARTRAMIEÆ.

BARTRAMIA, *Hedwig.*

B. LONGICOLLIS, Hampe.  
 B. MOLLICULA, C. Muell.  
 B. TRICHOPHYLLA, C. Muell.  
 B. SUBLEVISSIMA, C. Muell.  
 B. HOMOMALLA, C. Muell.  
 R. PROFUNDIFOLIA, C. Muell.  
 B. RHIZOGONOIDEA, C. Muell.  
 B. ANGUSTA, Mitt.

## BRYEÆ.

BRACHYMENIUM, *Schweinitz.*

B. NIPALENSE, Hook.

BRYUM, *Dillenius.*

B. CORONATUM, Schw.  
 B. DOLIOLUM, Dabq.  
 B. FLAVIDUM, C. Muell.  
 B. BURMENSE, Hampe.  
 B. PINETORUM, C. Muell.  
 B. PILIFORME, Mitt.  
 B. ROSEUM, Schreb.

ORTHOMNIUM, *Wilson.*

O. TRICHOMITRIUM, Wils.

MNIUM, *Dillenius.*

M. RHYNCHOPHORUM, Hook.

RHIZOGONIUM, *Bridel.*

R. SPINIFORME, Hedw.

## HYPOPTERYGIEÆ.

CYATHOPHORUM, *Bridel.*

C. ADIANTUM, Griff.  
 C. KURZIANUM, Hampe.

## HOOKERIEÆ.

CALICOSTELLA, *Mitten.*

C. PAPILLATA, Mont.

DISTICHOPHYLLUM, *Dozy and Molkenboer.*

D. MOLLE, Mitt.

## NECKEREÆ.

METEORIUM, *Bridel.*

M. WIGHTII, Mitt.  
 M. SCABRIUSCULUM, Mitt.  
     *Neckera camptoclada,*  
     *N. dieranoblasta,* C. Muell.  
 M. (NECKERA) LANCEOLATUM, C. Muell.  
 M. ARBUSCULUM, Mitt.

M. SPARSUM, Mitt.  
 M. DIVERGENS, Mitt.  
 M. MEDIUM, Mitt.  
 M. CORDATUM, Mitt.  
 M. MOLLISSIMUM, Mitt.  
 M. CRINITUM, C. Muell.  
 M. NEMATOSUM, C. Muell.  
 M. CRASSUM, Wils.

TRACHYPUS, *Schweinitz.*

T. BICOLOR, Schw.  
 T. FUSCESCENS, Mitt.  
 T. CRISPATULUS, Hook.

NECKERA, *Hedwig.*

N. PARISHII, Mitt.  
 N. FIMBRIATA, Harv.  
 N. ACUTATA, Mitt.  
 N. HIMALAYANA, Mitt.  
     *N. Burmensis*, Hampe.  
 N. UROCLADA, Mitt.  
 N. SUBRUGULOSA, Hampe.  
 N. SUBINTEGERRIMA, Hampe.  
 N. LACERIDENS, Hampe.

POROTRICHUM, *Bridel.*

P. ELEGANTULUM, Mitt.  
 P. ALOPECUROIDES, Hook.  
 P. VITTATUM, Mitt.  
 P. GLOSSOPHYLLUM, Mitt.  
 P. BURMANICUM, Mitt.  
 P. (NECKERA) JAVANICUM, C. Müll.

HOMALIA, *Bridel.*

H. ROTUNDATA, Hampe.  
 H. BIFORMIS, Hampe.  
 H. EROSA, Hampe.  
 H. PENNATULA, Mitt.

## SEMATOPHYLLÆ.

MEIOTHECTUM, *Mitten.*

M. (PTEROGONIUM) MICROCARPUM, Harv.

CHIONOSTOMUM, *C. Mueller.*

C. (NECKERA) ROSTRATUM, Griff.

ACROPORIUM, *Mitten.*

A. ACUTIRAMEUM, Mitt.

ISOCALPE, *Mitten.*

I. (NECKERA) CAPILLACEA, Griff.  
 I. (STEREODON) UNCIFOLIOLA, Mitt.

ACANTHOCOMA, *Mitten.*

A. RUGICUSPIDATUM, Mitt.  
 A. (STEREODON) SURCULARIS, Mitt.  
 A. (STEREODON) PILOSULUS, Mitt.

RHAPHIDORHYNCHUM, *Schimper.*

R. CESPITULOSUS, Mitt.  
 R. PREMOLLIS, Mitt.

## STEREODONTEÆ.

ISOPTERYGIUM, *Mitten*.

- I. (STEREODON) LIGNICOLA, Mitt.  
 I. ALBESCENS, Hook.  
 I. DISTICHACEUM, Mitt.  
*Hypnum pycnopteron*, C. Muell.  
 I. SUBPALLIDUM, C. Muell.

RAGROTHECIUM, *Schimper*.

- R. NEMORALE, Mitt.

## LEPTOHYMENIUM.

- L. (PTEROGONIUM) JULACEUM, Hook.

PTEROGONIUM, *Swartz*.

- P. INFLUXUM, Harv.  
 P. CAUDATUM, Mitt.

ENTODON, *C. Mueller*.

- E. PLICATUS, C. Muell.

SYMPHYODON, *Mont*.

- S. TRACHYCARPUS, Mitt.  
 S. ERRATICUS, Mitt.  
 S. ERINACEUS, Mitt.  
 S. DIVARICATUS, Mitt.  
 S. ELLIPTICUS, Mitt.  
 S. (ENTODON) PERPURASCENS, C. Muell.

TRICHOPELMA, *Mitten*.

- T. (NECKERA) TENUE, Hook.  
 T. (LEPTOHYMENIUM) NATTOUNGENSE, C. Muell.  
 T. (HYPNUM) MACROCARPUM, Hbthsch.  
 T. (HYPNUM) ORTHOTHECIUM, Schw.

CAMPYLIUM, *Sull*.

- C. GLAUCOCARPUM, Hbthsch.

ECTROPOTHECIUM, *Mitten*.

- E. (STEREODON) ASSAMICUM, Mitt.  
 E. COMPRESSIONIFOLIUM, Mitt.  
 E. APPRESSUM, Mitt.  
*Hypnum protractile*, C. Muell.  
 E. BUTENZORGH, Bel.  
 E. CYPEROIDES, Hook.  
 E. RETICULATUM, Dozy and Molk.  
*Hypnum succosum* and  
*crassi-reticulatum*, C. Muell.

TAXITHELIUM, *Spruce*.

- T. (HYPNUM) NIPALENSE, Hook.  
 T. TRACHYLOPHYLLUM, C. Muell.  
 T. MICROCLADUM, C. Muell.  
 T. SAXOPHILUM, C. Muell.

## HYPNÆÆ.

STEREOPHYLLUM, *Mitten*.

- S. (HYPNUM) TAVOYENSE, Hook.  
 S. WIGHTII, Mitt.  
 S. (PLATYHYPNUM) YOMAHENSE, Hampe.

RHYNOSTEGIUM, *Schimper.*

- R. SUBVAGANS, Hampe.  
R. CYLINDROTHECIUM, C. Muell.

ANOMOBON, *Hooker.*

- A. FUSCINERVIS, C. Muell.

THUIDIUM, *Schimper.*

- T. (LESKEA) INVESTE, Mitten.  
    *Cyrtohypnum adicollum*, Hampe.  
T. CYMBIFOLIUM, Doz. and Molk.  
T. TRACHYPODON, Mitt.  
    *Cyrtohypnum cygnisetum*, Hampe.  
T. TRACHYACRON, C. Muell.  
T. GLAUCINUM, Mitt.  
T. PRIONOPHYLLUM, C. Muell.

## SKITOPHYLLEÆ.

FISSIDENS, *Hedwig.*

- F. ANOMALUS, Mont.  
F. AREOLATUS, Griff.  
F. CIRCINALIS, Mitt.  
    *F. flaccidus*, C. Muell.  
F. PLANIFOLIUS, C. Muell.  
F. DIVERSIFOLIUS, Mitt.  
    *F. urceolatus*, Hampe.  
F. CORNULUS, C. Muell.  
F. PERPUSILLUS, Thw. and Mitt.  
F. MINUTUS, Thw. and Mitt.  
    *F. spathulatus*, C. Muell.  
F. SUBCRENULATUS, Hampe.  
F. PAPILLOSUM, Thw. and Mitt.  
    *F. granulatus*, Hampe.  
F. ATRICULATUS, C. Muell.  
F. SUBSPATHULATUS, Hampe.  
F. LUTESCENS, Hampe.  
F. CROCATUS, Hampe.  
F. CRASPIDOPHYLLUS, C. Muell.  
F. BORONGENSIS, Hampe.

## POLYTRICHEÆ.

POGONATUM, *Bridel.*

- P. HUMILE, Mitt.  
P. ALOIDES, Brid.  
P. GYMNOPHYLLUM, Mitt.  
P. RUFISETUM, Wils.  
P. MACROSTOMUM, Brown.  
P. BURMENSE? Hampe.

## SPHAGNEÆ.

SPHAGNUM, *Dillenius.*

- S. CUSPIDATUM, Ehrh.

Species enumerated by C. Mueller and Hampe amongst those collected by Kurz, but not known to Mr. Mitten.

- MILDEA HAMPEANA, C. Muell.  
DICTYOPTERON FALCATUM, C. Muell.

CHETOMITRIUM SCOTTIANUM, C. Muell.  
 ROZIA DECOLORATA, C. Muell.  
 PLATY-HYPNUM MEGABLASTUM, C. Muell.  
 HYPNUM MARCIDULUM, C. Muell.  
 H. ROBUSTI-PINNATUM, C. Muell.  
 H. FULVO-NITENS, C. Muell.  
 H. REFLEXULUM, C. Muell.  
 DREPANO-HYPNUM SUBLEIOPHYLLUM, Hampe.  
 D. SCABRUSCULUM, Hampe.  
 D. PUNCTULATUM, C. Hampe.  
 D. VARIIFLEXUM, Hampe.  
 D. PRIONOTRICHUM, C. Muell.  
 D. CURVATIRAMEUM, C. Muell.

Order CHARACEÆ.<sup>1</sup>

Acotyledonous plants, cellular, aquatic. *Stems* tubular, jointed, naked or surrounded by several parallel elongated cells. *Branches* whorled, on a level with the joints. *Reproductive organs* antheridia and sporangia, borne on the branches.

*Characeæ* often exhale a fœtid alliaceous odour, and their transparent rhizome is fixed in the mud of stagnant and running water, by filiform tubular rootlets. The plant is sometimes reproduced by the lower nodes of the stem being converted into starchy tubers.

CHARA, *Linnaeus*.

C. GYMNOPIYIS, A. Brongn. In paddy fields along the Koladyne Valley.

NIFELLA, *Agardh*.

N. ROXBURGHII, A. Brongn. Kyā-eng, Pegu.  
 N. MICROGLOCHIA, A. Brongn. Arakan. Swamps on the Koladyne River.  
 N. OLIGOSPIRA, A. Brongn. Kyā-eng, Pegu.

Order EUISETACEÆ (Horsetails).<sup>2</sup>

A singular order of leafless Aerogens with hollow jointed stems which are simple or branched. The place of leaves is taken by a membranous sheath at every joint, completely surrounding the stem or branch in a whorl, and is divided either into a number of small teeth like a saw, or into fewer and more elongated lobes. Any one who has noticed the Casuarinas, which are so common on the sandy sea-shores of Burma, may be said to have seen a gigantic equisetum. It is impossible to look at the branches of this singular tree without seeing the likeness at once. Their jointed branchlets (for they are leafless too), harsh to the touch like an Equisetum, with toothed sheaths also at the joints, suggest that plant at once. They are, however, in all but this accidental though obvious similarity, widely different plants.

The fructification of Equisetum (the only genus) is in the shape of a terminal cone, commonly about  $\frac{3}{4}$  to 1 inch in length, consisting of a number of peltate, or shield-like scales, attached to a central axis, packed closely together by their edges, the flat shield-like surface being outwards. As the cone ripens and expands, the edges of the

<sup>1</sup> "A family of plants generally classed among the Alge, but which, from the character of their reproductive organs, perhaps demand a more elevated position. They are remarkable for their well-known circulation, first discovered by Corti. The Characeæ are aquatic plants of filamentous structure, exhibiting elongated axes furnished at intervals with whorls of branches."—Griffith and Henfrey, Micrograph. Dictionary.

<sup>2</sup> "Tubular, symmetrically branched bodies, multiplied by spiral coated nucleoli, filled with starch."—Lindley, Veg. Kingdom.

<sup>3</sup> The present account of the Ferns and Fern allies of Burma is drawn up and arranged by the Rev. C. Parish, but the localities from the Nicobar group have been added from a paper on the vegetation of the Nicobar Island in the Journal of the Asiatic Society of Bengal, 1876, Part II. p. 105, and where a species has been added on the authority of Kurz the letter [K.] indicates the fact.

scales separate, and show a circle of spore-cases on their under-surface, each of which opens by an internal slit and discharges the spores. These spores are remarkable for being surrounded by two spiral filaments called *claters*,<sup>1</sup> which are coiled tightly round them. When uncoiled, which in a dry state of the air they will become, these filaments are seen to be attached by their centre to a common point of the spore, so as to make them look like four legs, each with a swollen termination like a foot, bearing the spore at their point of junction. They are highly hygrometric, and if a number of them be laid on a piece of glass under a microscope, and breathed upon and allowed to dry alternately, they may be seen to twist and untwist themselves and wriggle about as if they were endowed with life.

Equiseta are humble plants, two or three feet high, though occasionally attaining a larger size. They appear to be the degenerate descendants of gigantic ancestors, which under the names Calamite and Stigmaria are now found (together with gigantic Lycopodia) fossilized in our Coal-measures.

They are rigid, hard, plants, rough to the touch, owing to the quantity of siliceous matter which their cuticle contains. In *Equisetum hyemale* this is so great as to make it useful for polishing furniture and metals, for which purpose it is sold under the name of Dutch-rush. A section of this cuticle, when submitted to a microscope and viewed by polarized light, forms a very beautiful object: the crystals of silica are clearly seen arranged in rows running parallel with the axis of the stem.

Equiseta have been generally classed near to Ferns, being considered their near allies; but Lindley says that "their relation to Ferns is not obvious." In the possession of claters they resemble *Jungermanniaceæ* and *Marchantiaceæ*—and, as he says, "the resemblance between the peltate scales of *Equisetum* and the umbrella-like heads of the spore-cases in *Marchantia* is too obvious not to strike the most unpractised observer." It is with these that he thinks *Equisetum* has its nearest affinity.

I have found one species, and but one, in Burma :

EQUISETUM, *Linnaeus*.

E. DEBILE, Roxb.

#### Order LYCOPODIACEÆ (Club-mosses).

An order of Acrogens, with one- to three-celled axillary spore-cases or thecæ, without any jointed ring. Reproductive bodies all of one kind.

LYCOPodium,<sup>2</sup> *Linnaeus*.

Erect, pendulous, or creeping plants, with closely imbricated, narrow, rigid leaves, and a swollen or club-shaped termination, in the axils of the scales of which the thecæ, or spore-cases, are situated. Spore-cases kidney-shaped, one-celled, opening by two valves, many-seeded. The fruit-heads or club-like terminations are sometimes branched, as in *L. clavatum*. They may be likened to large mosses, or to diminutive fir-trees; indeed, "they are intermediate between ferns and cone-bearing trees on the one hand, and between ferns and mosses on the other" (Lindley).

They are the dwarf representatives of the gigantic *Lepidodendron* and *Sigillaria* which flourished in the forests of the primæval world, and the fossil remains of which are found abundantly in our Coal-measures.

<sup>1</sup> Elater—ἐλάτηρ, placenta genus. Placenta, botanically, is that part of the interior of an ovary where the ovule originates: or the name may be given from the meaning of the Greek word for "to drive," because it scatters or propels the spores.

I have used the word *clater* here for the spiral threads of the spores of *Equisetum* because Lindley uses it, but they are both structurally and morphologically different from the proper elater of *Jungermanniaceæ*. In the former, they are attached to the spore, and according to Berkeley are but the splitting up the outer coat of the spore—"nothing more than the unrolled spiral of which that outer coat consists." Whereas, in the latter, they are wholly independent bodies, attached to the valves of the spore-cases, and instead of being simple threads, are elongated sausage-like hyaline sacs, in which a double spiral lies coiled up.

<sup>2</sup> Lycopodium. *λέκος*, a wolf, and *πῶς-ποδός*, foot - from a fancied resemblance.

As to ferns, so to Lycopods, medicinal virtues have been ascribed. "The most remarkable plant of the order is the *Yatum condenado*. *Yatum*=Great Devil and *condenado*=accursed—which appears to be *L. rubrum* of Chamisso. Sir W. Hooker, who calls it *L. catharticum*, states that it acts most vehemently as a purgative, and has been administered successfully in Spanish America in cases of Elephantiasis."—Lindley.

One of the most curious uses is that to which the spores of *L. clavatum* are put. In consequence of their highly inflammable nature, they are used, under the name of "Vegetable Brimstone," to produce stage lightning. Apothecaries also are said to roll pills in the powder to keep them from sticking to one another.

*Lycopodium clavatum* is a long straggling terrestrial species, common also in Europe. *L. phlegmaria* is an epiphyte, and may be not unfrequently seen hanging from trees in shady jungles to the length of 12 to 18 inches. *L. involvens* or *circinale* (as I take the plant to be which grows on Zwā-ga-hyn) is a small, terrestrial, tufted, caespitose species, with rather rigid tripinnate branches growing round a common central root. It is possessed of extraordinary hygrometric properties. When wet, it lies expanded; but when dry, either out of doors in the hot sun, or indoors in a dry room, it rolls itself up into a round ball. In consequence of this property, it was quite an unmanageable specimen for the Herbarium, so, not being placed among the other species, it has been unfortunately mislaid and lost. I cannot, therefore, speak positively of it, but, in appearance, it corresponds exactly to the two figures of *L. lepidophyllum* of Hooker, *Icones Plantarum*, Vol. II. tab. clxii. and clxiii. But that it is there said to be a native of Mexico, I should have pronounced it to be that species; which, indeed, it may possibly be, notwithstanding the distance of the two localities.

*L. CLAVATUM*, L.

*L. PHLEGMARIA*, L.

*L. CERNUUM*, L.

(var. *curvatum*, Sw. Kamorta, *fide* Kurz.)

*L. LAXUM*, Presl. Kamorta, *fide* Kurz.

*L. SQUARROSUM*, Forster

*L. OBTESIFOLIUM*, Hamilton.

(*Hamiltonii*, Spring.)

*L. INVOLVENS*, Sw.

#### SELAGINELLA,<sup>1</sup> *P. de Beauv.*

Though of the same natural order, *Selaginella* present a totally different appearance from *Lycopodia*. Instead of the hard rigid habit of the latter, they are plants of a thin and delicate texture, and are distinguished by their much-branched trailing stems, which are flat, and have their innumerable small leaflets bilaterally disposed. Their fructification consists of axillary two- to three-valved thecae, borne on terminal scaly spikes. A small and uninteresting species, *S. Blangieri*, is common on wet clayey banks, and is only two or three inches long; but the larger kinds, when they find a suitable habitat, form large tangled masses, and are very beautiful objects. At Way-ta-ma-yaing, south-east of "The Three Pagodas," I have waded knee-deep in them. I am indebted for the names of the undermentioned species to Mr. Baker, of Kew, who will, I believe, shortly publish a work containing a description of all the known species of *Lycopodiaceæ*.

*S. DEBILIS*, Spring.

Zwa-ka-hyn.

*S. CHRYSOCALON*, Spr.

Zwa-ka-hyn.

*S. BLANGERI*,<sup>2</sup> Spr.

On banks and old Pagodas, common.

(*S. pruriifolium*, Baker. *Lycopodium imbricatum*, Roxb.)

<sup>1</sup> *Selaginella*, dim. of *Sclago*, a name of Pliny's for some plant.

<sup>2</sup> *S. imbricata* of Kurz's list = *S. Blangeri*, Spr.

*S. PUBESCENS*, Spr.  
*S. FLABELLATA*, Spr.  
*S. CAULESCENS*, Spr.  
*S. WALLICHII*, Spr.  
*S. ATROVIRIDIS*, Spr.  
*S. CAUDATA*, Spr.  
*S. RADICATA*, Spr.  
*S. VAGINATA*, Spr.  
*S. TENELLA*,<sup>1</sup> Spr. Kamorta, *fide* Kurz.

*PSILOTUM*,<sup>2</sup> Sw.

(*Bernhardia*, Willd.)

A genus of a single species. Epiphytal, erect, about one foot high, slender, dichotomously branched; stem 3-sided; thecæ axillary, 3-celled; leaves minute, bristle-like. On trees in damp jungles towards the south; rare.

*P. TRIQUETRUM*, Sw.

*Bernhardia dichotoma*, Willd.

#### Order MARSILIACEÆ.

Lycopodal Aerogens, with reproductive bodies of two kinds. The order is divisible into two distinct groups, to one of which belong *Marsilea* and *Pilularia*; and to the other *Azolla* and *Salvinia*. All the genera are aquatic.—*Berkeley*.

*SALVINIA*, *Micheli*.

A genus of small aquatic plants, with a filiform floating rhizome or root-stock, alternate imbricated fern-like leaves, and bladder-like fruit on short leafless branches. "All the supposed species are reducible to one which occurs in the south of Europe in stagnant pools, and is found in all the warmer parts of the world."—*Berkeley*.

*S. cucullata*, Roxb. (M.)

#### Order FILICES. FERNS.

The late Dr. Mason, in his introductory remarks under this head, after acknowledging what he kindly calls a "valuable Catalogue and Synoptical table" furnished by me, goes on to say that "Synonymy is the great opprobrium of Natural History. The difficulty in the study of nature is not in what God has made, but in deciphering the illegible characters that man has written upon her face. She places us on an enchanting ground of hill and dale, dingle and dell, stream and streamlet, and 'every tree that is pleasant to the sight and good for food'; but naturalists, by the multiplicity of barbarous names they have heaped on the same object, have turned the whole into a continent of mud.

"A tribe of ferns with the sori continuous on the margin, and easily recognized, Linnæus designated *Pteris* or plume, the Greek name for ferns. Modern naturalists, Dutch and English, German and French, have so *improved* on him and on each other that *Pteris* now appears in different books under *eighteen* different names, and, to complete the cycle, showing the impertinence of these changes, Sir Wm. Hooker, the most distinguished of living Botanists, has gone back to the old Linnæan genus and adopted it in his new work on ferns.

<sup>1</sup> Among *species dubia* of Spring.

<sup>2</sup> Presumably from ψιλός, to strip off the hair, in allusion to the bare, naked appearance of the plant, which may fairly be said to be leafless.

"The tree fern which appears under Wallich's name of *Polypodium giganteum* will be found in the following Catalogue under Sir Wm. Hooker's name of *Alsophila gigantea*;<sup>1</sup> but Moore more recently refers it to *Alsophila glabra*. He remarks, 'it sometimes becomes difficult to distinguish *Alsophila* and *Polypodium*.' Where there is no natural boundary, why make an artificial one?"

"The silver fern is referred to *Nothochlæna argentea*, that being the systematic name under which it is described in the latest work on ferns to which I then had access; but I since find that Sir Wm. Hooker refers it to *Cheilanthes argentea*. Moore observes: '*Nothochlæna* has all the habit of *Cheilanthes*, with which some of the species have much affinity.'

"One of the most common ferns in Burma, very abundant at the base of the old walls of Toung-ngoo, is the four-eared *Pteris*, *P. quadriaurita*, easily recognized by each of the lower pair of pinnae being double, so as to suggest two pairs of ears. To the description of this species Sir Wm. Hooker devotes a dozen lines of large type, and then adds 12 dozen lines in small type mainly to an exposition of the synonyms."—F.M.

Our good and worthy missionary has been a little hard here, I think, on botanists, indeed, on naturalists generally; for, although a confused heap of synonyms and a multiplicity of barbarous names might reasonably be pronounced to be an inconvenience, they hardly deserve to be stigmatized as an opprobrium: and while the subject may legitimately afford (as it has afforded before now) a fair mark for a shaft of good-humoured satire, it is hardly the occasion for so serious a homily as he has read us.

One wonders the more at Dr. Mason's warmth, when one reflects that but for this very barbarous nomenclature, and for the aid of those artificial boundaries with which naturalists furnished him, he would have been simply unable to compile the work in which he evidently took such pleasure, which will cause his name to be remembered in Burma as that of an ardent observer and lover of nature, and the only fault of which is the *want* and not the *excess* of that artificial symmetry which yet he so strongly decries! He must have forgotten, too, when he called a synoptical table "valuable," that its value lay wholly in its artificial character.

"Where there is no natural boundary, why make an artificial one?" I presume, in order to bring part at least of this boundless nature within handling distance. Its vastness makes definition necessary; in no other way can it be dealt with. *System* means putting loose materials into shape, and this must be an artificial process. And though we say (as we do) that nature refuses to be bound by system, it is not, after all, so much nature that we bind as ourselves by it, in order that we may learn her ways and instruct ourselves in her methods, by following them in all their intricacies as far as we are able. And for this we want names and terms, and their very increase shows that we are pursuing her farther, and realize more thoroughly her infinite variety; and in so doing we do no violence to nature, but reap infinite advantage to ourselves.

To come to Ferns and to the point. Fewer names, of course, sufficed when less was known—*Pteris*, for example, when known ferns were few, might be used to designate all those which had their "sori continuous on the margin"; and *Polypodium*, for that matter, to designate all the rest, without inconvenience. But as the number increased, discrimination would become necessary, and with discrimination, subdivision, and with subdivision a greater attention to minute points of structure, and, withal, new names. So that what was once a *Pteris* or a *Polypodium*, came to be called something else; the old name being, however, retained for a section

<sup>1</sup> Some people call this word *gigantea*.  
A rhyme most proper for "infantia."  
But if you'd not offend my ear,  
I pray you, call it *gigantea*.  
And yet to blame you I'll not venture,  
Should you call a silver-fern, *argentea*.  
Nor deem me in this thing pedantic—  
I point you to a fault *giganteæ*.—C.P.

—that section to which the original simple definition was found to be most applicable, or which included plants that came nearest in character to the one to which the name was first applied. Hence, *e.g.* Wallich's *Polypodium giganteum* would become Hooker's *Alsophila gigantea*, and so on. And hence, inevitably, *Synonymy*. And, as in nature, animal or vegetable, those species are accounted to be the highest and the most perfect, which have the greatest differentiation of parts, *i.e.* separate organs for separate uses (a bird, for instance, to possess a higher organism than a snail); so, in Botany, an increased, and presumably appropriate, terminology, as it is the consequence of a larger discrimination, or differentiation of species, argues an advance and not a deterioration in that Science.

And, for the inordinate multiplication of names for one species, however undesirable, the thing has been unavoidable—it was not planned, but it grew:—it is not an “opprobrium,” but an accident. One person finds a fern in one place, say Burma; a second finds one in another place, say China; and a third in a third, say New Caledonia; and so on; but not one of the three knows for certain whether it be new or not; so each gives it a name, according to his fancy or his judgment. In course of time all these several plants find their way to Kew, with many others collected by different persons all the world over; and, when they come to be collated and compared, they are all found to be one and the same, and perhaps not new either, but to have had a name given it long ago, possibly even by Linnaeus himself! Some who have given a new name may even have been authors of note, but their names must give place to the oldest. Thus, for example again (I invent the names), *Pteris elegans* of one, may be *Pt. repens* of another, and *Pt. bifurcata* of a third, and so on, and the clearing up of all this difficulty, and the unravelling of all this entanglement (which may have been growing for years), may well afford Sir Wm. Hooker matter for “a dozen lines of large type,” with, possibly “twelve dozen more of small type in an exposition of the synonyms.” Nor, as a fact, is the fern in question, *Pteris quadriaurita*, always so “easily recognized” as Dr. Mason says. It is a wide-spread and Protean fern, “varying much in size of frond, number of pinne, and in the nature of the apex of these pinne.” A great part of the twelve dozen lines is taken up with the elucidation of these differences. True, there may be some who think all this to be waste of time, men even of a practical and legal turn of mind,—for, “*de minimis non curat lex*,”—but there are many who think differently, and are persuaded that, as in the operations of nature, a minute, and, if you like, contemptible millipore, by the persevering continuance of its obscure work, has built up habitable islands without number, and barrier reefs hundreds of miles long; so, in the study of nature, the power of patient persevering attention to, and investigation of small things, has resulted in making science what it is, and in building up the fame of a Hooker or a Darwin.

Ferns hold the first rank among Cryptogamous plants, *i.e.* plants whose organs of reproduction, though existent, are hidden from view. They are flowerless plants. They are also called *Acerogens*, because they grow from the point, or terminal axis only. They are, further, remarkable for their *vernation*, or manner in which they are folded before expansion, which is called *circinnate*, or, familiarly, rolled up like a watch spring. The elegant crozier-like terminations of the undeveloped fronds must have been remarked by all who have observed the growth of ferns. These unroll themselves just as a watch-spring would be unrolled if an attempt were made to expand it. Nothing can well be imagined more graceful than the form of a tree-fern when its fully developed drooping fronds are seen surmounted by a crown of the undeveloped circinnate ones.

A fern either grows on an erect *caudex* (stem or trunk), which may be only a few inches high, or many feet and tree-like, in which case the fronds are *tufted*, growing all round a common central axis; or, it develops a slender elongated horizontal axis, called (as in a similar growth of orchids) the *rhizoma*, or root-stock, from which the fronds issue at varying distances. The *frond*, which, strictly speaking, is the leafy portion of the plant only (though it may be sometimes used more generally for that and its support too), is raised on a longer or shorter stalk, which is the *stipes*. The larger, or primary, divisions of the frond are called

*pinna*, their subdivisions *pinnales*, and theirs again (or, in any case, the ultimate and smallest divisions) *segments*. The *rachis* (back-bone) is the part which, in fact, stands in that relation to the divisions or subdivisions—the central stalk as we may call it—and the *costa* is the mid-rib of the leafy segment. We come next to the fructification, which is always<sup>1</sup> seated on the under-surface of the frond, in round heaps, in lines (straight or curved), or in patches. These are called *sori*, which word, indeed, only means “heaps.” If these *sori* be closely examined with a lens, they will be seen to be composed in all *Polypodiaceæ* of smaller stalked bodies, with a jointed ring nearly surrounding them; these are the *Thecæ*, or *sporangia*; and, last of all, when the fructification is thoroughly ripe, these *thecæ* burst asunder and scatter their contents in the form of the finest dust, which, in common parlance, is the seed, but, technically, the *spores*. The difference is that the true seed (of Phanogamous plants) germinates from given points, one point always descending as a rootlet, and another ascending as a leaf-bud; whereas in the spore (the analogous organ in Cryptogamous plants) germination takes place indifferently from all points. But I had nearly forgotten one other part of which it is necessary to know the name. A very large proportion of ferns have their *sori* covered with a thin filmy or scaly covering, shaped to suit the form of the sorus. This is the *indusium*, sometimes also called the *involute*. It is on the presence or absence of this covering, on the shape of the *sori* and the direction they take, as well as on the veining of the fronds and the different structure of the *thecæ* (which are not always ringed, as just now described), that the divisions of the alliance “*Filicales*” are made to turn.

Many ferns have had medicinal virtues ascribed to them, whether with good foundation or not, I am unable to say—probably, in order to prove effective, a few grains of faith should be added to the dose.

The fronds of certain ferns contain mucilage, and so may be considered lenitive. Some are certainly fragrant and aromatic—our European *Lastræa oreopteris* is remarkably so, the plant being covered with small glands of an essential oil—it too therefore may have some healing virtue of a mild nature. “Capillaire is so called because prepared from *Adiantum capillus-Veneris*.” But, if all that is said be true, there is hardly a complaint that may not have its cure in a fernery. Ferns are solvent, deobstruent, sudorific, antihæmatic, anthelmintic, febrifugal, astringent and purgative—they are tonic and emetic, and they cure the rickets. However, (what is undoubtedly true and more practical), pigs feed upon the roots of *Pteris esculenta* in Tasmania, and human beings will do the same when very hungry and nothing better offers itself. Indeed, my friend Mr. Theobald tells me that he found “the young curly stems” (the crozier-headed fronds aforesaid) “very nice, when boiled tender and mixed with butter and pepper.” I should have thought they would prove rather *husky* food, from the quantity of dry scales which cover those young shoots—and that he must have been somewhat in the mood of the Prodigal; however, the Scotch, I believe, eat nettle-tops, and like them; and a Burman is almost as bad as a caterpillar in his omnivorous appetite for green things, so, what wonder? But, to make an end with the uses of the Fern, the very spores have been turned to good account, and have furnished the poet with a point:—

Gadshill: “We have the receipt of *fern-seed*, we walk invisible.”

Henry IV. Part i. Act ii. Scene 1.

The whole number of known ferns may be set down as about 2300, though every day new discoveries are being made and their number added to. Of this number, I have found about 1-tenth, or 212, in the Temasserim Provinces, for my search can hardly be said to have extended farther. There must be more yet even in these Provinces, and many more in the whole of Burma—the greater

<sup>1</sup> As a remarkable instance of the saying that there is no rule without an exception, a fern has been found in Ceylon with its fructification on the upper instead of the lower surface! I possess a very fine specimen of “*Aspidium aucumbum*,” Synopsis, p. 253, which has all the fructification on the upper surface, or what may be called the wrong side.

part of which has been quite untouched by me—and, of these 212 species, not one was furnished by another person; they are all of my own individual gathering, as I never fell in with or heard of any fern-collector in Burma during the whole of my residence. The number, therefore, is not offered as strictly that of all the ferns indigenous to the country, only of those that I have proved to be so.

A full Catalogue of these is given below, and a limited number have been selected (in a somewhat arbitrary fashion certainly, at the same time, according to my idea of their individual interest, and with some reference also to space) for description, or as ground for some observation. There is the less need of a detailed description of all the ferns, as (which is not the case with the Orchids) books are to be had which contain full descriptions of all known species, viz. Sir Wm. Hooker's "Species Filicum" in five volumes, and Baker's "Synopsis" of the same, which is more compendious, handier and less costly.

Before leaving the subject of ferns, I should like to say a word or two on fern collecting. There are many fern collectors, but very few good fern collections. They are such pretty things and so easily pressed and dried, as compared with other plants, that many take to collecting them as an amusement; and, in the majority of cases, collections made in the ordinary way, however pretty they may look on paper, are, from a scientific point of view, utterly worthless. To identify a fern (unless, indeed, one be very familiar with it or it be a common one), a scrap, such as the tip of a frond, or a pinna, is quite useless; how much more, whereby to determine a new species! Yet scraps are the rule, and really good specimens the very rare exception. To be of real use (and it will look much better too), a fern, if small enough to lie on a sheet of cartridge paper, should be dried whole, rhizome and all; or, if of the tufted kind, the stipes, cut off at the very bottom, should be dried with the frond; and rather than cut, the specimen should be folded; or, if divided, the separate portions preserved, duly marked, on separate sheets. Or, again, if part must be sacrificed, let it be a *perpendicular half*, in which case, the remaining half will be the fac-simile of the lost half. In every case a specimen should be as large as it conveniently, or inconveniently, may, and always have a portion of the stipes showing the scales, if any, near the bottom. If the fern be so large as to make it impossible to dry any considerable portion of it, then a pinna must needs suffice; or, the end of the frond, and a portion of one of the lowest pinnae, which often differ in form from the rest; but, always if possible, a piece (a slice cut longitudinally will do) of the stipes. As a rule insects do not attack ferns so freely as they do other dried plants, but the best way to ensure their safety is to wash them over, when thoroughly dried, with a weak solution of corrosive sublimate dissolved in spirits of wine.

#### GLEICHENIA<sup>1</sup> DICHOTOMA, Willdenow.

Rhizome slender, creeping extensively underground, throwing up fronds at intervals. Stipes (frond-stem) rounded, slender, repeatedly dichotomous, *i.e.* branching in a bifurcate manner, first into two, then each of the two divided portions into two again, and so on indefinitely; the ultimate branches bearing simply forked pinnae, and at each point of bifurcation is a small pair of pinnae. The pinnae are lanceolate and pointed, pinnatifid; segments narrow, linear, blunt at the end. The whole frond is glaucous (of a bluish-white colour) underneath. This fern forms large tangled masses, varying much in height, from two to four feet or more. The sori, which are naked and consist of very few thecae, and are consequently small, are placed in two single lines, one on each side of the midrib of the segments.

On the cliff at Amherst, very sparingly. Abundant at Mergui on the road to Kulween. A common tropical fern, and of very wide range.

Another species, *G. longissima*, is found on mountains at a considerable elevation, as on Nat-toung, near Toung-ngoo. Other species, probably, remain to be found.

<sup>1</sup> *Gleichenia*—presumably from a proper name.

*ALSOPHILA*<sup>1</sup> *GLABRA*, *Hook.*

A very large fern, with a caudex, or stock, about two or three feet high, covered with the bases of old fronds. Fronds 5-6 feet long, bipinnate; pinnae 18 inches to 2 feet long, lanceolate, terminating in a lobed and serrated point; pinnules 4-5 inches long by  $\frac{3}{4}$  broad, square at the base, nearly sessile, oblong, pointed, pinnatifid, *i.e.* cut down about half-way to the costa, or midrib, into lobes which are rounded and serrated. Sori very regular and uniform, forming two sides of a triangle<sup>2</sup> in the lobes, the apex towards the end of the lobe. Whole plant smooth. This is, undoubtedly, *Gymnosphaera glabra*, of Blume. It is identified with *Alsophila gigantea*, Wall., in Hooker and Baker's Synopsis, of which latter fern Sir W. J. Hooker says in his "Species Filicum," that it grows to a gigantic size, "caudex 50 feet high. Wall.," "the mountains of Tenasserim" being given as a locality. This may be so, but I must say that, although I have seen a great deal of the Tenasserim forests, and although *A. glabra* is a common fern in damp shady places, I have never seen it larger than described above, nor have I seen any tree-fern at all approaching the size given for *A. gigantea*; none, indeed, I think, more than 10 or 12 feet high. These were *A. latebrosa*, *contaminans*, and *comosa*. The first two are aculeate, *i.e.* their stipites are covered with short sharp thorns. They are all three found here and there in mountain valleys. *A. comosa* may be found at the last 'tsakan or halting place, near a huge granite boulder, before you make the last ascent of Nat-toung, near Toung-ngoo.

*DIACALPE*<sup>3</sup> *ASPIDIODES*, *Blume.*

A very elegant finely divided fern, averaging (as I know it on the Tenasserim mountains) about two feet in height. The stipes is about half this height, and is clothed with numerous brown scales at the base. The fronds are tripinnate, nearly as broad as long. The lower pinnae are much longer than the upper ones and nearly opposite; the others being alternate. The under surface is profusely covered with sori, which are globose, and closely covered by their indusium, which ultimately bursts irregularly at the top.

Abundant on the mountains at about 4000 feet.

*DICKSONIA*, *L'Heritier.*

Large, mostly aborescent ferns with inferior subglobose, or eup-shaped and entire, or more or less distinctly 2-valved involucre. *Cibotium*, by some kept distinct, is united under *Dicksonia*, in Baker's Synopsis. It belongs to that section which has very distinct 2-valved involucre.

*CIBOTIUM*<sup>4</sup> *GLAUDESCENS*, *Hook.*

*C. Barometz*, Link.

A large and extremely beautiful fern, with a short caudex and fronds six or eight feet long. Fronds bipinnate, primary pinnae rather distant, alternate, lanceolate; secondary pinnae oblong, rather narrow and ending abruptly in a fine point, cut down nearly to the rachis or midrib; pinnules or segments subfalcate, acute; whole frond glaucous on the under side. Involucre 2-valved, one on each side of the base of the segments, or nearly in their axis. Said to be arborescent. It may grow in some places to a size which will entitle it to be so called (of this I cannot speak), but all the individuals which I have seen in the Tenasserim Provinces have only developed a very short caudex, but little elevated above the ground. I find it at the foot of a very fine waterfall which descends from Nō-ā-la-bo, a large

<sup>1</sup> *Alsophila*. ἄλσος, a watered wood, and φιλέω, to love.

<sup>2</sup> Or, better, as expressed in Synopsis Filicum, "like an inverted V."

<sup>3</sup> *Dicalpe*. δία and κέλεπη, an urn or drinking cup. Application not very apparent.

<sup>4</sup> *Cibotium*. κιβώτιον, a little box, which the involucre well represents.

mountain East of Tavoy; also, by the stream that tumbles down the steep side of Patau, in the island called Madremacam, Mergui. In Baker's Synopsis the name is changed into *Dicksonia* (*Cibotium*) *Barometz*, because it is supposed by some to be the fern called *Polypodium Barometz* by Loureiro—a fern of which wondrous things have been said. The following account is taken from the "Treasury of Botany" under the heading of "*Cibotium*."

"*C. Barometz*, sometimes called *C. glaucescens*, is believed to be the '*Baranetz*,' *Agnus Scythicus*, or Tartarian Lamb, about which travellers have told so wondrous a tale. This 'Lamb' consists merely of the decumbent shaggy caudex of a kind of fern, which is *no doubt* the species just referred to. When inverted (the basal part of the stipes of four of the fronds, suitably placed, having been retained as legs, and the rest cast away), these caudices present an appearance which may be taken as a rude representation of some small woolly animal. The 'traveller's tale' is that on an elevated uncultivated salt-plain of vast extent, West of the Volga, grows a wonderful plant, with the appearance of a lamb (*Baran* in Russian), having feet, head, and tail distinctly formed, and its skin covered with soft down. The 'lamb' grows upon a stalk about three feet high, the part by which it is sustained being a kind of navel: it turns about and bends to the herbage, which serves for its food, and pines away when the grass dries up and fails. The fact on which this tale is based appears to be, that the caudex of this plant may be made to present a rude appearance of an animal covered with silky hair-like scales, and, if cut into, is found to have a soft inside with a reddish flesh-coloured appearance. When the herbage of its native haunts fails through drought, its leaves no doubt droop and die: but both perish from the same cause, and independently of each other. 'Thus it is (observes Dr. Lindley) that simple people have been persuaded that there existed in the deserts of Scythia creatures half animal, half plant.' 'This condition of the root-stock of some ferns' (writes Sir W. J. Hooker) long engaged the attention of early writers of the marvellous, and many strange figures were published of it; but Dr. Beyne, of Dantzic, in 1725, declared that the pretended *Agnus Scythicus* was nothing more than the root of a large fern covered with its natural villus or yellow down," etc.

It will be noted that the writer of this article says, there is "*no doubt*" that the fern which was the base of this wondrous tale is our *C. glaucescens*. But that fern must have been a *Scythian* or *Tartarian* plant—whereas ours is a tropical one. Is our *C. glaucescens* found also on the bleak and arid plains spoken of? Our fern, I believe, could not exist in such a climate. Again, to present even the most distant appearance of an animal, it is necessary that the caudex should be "*decumbent*" (as *Aspidium Barometz* is described by Willdenow "*radix decumbens, crassa*"), whereas our *C. glaucescens* has an erect caudex and tufted fronds. It is indeed pronounced to be "*caulescent*"; but in order to be caulescent, the caudex of a fern must be erect and not decumbent. This is the difficulty which seems to me to militate against the identity of the two plants. Erasmus Darwin's fanciful Muse thus describes this strange fern; (the very first line, I observe, ill-suits our tropical plant):

"Cradled in snow and fanned by arctic air  
Shines, gentle Barometz! thy golden hair;  
Rooted in earth each eloven hoof descends,  
And round and round her flexile neck she bends;  
Crops the grey coral-moss and hoary thyme,  
Or laps with rosy tongue the melting rime,  
Eyes with mute tenderness her distant dam,  
Or seems to bleat—a vegetable Lamb."

*Loves of the Plants*, Canto I., 281.

<sup>1</sup> e.g. That of *Davallia Canariensis*, sometimes called the "hare's foot fern," from the similarity of the end of the rhizome to the foot of that animal.

HYMENOPHYLLUM,<sup>1</sup> *Smith*, andTRICHOMANES,<sup>2</sup> *Smith*.

These two genera, separated by their fructification only, are remarkable for the delicate and translucent texture of their fronds, and have been called "filmy ferns" in consequence.

The fructification of *Hymenophyllum* is either terminal or lateral relatively to the pinnæ, or to the frond itself, if entire; but it appears always to end a contracted segment of a divided frond, or the vein of an entire frond. The thecæ are sessile or nearly so on a central receptacle, or *columella*, which looks like the prolonged and thickened vein. The involucre is 2-lipped, formed of the same substance as the frond itself.

The fructification of *Trichomanes* is very similar, but the involucre is undivided, looking like a little urn, and the central axis, or *columella*, on which the thecæ are seated, is considerably prolonged, forming a seta—hair or bristle,—which peculiarity has caused, if not all the species, at all events our single British one, to be called *The Bristle-fern*. They both have slender thread-like (more rarely stout) creeping rhizomes, which love to hide themselves in the deep moss which clothes the lower parts of trees, or among any loose vegetation which will provide them with the moisture they require. Some have exceedingly minute and simple fronds—others fronds a foot or more in length, and much divided. I have gathered about a dozen species in all, but, I dare say, there are many more yet undiscovered. A British species, *Hymenophyllum Tunbridgiense*, is among those gathered. A pretty little *Trichomanes*, which I discovered many years ago at Henzai, and named *Henzaiense* accordingly, appears in the Synopsis Filicum as the mutual discovery of a *Mr. Henzai* and myself at Maulmain, in *Pegu*! A larger and a widely distributed species, *T. Javanica*, with fronds about 6 or 8 inches long and pinnated, which are tufted at the end of short rigid rhizomes, emitting long wiry roots, is a terrestrial fern, frequently found on the banks of hill-streams. It is one of many ferns to be found by the stream at Madrecamam, Mergui, a delicious little bit of fern-hunting ground.

Space does not admit of special description.

DAVALLIA,<sup>3</sup> *Sm.*

This genus furnishes about a dozen species, all tree-loving, and never so happy as when they can insert their long running rhizomes among the sheathing bases of the huge leaves of the Palmyra or Talipot Palms, which often cling to the trunk long after the leaves themselves have perished. Mergui is rich in such trees—indeed, I do not know that I have ever seen anything finer or nobler than a grove of *Corypha umbraculifera* (Talipot), which is to be seen a little way in, behind the town. On their trunks, as also on the numerous cocoa-nut trees all round about, may be found in profusion *Davallia solida*, *D. elegans*, *D. bullata*, with many other most interesting ferns.

The *Davallias* have nearly all gracefully drooping and much-divided fronds on scaly creeping root-stocks. Maulmain has furnished one new species:—

*D. HYMENOPHYLLA*, *Par.*

*D. Parishii*, *Hook.*

This species has fronds of so extremely delicate and semi-transparent a texture that the name "*Hymenophylla*" naturally suggested itself. The rhizome is short, and not scaly. Stipes very slender and brittle; "fronds flaccid, 6–9 inches by 4–6 inches, in outline deltoid, divided down to the rachis on the lower part; but not on the upper. The lowest pair of pinnæ are broadest and most deeply cut on the lower side; lowest *pinnules* reaching down nearly to the rachis, toothed more than half-way

<sup>1</sup> *Hymenophyllum*. *ὑμην-ενος*, a thin membrane; and *φύλλον*, a leaf.

<sup>2</sup> *Trichomanes*. *τριχ-ανδς*, a hair; and *ανδς*, thin (?), in allusion to the thin bristle?

<sup>3</sup> *Davallia*, presumably from a proper name.

down, with oblong, blunt, crenate lobes; sori few, marginal in the crenations."—*Hooker*. On limestone rocks in the neighbourhood of Maulmain. In crevices about the mouth of the Damathat Caves; but very difficult to extract owing to the depth at which the rhizomes hide themselves, and the brittle nature of the stipites. Only to be found during, or immediately after, the rains.

LINDSAYA,<sup>1</sup> *Dryander*.

This genus is distinguished by having its sori in a continuous line close to the margin of the frond, covered by a continuous indusium, which opens outwards.

*L. LANUGINOSA.*

*L. lanuginosa* is a rare plant. It has a creeping rhizome clothed with small scales. The fronds are very long and narrow; the stipes 5 or 6 inches, the frondose portion two feet long by some 4 inches broad, simply pinnate; pinnæ 2 inches long by  $\frac{1}{2}$  an inch, and bluntly rounded at the end in the barren frond; narrower in the fertile frond. The pinnæ, being jointed on to the rachis, fall off in drying, which makes the dried specimens wear a wretched appearance. It very much resembles *Nephrolepis acuta* in appearance, and, like it, has little chalky dots along the edge of the upper surface of the pinnæ.

Found by me on one Palmyra tree only in Tavoy, and gathered only once, owing to the circumstance that the fronds disappear soon after the rains are over, and my visits to Tavoy were, on all but one occasion, made in the dry weather. No doubt a resident would find it on other trees.

*L. ENSIFOLIA, Sw.*

*L. Griffithiana, Hook.*

A most variable plant. In its "*ensifolia*" form, it is found on the hill overlooking Maulmain. This form shall be first described. Fronds closely set upon a slightly creeping rhizome, roots numerous, wiry. Height varying from 8 inches to 18, or even more; stipes about half the height; frondose portion pinnate; pinnæ opposite or nearly so, 5 or 6 pairs and a terminal one, on short stalks, narrow, linear, blunt-pointed, the lowest the longest, 5 or 6 inches long by  $\frac{3}{4}$  inch broad, shortening upwards, the topmost sometimes pinnatifid. The stipes is slender, smooth and light brown in colour.

*L. Griffithiana* has a stipes 10 inches or a foot long, terminated by a simple undivided frond 7 or 8 inches long by  $\frac{3}{4}$  inch broad. This, however, is but an undeveloped form of the foregoing, as was clearly proved by my finding at "Madrema-cam" both forms on one stock, and numerous plants of intermediate forms:—and, what is rather strange, the young seedlings are often bipinnate in an early stage and become simpler afterwards.

Lindsaya Lobbiania, hardly, if at all, distinct from *L. cultrata*, is also found in the same small paradise of Ferns.

ADIANTUM,<sup>2</sup> *L.*

The indusia of this genus open inwardly, being formed, in fact, by a portion of the edge of the frond turned back so as to cover the marginal sori; they are either distinct, or confluent and continuous.

*A. PARISHII, Hook.*

This is a most interesting discovery. Until it was found only one species of *Adiantum* was known to exist, which had an absolutely undivided frond:—this was *A. reniforme*, a Madeira and Teneriffe plant. My plant is thus described. Whole height 1 to 2 inches, tufted, *i.e.* with stipites growing all round a common central axis, as opposed to those ferns which have creeping root-stocks and throw up fronds here and there from it. "A few fibrous tomentose radicles descend into the soil, and, from the summit of these, at the dry season of the year, are seen little else but

<sup>1</sup> Lindsay—a proper name.

<sup>2</sup> Adiantum. *ἀδιάντρον*, the Greek name for the plant; a priv. and *δαίω*, to moisten.

jet-black, needle-like, very slender, but firm and brittle stipites, from  $\frac{1}{2}$  to 1 inch in length, from which the fronds have fallen. In the rainy season, a new crop of fronds, with their stipites, appear. These fronds are an inch in length at the utmost, rather more in breadth, quite simple (undivided) flabellately orbicular, membranaceous, subpellucid; the somewhat cuneate base is entire; the rest of the frond, in the sterile plant, crenato-dentate; in the fertile 3 to 5-6 lobed, soriferous in the sinuses, the lobes themselves sinuato-crenate, though much less deeply than in the sterile fronds. Involucres of a thick, subcoriaceous texture and dark colour, subreniform, large for the size of the frond, and closely applied to it. All the veins originate from a thickened common point at the base of the frond, are many times dichotomous, distant from each other, and very conspicuous, some extending into the involucre and there bearing the sori; the rest terminating just within the margin of the frond, and clubbed at the apex. Stipites very slender, erect, rigid, glabrous, intensely black and glossy, jointed at the setting on of the frond, which is there deciduous."—Hooker, *Filices Exotice*, sub Pl. LI.

This charming little fern was discovered in 1857 on the top of Zwā-ga-byu— the large Limestone rock visible from Maulmain to the North, and familiarly known as "The Duke of York's nose."

*ADIANTUM CAPILLUS-VENERIS*,<sup>1</sup> L.

This, the true "Maiden-hair fern," found, now but sparingly, on the sea-coasts of Great Britain and Ireland, in Madeira and elsewhere, is also found in Burma. When wading across the Megala-choung, a tributary of the Houng-drau, in 1858, I came upon a fine mass of it growing on the face of a rock which formed an island in the middle of the stream. I have never seen it since. I have it also from seaside rocks, Kurrachee.

*A. LUNULATUM*, *Burm.*

This is the very common but pretty species seen on banks almost everywhere. It is a long, slender, delicate fern, simply pinnate, pinnae about an inch across. The slender rachis is frequently elongated, and takes root at the apex.

*CHEILANTHES*,<sup>2</sup> *Sw.*

This genus consists of mostly small and much divided ferns, with free veins, sori terminal (or nearly) on the veins, at first distinct and rounded, afterwards often confluent. The indusium is made by the reflexed margin of the frond, and, like the sori which it covers, is roundish and distinct, or confluent and continuous.

*C. varians* and *C. tenuifolia* are rather common ferns on banks: both are found on the hill which overlooks Maulmain. They are slender brittle plants about 8 or 9 inches high. The fronds of the former are bipinnate, long and rather narrow, with distant pinnae. Those of the latter are tripinnate, broader and deltoid in outline. On *C. varians* I have often seen scales or gemmæ in the axis of the lobes, never on *C. tenuifolia*. These gemmæ will reproduce the plant, though I never saw them actually sprouting while on the fern itself.

*C. FRAGILIS*, *Hooker.*

A very brittle tufted species about a foot high (though often larger), bipinnatifid, almost too near to *C. Mysorensis* to be unmistakably distinct. On limestone rocks. If any one will crawl through the hole at the end of the (so-called) Farm-caves near Maulmain, and then clamber up the rocks, he will be sure to find it. This is where I discovered it. The rocks are, I believe, not otherwise to be ascended.

*C. FARINOSA*, *Kaulf.*

I take this opportunity of stating, once for all, that, although a detailed

<sup>1</sup> "Capillaire, the maiden-hair fern, from its being used to prevent the hair from falling off, says Matthioli (l. iv. c. 132), quoting from Theophrastus: 'ad deluvium capillorum utile.'"—Prior, "Popular Names of British Plants." Williams and Norgate, 1870.

<sup>2</sup> Cheilanthes. *χελαιος*, lip or margin, and *ανθος*, flower, or that part of a plant which fructifies.

description of a few of the more remarkable ferns (as of Orchids) may be found here, it does not fall within the compass of this work, nor is it possible within the limits prescribed, to give this in the case of all the species mentioned. It is the less needful, as a published work exists, in which every known Burmese fern will be found fully and scientifically described, the "Synopsis Filicum." Accordingly, I simply mention that the above-named fern, one of the many so-called "silver ferns" (because their under-surface is covered with a white powdery—farinaceous—substance), is a Burman fern, to be found, no doubt, in many places, but, specially, on rocks at Kulwee in Beloo-gewn, near Maulmain. It used to be found on rocks close behind the General Hospital and elsewhere on the hill, sparingly: but I doubt if it be not now exterminated. Dr. Mason, no doubt, means this fern, by "*Nothochlæna argentea*"; but no *Nothochlæna* has yet been found, as far as I know, in Burma.

*C. ARGENTEA, Hooker.*

Another silver-backed fern—with varieties of a golden colour—is to be gathered on Zwā-ga-byn, already mentioned (another small Paradise for a Botanist), near the top, together with *C. rufa*, *Nephrodium* (*Arthrobotrys* of Wallich) *cochleatum*, *Lycopodium involvens* (a very curious and rare plant), and a host of other interesting things, both Cryptogamic and Phanerogamic. The remarkable point about the discovery of *C. argentea* here is that the other localities given for it are such as *Ural, Siberia; Kamtschatka; Altai*; and the Russian possessions in *N. America*; also at 5500 feet in Khasya. On Zwā-ga-byn it is found at 2000 feet of elevation, and not there only, but generally, on Limestone rocks, in the neighbourhood of Maulmain and within a few hundred feet of the plain, and of very large size. It may be worthy of note, that several plants appear to descend to a lower level in Burma than elsewhere; for example, Oaks in Beloo-gewn at the sea-level; Pines, east of Mya-wad-dee, very few feet above the sea-level—*abundant* at 1000 feet; and Rhododendra at 4000 feet on Dauna-toung, Maulmain, and on No-a-la-bo, Tavoy, in latitude 14°.

*ONYCHIUM*<sup>1</sup> *AURATUM, Kaulf.*

A golden-backed fern. It seems to affect old *Toung-yas* and other clearings, where it is often most abundant; occasionally also it may be gathered on old Pagodas, rooting itself between the bricks. Kulwee; Ascent of Toung-wine, Maulmain; and Ka-la-ma-toung, Martaban.

*PTERIS*<sup>2</sup> *AQUILINA, L.*

The common English brake. A fern found all over the world in both hemispheres, "unless it be absent from S. temperate America, from which there are no specimens in the Kew Herbarium. In Lapland it just passes within the Arctic circle. It ascends in Scotland to 2000 feet; in the Cameroon Mountains to 7000 feet; in Abyssinia to 8000 or 9000 feet; in the Himalayas to about 8000 feet" (*Synopsis*). Our highest Burmese mountains are about 8000 feet (Nat-toung, Toung-ngu, being a little under this), and although I do not recollect noticing it at the summit of that mountain, it does most probably attain to our highest points. The *lowest* height at which I have found it is 700 feet above the sea, which is the height of Patau, Madremacam, Mergui, where it is found growing luxuriantly. Mergui is in about 12° North Latitude. This is, if I mistake not, another instance of a plant being found at an unusually low level on the Burmese coast. "Dr. Spruce has seen it in the Andes 14 feet high" (*Synopsis*). In Burma I should say it attains the average height which it attains in England.

*P. LONGIFOLIA, L.*

A common tropical species, to be seen on almost every wall and Pagoda that is at all dilapidated, nor does it always wait for that state, so impatient is it to establish its title to a footing. Martaban Pagoda used to be covered with it.

<sup>1</sup> *Onychium.* ὄνυξ, a nail of the hand, from supposed resemblance of segments.

<sup>2</sup> *Pteris.* πτερίς, a fern.

*P. SEMIPINNATA, L.*

A striking fern of moderate size, 2 or 3 feet high, to be known by the lower side of the pinnæ only, and not the upper, being cut into narrow linear pinnules. I found it but once. On the proper right bank of the Tenasserim River, a few miles from Mergui, are some pagodas whence a pretty view is obtained. I forgot the name of the spot, but it was in walking to it that I gathered *P. semipinnata*.

*P. LUDENS, Wallich.*

Remarkable for having fronds of two distinct forms on the same root-stock. The barren frond has a black, polished stipes 4 or 5 inches high, and is "hastately 5-lobed," a prominent vein running into each lobe, cordate below; in fact, it may be described as between heart-shaped and arrow-headed with blunt lobes. It is of a coriaceous or leathery texture, green above, brown underneath. The fertile fronds are on much longer stipes, about a foot long, and are deeply pinnatifid, being divided into 3 primary lobes, these being again divided, the terminal one into three, and the lateral ones into two narrow linear pointed segments. The frondose portion is about as broad as long, varying from 4 to 6 inches. The rhizome or root-stock is creeping, about as thick as a crow-quill, hard and wiry.—Limestone rocks, Maulmain.

*P. PEDATA, L.*

This in general character is like the last, also in texture. Rhizome similar. Stipes one foot or more, smooth, brown; the frond at the end 4 to 6 inches each way, tripartitely divided primarily; the lateral divisions lobed on the lower side of the prominent rib, undivided on the upper; the terminal division lobed on both sides, with a larger lobe at the end, which is drawn out into a fine point. All the lobes, or pinnæ, as they may also be called, are much broader than those of *P. ludens*, and the fronds are all of one and the same form. Also on Limestone rocks, Maulmain.

CERATOPTERIS<sup>1</sup> THALICTROIDES.

An aquatic fern, from one to two feet high, generally wholly submerged in quiet deep waters. Root tufted, fibrous. Fronds rather succulent, and pellucid in texture. Sterile and fertile fronds different, though sometimes a frond is partly fertile, partly sterile. They are both much divided, being bitripinnate; but, in the sterile, the divisions are broad and expanded, and, in the fertile, narrow, linear, being contracted by the production of the fructification, which is sparse, scattered thinly under the continuously reflexed margin of the segments. Although generally found in water, this singular fern does not disdain other habitats. For several years it sprang up in the rainy season on the gravel path in my garden in Maulmain. How it came there I have no idea (as it was, in fact, my first acquaintance with the fern), except, of course, that the spores must have floated thither on the air, but it must have been from some long distance, as I am not aware of its existence anywhere near Maulmain, and my house was 70 feet above the level of the River Salween, in which it certainly could not grow. The plants, naturally, were small, yet they furnished very pretty little specimens, some 8 inches high, in full fructification.

ASPLENIUM,<sup>2</sup> Linn.

The second largest genus of ferns, "including plants from all parts of the world where ferns grow, of every variety in size, texture, and cutting." Sori, dorsal or marginal, attached to the veins, generally oblique as regards the medial line of the frond, long and linear, or short and oblong. Indusia the same shape as the sori, bursting along their whole length; when single, towards the mid-rib; when double (*Diplazium*), both ways.

*A. NIDUS-AVIS, L.*

Fronds 4-5 feet long by 6-8 inches broad, undivided, lanceolate, bright green,

<sup>1</sup> Ceratopteris. κέρασ-ατος, a horn; and πτερίς.

<sup>2</sup> Asplenium. a priv. and σπλήν, the spleen; from supposed power to cure.

smooth, glossy, tapering gradually below, till, at the base, nothing is left but the broad somewhat expanded brown mid-rib; numerous, set densely round a common axis, and curving gracefully outwards so as to form a sort of deep *nest* in the centre; hence the specific name. Roots densely matted, tomentose, brown. Always growing on trees in wet shady jungles, and forming striking and handsome objects. Frequent. Near Hleing-buay, on the Da-gying, is a swampy piece of jungle, high up on the big trees of which *A. nidus-avis* may be seen in perfection. Sori in this and the following species in long thin oblique lines.

*A. GREVILLEI*, Wall.

A rare terrestrial fern, of the same general character, having lanceolate undivided fronds about a span long, with foot-stalks of about equal length. "Tavoy" is given (and Mishmee) as a locality in the Synopsis. My specimens were gathered on *Tavoy Island*, on which I was once driven by a contrary wind, when making my way from Tavoy to Mergui in a Burman boat. *Asplenium nitidum, erectum, resectum, normale*, may all be found on trees on *Tu-ok*, at about 3000 feet, a rare place for ferns and orchids. Altogether I find some twenty species of this genus.

*DIDYMOCHLENA*<sup>1</sup> *LUNULATA*, Beauv.

A genus of a single species. Fronds tufted. Caudex stout, erect, "subarborescent" (Synopsis). As seen by me, hardly deserving to be so called, as it was but a few inches high, but it may well grow higher elsewhere. Fronds (as seen) about 4 feet high, bipinnate; pinnules about 1 inch long, subquadrate, rounded, stalked. Sori 3-6 on each pinnule, elliptical. Indusium of the same shape, attached by a central longitudinal receptacle, and free all round. A handsome and remarkable fern found in South tropical America, Cuba, Madagascar, Natal, and Fiji Islands, Loc. *Tu-ok*.

*ASPIDIUM*<sup>2</sup> *ACULEATUM*, Sw.

A very common British species, gathered by me on the top of No-a-la-bo (Ox's hump), Tavoy, 4000 feet, in 1856, also on Moollee-it, 6000 feet. It appears to be world-wide.

*NEPHRODIUM*,<sup>3</sup> Rich.

"Sori subglobose. Involucres cordato-reniform, attached by the sinus. A cosmopolitan genus, the species of which vary widely in size, texture, cutting and venation."—*Synopsis*. Out of the 30 or more species which I have found in Burma, it is difficult to know which to select for description. I will, therefore, give here, the only new and previously unknown species.

*N. PARISHII*, Hooker.

Caudex creeping. Stipes soft, slender, smooth and quite scaleless, 6-9 inches long. Fronds 6-8 inches each way, tripinnatifid, pubescent, deltoid, the lower *pinnæ* much the largest; lower *pinnules* larger than the others; segments and pinnules all decurrent so as to form a winged rachis. An elegant, transparent, succulent fern, most sensitive of drought, only growing in the wettest and shadiest nooks of limestone rocks (Maulmain) during the rains, perishing immediately the rains are over.

*NEPHROLEPS*,<sup>4</sup> Schott.

A small genus of Aspidioid ferns with kidney-shaped indusia, and very long, comparatively narrow, simply-pinnate fronds and creeping rhizomes. The pinnæ are jointed on to the rachis, consequently are apt to fall off in drying. The sori are round and the veins free. The pinnæ in *L. exaltata* and *L. acuta* have white cretaceous dots on their upper surface. I have not observed them on *L. tuberosa* (*cordifolia*, Baker). The latter plant I find always on trees; the former two on banks.

<sup>1</sup> Didymochilana. *δίδυμος*, twin; and *χλαῖνη*, cloak or covering.

<sup>2</sup> Aspidium. *ἀσπίς-ιδος*, a shield.

<sup>3</sup> Nephrodium. *νεφρός*, a kidney; and *εἶδος*, appearance, in allusion to shape of indusium.

<sup>4</sup> Nephrolepis. *νεφρός*, a kidney; and *λεπίς*, a scale, from the shape of the indusium.

OLEANDRA,<sup>1</sup> *Car.*

A small genus distinguished by its slender, scaly, scandent rhizome, jointed stipes, and entire long narrow lanceolate or trap-shaped fronds. Sori round. Indusia reniform; in a single row close to the rachis (or mid-rib), nearly all along the frond.

*O. CUMINGII*, *J. Scr.*, var. *LONGIPES*, *Hook.*

Rhizome long, creeping or scandent, of the thickness of a crow-quill, emitting long wiry roots from its under surface. Stipites varying in length from 4 to 8-9 inches, smooth, rigid, jointed at the setting on, also at about 1½ to 3 inches from the base. Fronds varying from 5-6 inches to 18 or more in length, with a breadth of 1 to 1½ inch, tapering below and acuminate at the apex. Rare, as far as my experience goes. Very sparingly on rocks at the top of Toung-wine range, Maulmain; also on Madremacam, Mergui.

*O. NERIFORMIS*, *Car.*

Fronds similar to the last, but stipes very short, the joint very near to the rhizome, which has a habit of growing in short curves with the fronds single or in tufts at the bent angle between the curves. Rare also; found but once, and very small, on trees on Dauma-toung at 4000 feet.

POLYPODIUM,<sup>2</sup> *L.*

The largest of all the genera, and a very unwieldy one, containing as it does some 400 species, of which I find about 40 in Burma. *Polypodium* may be said generally to include all those ferns which have round naked sori—in other words, sori without any covering, indusium or involucre. This is the one great point of similarity, but in all other respects—habit of growth, size, cutting, venation, texture—there is an endless diversity within the limits of the genus. These differences have been the foundation of several distinct genera with authors, e.g. *Phegopteris*,<sup>3</sup> *Goniopteris*,<sup>4</sup> *Dictyopteris*,<sup>5</sup> *Niphobolus*,<sup>6</sup> *Phymatodes*,<sup>7</sup> and others; these are all, however, included in *Polypodium* in the "Synopsis Filicum," but the names are retained as those of sections of the genus, so that, practically, things remain much as they were; for, in specifying any one it becomes absolutely necessary to add the name of the section to that of the genus; and whether any advantage is thus gained, I very much doubt; however, leaving this to the doctors, I will go on to select a few species for particular mention.

*P. (DICTYOPTERIS) TENUIFRONS*, *Hooker.*

"Rhizome creeping, fragile; stipes very slender, 8-12 inches long; frond 6-12 inches each way, deltoid, the upper part pinnatifid; below the pinnatifid portion are 2 or 3 distinct pinnae, the lowest much the largest, deltoid; the lowest side produced, with deeply pinnatifid lanceolate lobes 2-3 inches long; texture very thin, flaccid; areolæ copious, without free veinlets; sori in rows near the main veins."—From *Synopsis*, in part.

In the debris of Limestone Rocks, about Maulmain, exactly as *Polypodium calcareum*<sup>8</sup> grows in the debris of the limestone of Cheddar cliffs in Somersetshire, of which (wanting the rigidity) it has very much the appearance. If I recollect right, one locality is about the entrance, or, rather, the sloping approach to, "the Farm-caves."

<sup>1</sup> Oleandra. ?

<sup>2</sup> Polypodium. πολλός, many; and ποῦς-πόδος, many divisions.

<sup>3</sup> Phegopteris. φηγός, fagus, a tree—oak or beech? and πτέρις.

<sup>4</sup> Goniopteris. γωνία, an angle, in allusion to the venation.

<sup>5</sup> Dictyopteris. δίκτυον, a net, in allusion to the venation.

<sup>6</sup> Niphobolus. νιφόβαλος, rained upon like snow, in allusion (I presume) to the dispersion of the sori.

<sup>7</sup> Phymatodes. φῦμα-ατος, lump or swelling; and εἶδος, appearance.

<sup>8</sup> *P. R. bertianum*, Holim., of *Synopsis*. Whatever may be the right of priority in this name, I doubt if English botanists will give up the familiar *P. calcareum* for it.

P. (PHLEGOPTERIS) OBSCURUM, *Hooker*.

I select this species chiefly with a view to point out an error in *Species Filicum*, Vol. IV. p. 237, 162. The fern there named *P. obscurum*, and described, is undoubtedly only *Nephrodium* (*Lastrea*) *melanopus* of the same work (Vol. IV. p. 110) without indusia. I can speak positively in this instance, as the specimens (thus differently named) were part of one and the same lot, all gathered in one place. By reference to the *Synopsis* it will be seen that Baker, in revising the specimens, thought so, for though (p. 308 of 1st ed.) he retains the species, he appends an observation, "very like a non-involucrate form of *N. sagenioides*," the latter being Baker's name for *N. melanopus*. And under the latter (p. 271) he remarks "*Involucres fugacious*," which they are. I give the description of the plant. Caudex 6-8 inches high, commonly elevated on its wiry roots. Fronds tufted. Stipes 6-12 inches high, slender, brittle, glossy-black (as is also the rachis till near the end), slightly scaly below. Frond 12-18 inches long by 6-8 inches wide, ovate-lanceolate, pinnæ 8-10 pairs, opposite, or nearly so, about 4 inches long by 1 inch broad, suddenly acuminate; the lowest pair different from the rest, being pinnate only on the upper half and bipinnate on the lower, the middle pinnæ longer than the rest. In hilly or mountainous parts, but at no great elevation.

P. (GONIOPTERIS) UROPHYLLUM, *Wall.*

This is really only a non-indusiate *Nephrodium*, the venation being exactly that of a *Eu-nephrodium*, and the habit of growth like that of the *N. abruptum* group; in fact, I detected indusia on this fern in a young state, and pointed out the fact to Sir W. Hooker, inclosing specimens to him which showed them plainly. This is acknowledged on p. 10 of Vol. V. of his *Species Filicum*: "Mr. Parish has lately convinced me that a minute indusium is seen upon the undeveloped sorus, which may require this (and possibly the same may be found in an equally early stage upon other species of *Goniopteris*) to be transferred to *Eu-polypodium*."

Caudex creeping; stipes 2 or more feet long, stout; frond 2-4 feet long, 1 foot and more broad; pinnæ several on each side of the rachis, 1 foot long and 2 inches broad, with a large terminal pinna, points acuminate; veins prominent, sori in two close rows, or sometimes only one.

P. DAREÆFORME, *Hook.*

A fern of a very different habit from the last. Rhizome, creeping like a *Davallia*, densely clothed with scales, size variable; as seen by me, small; stipes 2-3 inches, frond 6-8 inches long, 4-5 inches broad, subdeltoid, tripinnate, ultimate segments entire or forked, linear, rounded at the point; veins single in each division; sori generally one on each segment, consisting of few thecæ. On trees, at 4000 feet and upwards. Dauna-toung.

P. SUBDIGITATUM, *Bl.*

*P. Davallioides*, *Mett.*

A beautiful and much divided species, 2 or 3 feet high, with tufted fronds, terrestrial. On Nat-toung at 7000 feet, and Moelec-it, by the spring, 6000 feet.

P. (NIPHOBOLUS) ACROSTICHOIDES, *Forster*.

Rhizome creeping, as thick as a small crow-quill, clothed with round scales, which are closely appressed and dark in the centre. The fronds are narrow, long, strap-shaped, and pointed, varying considerably in length from 1 foot to 18 inches, and  $\frac{1}{2}$  to 1 inch broad, narrowing into a stipes 1-3 inches in length. Under-surface covered with soft tomentum, which consists of stellate hairs, a characteristic feature of this group. Sori crowded in oblique rows on the upper half of the frond. Mergui, on trees.

P. (NIPHOBOLUS) PENANGIANUM, *Hooker*.

Rhizome creeping, stipes short; frond 12-18 inches long, by 2-3 inches broad, with a suddenly acuminate termination, tapering very gradually below; texture soft, thick, covered underneath with soft grey tomentum. Sori in a patch near the end but not reaching it, leaving a V-shaped opening below. Apparently rare; on trees.

*P. (NIPHOBOLUS) NUMMULARIFOLIUM, Mett.*

Rhizome extensively creeping, of the thickness of twine, covered with scales. Fronds of two forms, set all along at  $\frac{1}{2}$  inch distances; barren fronds round or oval,  $\frac{1}{2}$  to 1 inch long, on a short stipe  $\frac{1}{8}$ – $\frac{1}{4}$  inch in length; fertile fronds linear, about 2 inches long by  $\frac{1}{4}$  inch broad; sori scattered over the whole under-surface. The upper surface smooth, naked; under surface covered with ferruginous tomentum. On trees, Tavoy, Mergui.

*P. (PHYMATODES) IRIODES, Lam.*

A very frequent and almost ugly fern, with fronds 2–3 feet long and 2–3 inches broad, undivided, strap-shaped, of a pale colour and leathery texture; sori very small, dotted irregularly over the under surface. On trees.

*P. (PHYMATODES) SINOSUM, Wall.*

A fern with a very remarkable rhizome, difficult to describe. It is commonly as thick as the finger, flat on the under surface, convex on the upper, fleshy, but often hollow, creeping, but not extensively; sometimes intertwined and forming patches the size of the hand, closely covered with peltate scales, which are black in the middle and pale round the edges. The stipes, 1–2 inches long, is jointed on a conical protuberance; barren fronds 3–6 inches long and  $\frac{1}{2}$ –1 inch broad, the edge entire; fertile fronds longer and slightly broader, their margin sinuous; texture leathery; venation obscure; sori large, round or oblong, sunk in the frond, showing prominences on the upper surface. Trees, Mergui.

*P. (PHYMATODES) RHYNCHOPHYLLUM, Hook.*

Rhizome creeping; barren fronds, round or ovate, 1–1 $\frac{1}{2}$  long on short stipites; fertile fronds 3–6 inches long,  $\frac{3}{4}$ –1 inch broad, narrowing gradually upwards to a fine point; texture hard, dry; sori rather large, round, confined to the narrowed end, in a single line on each side of the mid-rib. On trees among moss. Mountains at a high elevation. Moolce-it.

*P. (DRYNARIA) QUERCIFOLIUM, Linn.*

This is the common fern which covers nearly every tree in the plains in Burma. It is dimorphous, *i.e.* it has fronds of two kinds, sessile barren fronds and stalked fertile fronds; the first are lobed only and very rigid, erect; the last are long, pinnated and drooping.

*P. (DRYNARIA) CORONANS, Wall.*

*P. (Drynaria) conjugatum, Lam.*

This is a much rarer fern. The rhizome is very stout and thick, and densely clothed with long reddish scales; its habit is to grow round a tree horizontally and encircle it, hence the name "*coronans*"; the fronds are of one kind only, but the lower portion is expanded and lobed so as to resemble the barren frond of *P. quercifolium*; it then becomes narrower, and expands again upwards, where it is deeply pinnatifid. The fronds are erect, about 2–3 feet long by 1 foot or more broad, and of an exceedingly hard and rigid texture. On the Shan border about Way-ta-mar-ying.

*BRAINEA*<sup>1</sup> *INSIGNIS, Hook.*

A small tree-fern of a rigid habit, in appearance much like a *Cycas*. Stem 3–4 feet high, crowned with a tuft of fronds 2–3 feet long by 8–12 inches broad. On mountains in the Yun-zai-lin district among the pine-trees. "The sori are remarkable, confined to the costal arches, or also running up the simple veins half-way or more towards the margin, often becoming confluent."—*Hooker*.

*GYMNORHAMME*,<sup>2</sup> *Desp.*

A rather large genus containing ferns of very different habit, form, and size;

<sup>1</sup> *Brainea*, from J. C. Braine, Esq., Hongkong.

<sup>2</sup> *Gymnogramme*. *γυμνός*, naked; and *γράμμα*, writing, or an inscribed mark.

veins simple or forked or anastomosing. Sori naked, oblong or linear, arising from, and following the course of, the veins.

*G. JAVANICA, Bl.*

Rhizome creeping; stipes smooth, scaleless, pale, 1-4 feet long; frond 1-4 feet, pinnate, lower pinnae often again pinnate, shortly stalked, except sometimes the upper ones, varying exceedingly in size according to the size of the plant, 3-12 inches long by  $\frac{1}{2}$ -2 inches broad, the apex drawn out into a fine point. Sori copious, simple or forked, running along the parallel veins from the mid-rib, but falling short of the edge. Mountains at 4000 feet and upwards.

The only other species which I have found are *G. involuta* (*Selliguea Wallichiana*, Hook.), and *G. decurrens*;—both also mountain ferns.

*MENISCIUM*,<sup>1</sup> *Schreb.*

A small genus, with a *Goniopteris* appearance, habit and venation; fronds simple or pinnate; sori confined to the connivent transverse veinlets, hence short, and often somewhat concavo-convex, like a "meniscus" lens, whence the name. Species very variable and apt to run into one another. *M. triphyllum*, e.g. so called, is often five-leaved, and sometimes runs *M. Parishii* of Beddome close, which last Baker unites with *M. cuspidatum* of Blume, probably rightly, even suggesting that it is only "a meniscoid form of *Polypodium* (*Goniopteris*) *urophyllum*," which indeed it is uncommonly like.

*ANTROPHYUM*,<sup>2</sup> *Kaulf.*

Another small genus, very uniform in character, consequently without any very distinctive marks whereon to found species, of which probably too many have been made. The species are all small ferns with simple undivided rather leathery fronds, more or less lanceolate in shape and pointed, varying in length and breadth 3-12 inches by  $\frac{1}{2}$ -2 inches, sessile, or nearly so, on a small creeping rhizome. The venation is reticulated with elongated meshes; sori copious, following the veins. Among moss, generally on the perpendicular trunks of trees in damp jungles.

The several varieties found in Burma are probably all referable to *A. coriaceum* of Wallich.

*VITTARIA*,<sup>3</sup> *Smith.*

A small genus, consisting of a few ferns with long, narrow, undivided, often grass like fronds of leathery texture. Sori continuous along the edge or just inside it. *V. elongata*, a common fern, seen hanging like bunches of grass from trees, sometimes has fronds 2 feet long and only  $\frac{1}{4}$  inch broad. *V. falcata* is a short rigid species with curved fronds, which I find in mountainous districts. *V. Amboynensis* I find on trees, ascent of Zing-kyik, behind Martaban; and in the same locality, as also on Madremacam, Mergui, I find a minute species, 1 inch in full length and less than a line in width, though in full fruit. This is *V. minor* of Fée, var. *β. minima* (Species Filicum, V. p. 183). "Probably too near to *V. falcata*."—Hooker.

*TENITIS BLECHNOIDES*,<sup>4</sup> *Sw.*

A rather frequent fern. Rhizome creeping. Stipes 1-2 feet long, hard, brittle, smooth; fronds 1-1 $\frac{1}{2}$  feet long by 8-12 inches broad, simply pinnate; pinnae 5 or 6 pairs and a terminal one, 6-12 inches long by 1 inch broad, pointed; sori in two long lines half-way between the mid-rib and the edge. Barren pinnae broader.

*DRYMOGLOSSUM PILOSELLOIDES*,<sup>5</sup> *Presl.*

A small creeping fern, very much resembling *Polypodium nummulariaefolium* (already described) in form; in fact, until we come to the fructification, the descrip-

<sup>1</sup> Meniscium. *μήνίσκος*, a young moon, from the shape of the sori.

<sup>2</sup> Antrophyum. *ἐντρον*, a cave; and *φύω*, to produce—from the cavities between the sori.

<sup>3</sup> Vittaria. *vitta*, a band or fillet, from the form of the sori.

<sup>4</sup> Tenitis. *τανία*, *tania*, same as *vitta*.

<sup>5</sup> Drymoglossum. *δρυμός*, a forest; and *γλῶσσα*, a tongue. Application not very clear.

tion of the one will answer for the other. Rhizome extensively creeping, of the thickness of twine, scaly, with fronds an inch distance; barren fronds round or oval,  $\frac{1}{2}$  to 1 inch long, shortly stalked; fertile fronds about 3 inches long by  $\frac{1}{4}$  inch broad and rounded at the ends; sori in a broad continuous line all round the frond just within its margin, the thecae mixed with peltate scales. Frequent. Abundant on trees in Tavoy.

HEMIONITIS<sup>1</sup> CORDATA, *Rorb.*

Caudex short; roots numerous, fibrous, very fine; fronds tufted; barren fronds on short stipites 1-2 inches, themselves 2-4 inches long, broad and blunt at the apex, cordate, or heart-shaped, at the base; fertile fronds triangular, like an arrow-head, about 3 inches each way, elevated on stipites or stalks 8-10 inches long. Veins anastomosing; sori covering the whole back of the frond and following the course of the veins. My specimens are marked 'Young-ngoo,' but I think this is a mistake; it may be found there, but the likelier locality is the Limestone rocks in the neighbourhood of Maulmain.

ACROSTICHUM,<sup>2</sup> *Linn.*

"Sori spread over the whole surface of the frond or upper pinnæ, or occasionally (apparently) over both surfaces. A large genus, almost entirely tropical, including groups with a wide range in venation and cutting"—*Synopsis*.

A. SORBIFOLIUM, *Linn.*

"Rhizome thick" (about the size of the little finger), "woody, often 30 or 40 feet long, clasping trees like a cable, sometimes prickly; frond 12-18 inches long, 6-12 inches broad, simply pinnate; barren pinnæ 4-8 inches long,  $\frac{3}{4}$ -2 inches broad, 10-20 on each side the rachis, articulated with it at the base, the edge entire or toothed;" fertile pinnæ smaller and narrower, but not otherwise different. This is the description of the fern in its fully developed condition.

About the year 1860 I discovered in the extreme South of the Tenasserim Provinces a most singular and elegant form of a fern wholly new to me, of which the following may serve as a description. Roots (in the ground at the foot of a tree) numerous, wiry, of the thickness of pack-thread. Caudex or proper stem none, but from the roots was formed a slender branched rhizome no thicker than a knitting-needle; this, after having a very short lateral spread, turned and crept up the tree in the form of several slender stipites, which clung to the bark by innumerable minute rootlets. On these stipites, commencing almost from the ground, alternated a series of closely set elegant pinnæ about 2 inches long, on either side of the rachis of which were set 15 or 16 pairs of pinnules about  $\frac{1}{4}$  inch long, which were themselves farther subdivided into 8 or 10 minute wedge-shaped segments, the whole of a fragile, semi-transparent texture, so as to give the plant almost the appearance of fine lace-work. No trace of sori was to be found on any part of the plant. Being much puzzled in determining its affinity, I forwarded a specimen to the late Sir William Hooker soon afterwards, with other ferns. He replied, inclosing me fragments of a fern found in Borneo, of a somewhat similar character, begging me to "hunt for more." Accordingly, I sent my man down expressly to Puckham, on our extreme South border, with directions to search till he found more of the same, instructing him also how to press and convey the specimens safely. I think he was gone six weeks, but he was successful. Among several small specimens like my original one, he brought back one some 15 or 16 feet long, carefully cut into equal lengths, and well pressed. This specimen is now before me, laid out on about 10 large sheets of paper, all numbered, so that by putting them end to end I can reproduce the whole plant in excellent condition. The lower part of this remarkable specimen corresponds to the description just given, and the upper part to that of *Acrostichum sorbifolium* previously given. Little by little the slender, delicate, finely

<sup>1</sup> Hemionitis. ἡμιόνος, a mule. The Greek name for some plant.

<sup>2</sup> Acrostichum. ἀκρὸς, the summit or end; and σπῆχη, spike or rank.

divided, lace-like fern, grows stouter upwards, till the stipes develops itself into a coarse thick prickly stem; and towards the end, the finely divided tripinnatifid fronds cease altogether, and their place is taken by the large simply-pinnated normal fronds of the above-named fern!

This is *Lindsaya*? *Parishii* of Baker, Synopsis, ed. 1868, p. 109; among the corrigenda, however, at p. 452, appears the following remark: "Probably one of the very curious abnormal forms of *Acrostichum sorbifolium*." This is correct. But, under *A. scandens* (a common Burmese fern), at p. 412, I find the following observation: "*Davallia achilleifolia*, Wall. (Hook. Sp. Fil. Vol. I. p. 195 t. 56 D.) seems to be a deltoid tripinnatifid abnormal form," i.e. of *A. scandens*. I have little doubt, however, that it is rather a form of *A. sorbifolium*, for the figure might have been taken from a portion of my specimen, so truly does it represent it! I have another somewhat similar fern, which may be the young state of *A. scandens*; and yet another from the late General Munro, from Jamaica (no name), also apparently the young state of some species of climbing *Acrostichum*.

The note under *Davallia achilleifolia*, Sp. Fil. Vol. I. p. 195, may be read with interest; from it I extract what follows. "Mr. J. Smith finds similar productions on specimens of his *Stenochlæna* (*Acrostichum*) *scandens* from Cumming, and remarks, These abnormal fronds are usually about 3 inches in length and tripinnatifid, not unlike some delicate multifid species of *Davallia* or *Cheilanthes*. They are found on a lengthened rachis, like parts of the rhizome. There can be no doubt that it is a peculiar growth, common to more than one species of the genus." To this I would add a suggestion that possibly this is the normal and not the abnormal growth of all species of the *Stenochlæna* group of *Acrostichum*. It is, I think, not unlikely that they all begin life in this delicate form, gradually developing their coarser and robuster features as they grow up.

#### A. (EGENOLFIA) APPENDICULATUM, Willd.

A common fern in rocky places; and if all its differing forms are to be lumped together under the name here given (as they are in the Synopsis), certainly a very polymorphous one. Many ferns have been raised to the rank of species upon less ground than some of the varieties of this one may claim. The common form may be thus described. Caudex erect or slightly repent; stipes more or less tufted in consequence. That of the barren frond is 3-6 inches long, sealy; frondose portion 1 foot or more, simply pinnate; pinnae numerous, 1½-2 inches by ½ inch wide; sessile, sometimes crenate only, with a prominent lobe on the upper side close to the rachis, and sometimes deeply pinnatifid, in which case the lobe is less apparent. Fertile frond longer, both in the stipes and the frondose portion: sori sometimes covering the back of the very much narrowed pinnae, as in the crenate form; sometimes, as in the pinnatifid form, appearing as little lumps of fructification only, on a much attenuated mid-rib.

*Egenolfia* (sometimes also called *Polybotrya*) *Hamiltoniana* is a var. of larger growth. *E. costulata* is a most elegant and apparently distinct variety, which I find abundantly in only one spot that I can recollect. This is at the 'tsakan immediately before you begin the ascent of Dauna-toung, starting from "Christian Village." Here is what Hooker says of it. "A still more remarkable form than any of those" (previously described) "I have added to the number as var. *costulata*; especially that state found by Mr. Parish, distinguished not only by the deeply pinnatifid pinnae, but by the lower pair, both in the sterile and fertile fronds, being again pinnate. The Khasya specimens, however, exhibit quite intermediate forms."—Sp. Fil. Vol. V. p. 252.

#### A. (GYMNOPTERIS) COSTATUM, Wall.

##### *A. (Gymnopteris) virens*, var. Synopsis.

A handsome fern, frequently met with at the base of old Pagodas, is *A. costatum*, Wall., var. *undulatum* (*Jenkinsia undulata* of Hook. Gen. Fil. t. 75). Caudex stout, slightly repent; stipes 1-1½ foot long, slightly furfuraceous; fronds about the same length, simply pinnate, 18-20 pairs, with a terminal one; barren ones ovate-lanceolate, pointed, about 5 inches long by 1½ broad, crisped and wavy at the margins;

fertile fronds shorter and narrower, sometimes entirely covered with the confluent sori, but sometimes again these are in a broad marginal band, with a tendency to run down between the main veins towards the costa or mid-rib.

*A. (CHRYSONIDIUM) AUREUM, Linn.*

Caudex stout, erect; stipites tufted, 1-2 feet long, strong, glossy; fronds varying much in size, 3-1 feet long, or even more, and 1-2 feet broad, simply pinnate; pinnae broad, strap-shaped, sometimes a foot long and 2-3 inches broad, blunt at the end, the upper ones alone fertile and closely covered with the sori. Frequent in salt-water creeks.

*A. (HYMENOLEPIS) SPICATUM, Linn.*

Rhizome slightly repent; stipes 1-2 inches, fronds 5-6 inches long, bearing the sori on their suddenly contracted narrow apex. On trees, Madremacam, Mergui.

*PLATYCERIUM*<sup>1</sup> *WALLICHII, Hook.*

Fronds of two very distinct kinds, the one sessile and erect, the other pendulous. Barren erect frond always found appressed against the trunk of a tree, deeply lobed, with sinuous forked divisions; fertile fronds, a pair, from a common axis, pendant, each (generally but not always) in two main divisions, in the sinus of which, where they again divide, is situated a semicircular shield, 3-4 inches in diameter, wholly covered on the under side with the fructification imbedded in a thick mat of soft tomentum; beyond this the fronds divide and subdivide again in a bifarious manner. Substance very thick and tough, and soft, with a tawny pubescence underneath, dull green above. Frequent, especially on trees about Toung-wine, near Maulmain.

*P. BIFORME, Blume.*

A grand and striking fern, always on trees, generally on a stout horizontal bough. Fronds also of two distinct kinds as in the foregoing species. Barren fronds erect, sessile, deeply lobed and sinuate, several, sometimes forming a complete circle, entirely enveloping the bough on which it grows, and forming a huge nest or basin, filled with a mass of tawny fibrous roots, and with the decayed matter of the old sessile fronds, the substance of which is often an inch thick, which are also renewed and thus form a fresh layer, every year. Fertile fronds pendulous, 6-7 times dichotomous, pedicelled at the base, divisions ligulate, like long leather straps, 2 inches broad. Fructification covering the inside—the whole concavity—of a distinct leathery *half-cup*, which is pedicelled, and arises from the fork of one of the primary divisions of the pendulous frond. As the sessile fronds are several, and each has a central axis of growth of its own, emitting its own pendulous fronds, there is sometimes seen a complete circle of such fronds, arching out from the huge round boss formed by the united masses of sessile fronds; a sight to be seen in order to be appreciated. The sessile fronds often measure 4 feet from tip to tip of their lobes, while the pendulous ones are 6 feet long! When I first beheld one, nearly this size, in the year 1854, at Mergui, in the Kulween jungle, I was in raptures, and did not leave the spot until I had it down, lopping the bough short off on both sides, and putting it on a Burman's shoulders (a weight he could with some difficulty carry), brought it home in triumph. This same plant adorned my fernery in Maulmain for many years. I was at last tempted to send it to England, but it died *en route*.

Loc. Mergui and the islands of the Archipelago. I never saw it farther North.

*OSMUNDA*<sup>2</sup> *JAVANICA, Blume.*

Fronds tufted on a short erect caudex, which I find always elevated on a conical

<sup>1</sup> *Platycerium*. *πλατύς*, broad; and *κεράς-ατος*, a horn.

<sup>2</sup> "*Osmund*, *Osmund Royal*, or *Osmund the Waterman*, apparently a corruption of *gross mond-kraut*, greater moon-wort, representing its ancient officinal name, *lunaria major*. There are other derivations of it, such as that by Beckmann, from the name of some person; by Nennich, on the authority of Houttuyn, from *os*, mouth, and *mundare*, to cleanse; by others from *os*, bone, and *mundare*, to cleanse. The *Waterman* would seem to be its Flemish name, *Waterarn*. The *Royal* refers, we are told by Lobel (*Kruidb. i.* p. 991), to its great and excellent virtues."—Prior, *Popular Names of British Plants*, p. 171.

mass of tangled roots a foot or more high; they (the fronds) are simply pinnate, 1-2 feet long, and droop in a graceful curve outwards from a common centre. The pinnæ are long, narrow and acute, some of the middle or lower ones being fertile, and thereby contracted into small bundles of sori on the costa. This fern affects a peculiar habitat, rocks and stones just above the high-water level of mountain torrents, in the rocky beds of which I have invariably found it. Among other localities I recollect one—at the foot of the fine waterfall that descends from No-a-la-bo, visible from Tavoy. Here it grows abundantly in company with fine specimens of *Cibotium glaucescens*.

As our European *Osmunda regalis* is found in the Nilghiris, it may possibly grow also in Burma, though I never met with it.

SCHIZEA<sup>1</sup> DIGITATA, Sw.

A singular little terrestrial fern, with barren fronds just like a blade of grass, 8 inches to a foot long,  $\frac{1}{2}$  or  $\frac{1}{4}$  broad only. The fertile fronds have their fructification at the end, which is divided into a number of narrow linear spikes about  $1\frac{1}{2}$  inch long. As it grows in the ground among other vegetation, it may easily escape notice.

Loc. Madremacam, Mergui, near the top of Patau.

LYGODIUM,<sup>2</sup> Sw.

A genus of climbing and twining ferns of elegant habit. I find three species: *L. scandens*, *L. pinnatifidum*, and *L. polystachyum*. The first two are common and must have attracted the attention of all persons of observation who have taken their walks abroad in Burma. The last is a rarer plant. One locality is Madremacam, Mergui.

ANGIOPTERIS<sup>3</sup> ERECTA, Hoffm.

A large smooth lively green fern, very common on the banks of streams throughout Burma. In the Synopsis it is described as having a caudex (or trunk) 2-6 feet high, and fronds 6-15 feet long. As it has been found in many widely separated parts of the world, this general description is no doubt correct; but it certainly does not develop these large proportions in the Tenasserim Provinces. As I know it, it has little or no caudex, the fronds springing from near the ground, and being 6 or 8 feet long. The stipites are round, smooth and swollen at the base, and have "two large leathery auricles," one on either side. The fronds are bipinnate; pinnæ 1-2 feet long, also swollen at their base; pinnules 6-8 inches long by 1 inch broad, oblong and acuminate, the edge generally toothed. Whole plant smooth and shining. The sori consist of a few rather large sporangia, some dozen or so, arranged in an oblong form, and are set in rows contiguous to the edge of the pinnules. I have observed that when suffering from temporary drought, as in a hot midday sun, the swollen parts, above mentioned, become relaxed, and allow the fronds and the pinnules to fall back and droop in a flaccid manner; but that they resume their right position on the return of moisture to the air; thus behaving in a directly opposite manner to the swollen petioles of *Bauhinia*, which allow the leaves to fall back and fold in the damp night air, but are rigid in the daytime.

<sup>1</sup> Schizœa. σχίζω to split, from the character of the fructification.

<sup>2</sup> Lygodium. I presume from λόγος, a flexible twig, and εἶδος, appearance, from the twisted or twining habit of the genus. Ulysses bound the Cyclops rams "together" λόγοισι, in his device to escape from that interesting monster:

"Τοὺς ἀκῶν συνέεργον εὐστρεφέεσσι λόγοισιν," . . .

Σύντρεψ ἀνύμενον.—Odyssey, ix. 427.

"These, three and three, with osier bands we tied."—Pope.

<sup>3</sup> Angiopteris. ἄγγος, a vessel or pitcher; and πτερίς, from the form of the sporangia, or spore-cases.

OPHIOGLOSSUM,<sup>1</sup> *Linnaeus*.

Two species are found; one small and terrestrial, 2-3 inches high, and another long and epiphytal. The first, *O. nudicaule*, has a small tuberous root-stock, with two or three fleshy roots, a single ovate or lanceolate frond (or two) on a slender stipes, the fructification forming a two-ranked spike at the end of a long slender distinct peduncle, which springs from the base of the frond. The second, *O. pendulum*, has a long pendulous simple or divided strap-shaped frond, 2-3 feet long by 1-2 inches broad, with a short spike of fructification issuing from it more than half-way down. This spike is 2 or 3 inches long. The latter is to be found at Mergui, on trees.

*O. NUDICAULE*, L.

*O. PENDULUM*, L.

Nicobars (K.). Mergui (P.)

HELMINTHOSTACHYS,<sup>2</sup> *Kaulfuss*.

A singular plant. Rhizome creeping, of the thickness of a cedar pencil, emitting short fleshy roots from its under-part. Fronds single, on a stipes 12-16 inches long, palmato pinnate, *i.e.* divided into pinnæ somewhat in the form of an outspread hand. Pinnæ 4-6 inches long by 1½-2 broad, simple or divided. Fertile spike arising from the point of union of the barren segments, peduncle 4-6 inches long, fructification 3-4 inches.

H. ZEYLANICA, Hook.

Growing in the rich mould which is formed in the hollows of the limestone rocks about Maulmain (P.). Kamorta and Milor (K.).

<sup>1</sup> Ophioglossum. ὄφις, a snake or adder; and γλῶσσα, a tongue.

<sup>2</sup> Helminthostachys. ἑλμινς-μινθος, a worm; and στάχυς, a spike of corn, from the form of the fructification.



# CATALOGUE OF FERNS

## SYSTEMATICALLY ARRANGED.

### Order FILICES. FERNS.

#### Sub-order I. *OPHIOGLOSSACEÆ*.

##### *OPHIOGLOSSUM*, *Linnæus*.

- O. NUDICAULE*, L. Terrestrial.  
*O. PENDULUM*, L. On trees. Tavoy. Houg-drau. Nicobars, Kurz.

##### *HELMINTHOSTACHYS*, *Swartz*.

- H. ZEYLANICA*. Limestone Rocks, Tenasserim. Kamorta, Kurz.

#### Sub-order II. *MARATTIACEÆ*.

##### *ANGIOTERIS*, *Hoffm.*

- A. ERECTA*, Hoffm. Common in shady jungles by the side of streams.

#### Sub-order III. *SCHIZÆACEÆ*.

##### *SCHIZEA*, *Smith*.

- S. DIGITATA*, Sw. Rare. Near the top of Patau, Mergui.

##### *LYGODIUM*, *Sw.*

- L. SCANDENS*, Sw. Common.  
*L. PINNATIFIDUM*, Sw. Frequent.  
*L. POLYSTACHYUM*, Wall. Rather rare. Island of Madremacam, Mergui.

#### Sub-order IV. *OSMUNDACEÆ*.

##### *OSMUNDA*, *L.*

- O. JAVANICA*, Bl. In the bed of streams descending from No-ā-la-bo, Tavoy.

#### Sub-order V. *POLYPODIACEÆ*.

##### Tribe I. *ACROSTICHEÆ*.

##### *PLATYCERIUM*, *Desvaux*.

- P. WALLICHII*, Hook. Common about Toung-wine, Maulmain.  
*P. BIFORME*, Bl. Mergui and the Islands of the Archipelago.

##### *ACROSTICHUM*, *L.*

- A. (HYMENOLEPIS, Kaulf.) SPICATUM*, L. Mergui.  
*A. (CHRYSONDIUM, Fée) AUREUM*, L. Frequent in salt-water creeks.  
*A. (CHRYSONDIUM, Fée) AXILLARE*, Cav. On trees, in shady jungles.  
*A. (CHRYSONDIUM, Fée) LANCEOLATUM*, Hook. On trees, in shady jungles.  
*A. (GYMNOPTERIS, Bernhard) VIRENS*, Wall. On trees, in shady jungles.  
 var. *COSTATUM* = *JENKINSIA UNDULATA*, Wall. Base of old Pagodas.  
*A. (GYMNOPTERIS) FLAGELLIFERUM*, Wall.  
*A. (GYMNOPTERIS) VARIABLE*, Hook.

- A. (EGENOLFIA, Schott) APPENDICULATUM, Willd. On rocks and stones in dry places in the jungles.  
 var.  $\beta$ . HAMILTONIANUM, Wall. On rocks and stones in dry places in the jungles.  
 var.  $\gamma$ . COSTATUM, Hook. On rocks and stones in dry places in the jungles.  
 var.  $\delta$ . LUDENS, Wall. On rocks and stones in dry places in the jungles.  
 var.  $\epsilon$ . BIPINNATUM (*vide* Beddome). At the 'tsakan,<sup>1</sup> at foot of Dauna-toung.  
 A. (STENOCHLENA, J. Smith) SCANDENS, J. Sm.  
 A. (STENOCHLENA) SORBITOLIUM, L. Paekchan.  
 A. VISCOSUM, Sw.  
 A. CONFORME, Sw.

Tribe II. GRAMMITIDEE.

HEMIONITIS, *Linnaeus*.

- H. CORDATA, Roxb. Limestone rocks, Tenasserim Provinces.

DRYMOGLOSSUM, *Presland*.

- D. PILOSEOIDES, Presl. On trees, frequent. Abundant about Tavoy.

TENITIS, *Swartz*.

- T. BLECHNOIDES, Sw. Frequent: on the hill behind Maulmain.

VITTARIA, *Smith*.

- V. LINEATA, Sw. Common on trees.  
 V. MINIMA, Hook. Sp. Fil. Vol V. p. 183. Ascent of Kala-ma-toung.  
 V. AMBOYNENSIS, Fée. Sp. Fil. V. p. 177. Ascent of Kala-ma-toung.

ANTROPHYUM, *Kaulfuss*.

- A. CORIACEUM, Wall. Common on trees.

MENISCIUM, *Schreber*.

- M. CUSPIDATUM, Bl.  
 M. TRIPHYLLUM, Sw.

BRAINEA, *Hooker*.

- B. INSIGNIS, Hook. Yunzalin mountains at 4-5000 feet.

GYMNOGRAMME, *Desvaux*.

- G. (SELLIGUEA, Bory) ELLIPTICA, Baker=G. DECURRENS, Hook.  
 G. (SELLIGUEA) CAUDIFORMIS, Hook. Bot. Mag. t. 5328.  
 G. (SELLIGUEA) INVOLUTA, Don.=S. WALLICHIANA, Hook. Icon. t. 204.  
 G. JAVANICA, Bl.

POLYPODIEE.

POLYPODIUM, *Linnaeus*.

- P. (PHYMATODES) HIMALAYENSE, Hook. Mountains, Dauna-toung.  
 P. (PHYMATODES) LEHMANNI, Mettenius. Dauna-toung.  
 P. (PHYMATODES) JUGLANDIFOLIUM, Don.  
 P. (PHYMATODES) PALMATUM, Bl.=P. PARISHII, Beddome.  
 P. (PHYMATODES) LONGISSIMUM, Bl.  
 P. (PHYMATODES) DILATATUM, Wall.  
 P. (PHYMATODES) NIGRESCENS, Bl. Tee-wa-phado, ascent of Moolce-it.  
 P. (PHYMATODES) PHYMATODES, L.  
 P. (PHYMATODES) TRIFIDUM, Don.=P. OXYLOBUM, Wall. Dauna-toung.  
 P. (PHYMATODES) PTEROPUS, Bl.

<sup>1</sup> A halting or camping place in the jungles.

- P. (PHYMATODES) HEMIONITIDEUM, Wall.  
 P. (PHYMATODES) TRIODES, Lam. Common on trees.  
 P. (PHYMATODES) MEMBRANACEUM, Don. Kala-ma-toung, Martaban.  
 P. (PHYMATODES) RHYNCHOPHYLLUM, Hook. Dauna-toung.  
 P. (PHYMATODES) NORMALE, Don. Mergui.  
 P. (PHYMATODES) ZOSTERIFORME, Wall. On rocks under water in mountain streams.  
 P. (PHYMATODES) SUPERFICIALE, Bl.  
 P. (PHYMATODES) LONGIFOLIUM, Mett. Mergui.  
 P. (PHYMATODES) SINUOSUM, Wall. Mergui, on trees: rare.  
 P. (PHYMATODES) LINEARE, Thunberg=P. LORIFORME, Wall.  
 P. (PHYMATODES) ROSTRATUM, Hook. Dauna-toung.  
 P. (DRYNARIA, Bory) CONJUGATUM, Lam.=P. CORONANS, Wall. Rather scarce.  
 Shan border, south-east of Maulmain.  
 P. (DRYNARIA) QUERCIFOLIUM, L. Everywhere on trees in the plains.  
 P. (NIPHOBOLUS, Auct.) PENANGIANUM, Hook.  
 P. (NIPHOBOLUS) FISSUM, Baker=P. POROSUM, Wall.  
 P. (NIPHOBOLUS) NUMMULARIFOLIUM, Mett. On trees, Tavoy.  
 P. (NIPHOBOLUS) STIGMOSUM, Sw.=P. COSTATUM, Wall.  
 P. (NIPHOBOLUS) LINGUA, Sw. Common on trees.  
 P. (NIPHOBOLUS) ACROSTICHOIDES, Forst. Common on trees.  
 P. (NIPHOBOLUS) ADNASCENS, Sw.  
 P. (NIPHOBOLUS) GARDNERI, Mett. Mergui.  
 P. (GONIOPHLEBIUM, Bl.) SUBAURICULATUM, Bl.  
 P. (GONIOPHLEBIUM) PUBERULUM, Baker. Shan border, south-east of Maulmain.  
 P. (EU-POLYPODIUM) SUBDIGITATUM, Baker=P. DAVALLIOIDES, Mett.  
 P. (EU-POLYPODIUM) DAREIFORME, Hook. Rare. Dauna-toung.  
 P. (DICTYOPTERIS, Presl.) DIFFORME, Bl.  
 P. (DICTYOPTERIS) TENERIFRONS, Hook. In the debris of Limestone rocks.  
 P. (GONIOPTERIS, Presl.) TROPHYLLUM, Wall.  
 P. (GONIOPTERIS) PROLIFERUM, Presl.  
 P. (PHEGOPTERIS) OBSCURUM, Hook.<sup>1</sup>

#### ASPIDIÉE.

##### OLEANDRA, *Cavanilles*.

- O. NERIIFORMIS, Cav. On rocks. Rare. Loc.?  
 O. LONGIPES, Hook.=O. CUMINGII, J. Smith. var. On rocks. Toung-wine.

##### NEPHROLEPIS, *Schott*.

- N. ACUTA, Presl. Frequent. Kamorta. Katchall, Kurz.  
 N. EXALTATA, Schott. Common. Old wall at Martaban.  
 N. CORDIFOLIA, Baker=N. TUBEROSA, Hook.

##### NEPHRODIUM, *Richard*.

- N. (SAGENIA, Presl.) GIGANTEUM, Baker.  
 N. (SAGENIA) GRIFFITHII, Baker. Burma, Griffith.  
 N. (SAGENIA) CICUTARIUM, Baker=S. COADUNATA, Wall ?  
 N. (SAGENIA) DECURRENS, Baker. Kamorta, fide Kurz.  
 N. (SAGENIA) VARIOLOSUM, Baker.  
 N. (SAGENIA) ZOLLINGERIANUM, Baker. Tenasserim. Helfer.  
 N. (SAGENIA) POLYMORPHUM, Baker.  
 N. (SAGENIA) SUBTRIPHYLLUM, Baker.  
 N. (PLEOCNEMIA, Presl.) LEUZEANUM, Hook. Dongg-kon-laya, Ascent of Moollee-it.  
 N. (EU-NEPHRODIUM) TRUNCATUM, Presl.  
 N. PUNCTATUM, Par. Beddome, Ferns Brit. India, Tab. 131.

<sup>1</sup> Under this fern Baker, Synopsis Filicum, p. 308, remarks: "Very like a non-involucrate form of *Nephrodium sagenioides*." He is undoubtedly right. It is this and nothing else.—P.

- N. MOLLE*, Desv. Ubiquitous.  
 var. *didymosorum*, Par. Bedd. Ferns S.I. Tab. 84.  
*N. ARBUSCULA*, Desv. = *N. HOOKERI*, Wall.  
*N. EXTENSUM*, Hook.  
*N. UNITUM*, R. Br.  
*N. PTEROIDES*, J. Sm. = *N. TERMINANS*, Hook.  
*N. PLATYPUS*, Hook. ?  
*N. (LASTREA, Presl.) SETIGERUM*, Baker = *N. TENERICAULE*, Hook. Sp. Fil.  
*N. (LASTREA) RECEDENS*, Hook.  
*N. (LASTREA) MEMBRANIFOLIUM*, Presl.  
*N. (LASTREA) PARISHII*, Hook.  
*N. (LASTREA) ODORATUM*, Baker = *N. ERIOCARPUM*, Hook. Sp. Fil. Zwa-ka-bin.  
*N. (LASTREA) SPARSUM*, Don. = *N. PURPURASCENS*, Hook. Sp. Fil.  
*N. (LASTREA) FLACCIDUM*, Hook.  
*N. (LASTREA) PRESLII*, Baker = *N. PROPINQUUM*, Hook. Sp. Fil.  
*N. (LASTREA) FILIX-MAS*, var. *COCHLEATUM*, Don. Top of Zwa-ka-bin.  
*N. (LASTREA) SYRMATICUM*, Baker = *N. SPECTABILE*, Hook. Sp. Fil.  
*N. (LASTREA) SAGENIOIDES*, Baker = *N. MELANOPUS*, Hook. Sp. Fil.  
*N. (LASTREA) PROLIXUM*, Baker. Kamorta, *vide* Kurz.  
*N. (LASTREA) CALCARATUM*, Hook = *N. FALCIBOUM*, Hook. Sp. Fil.  
*N. (LASTREA) GRACILESCENS*, Hook. Madremacam, Mergui.  
*N. (LASTREA) HIRTIPES*, Hook = *ASP. ATRATUM*, Wall.

*ASPIDIUM, Swartz.*

- A. (POLYSTICHUM, Roth) ARISTATUM*, Sw.  
 var. *conifolium*, Wall.  
*A. (POLYSTICHUM) ACTLEATUM*, Sw. Mountains. Top of No-a-la-bo.  
 var. *bi-aristatum*, Bl.  
*A. (POLYSTICHUM) SEMICORDATUM*, Sw.

*DIDYMOCHELENA, Desvaux.*

- D. LUNULATA*, Desv. Only found by me in a damp hollow on Ta-ök.

*ASPLENIEÆ.*

*ASPLENIUM, Linnæus.*

- A. (ANISOGONIUM, Presl.) ESCULENTUM*, Presl. Swampy spots in jungles. Teeyang.  
*A. (DIPLAZIUM, Sw.) LATIFOLIUM*, Don.  
*A. (DIPLAZIUM) POLYPODIOIDES*, Mett.  
*A. (DIPLAZIUM) JAPONICUM*, Thunb. = *A. SCHUCHII*, Hook. Sp. Fil.  
*A. (DIPLAZIUM) TOMENTOSUM*, Hook.  
*A. (DIPLAZIUM) SYLVATICUM*, Presl.  
*A. (DIPLAZIUM) BANTAMENSE*, Baker = *A. FRAXINIFOLIUM*, Wall.  
*A. (DIPLAZIUM) PALLIDUM*, Bl.  
*A. TENUFOLIUM*, Don. Kala-ma-tonng. Martaban.  
*A. NITIDUM*, Sw. On trees in wet jungles.  
*A. HETEROCARPUM*, Wall. Zwa-ka-bin.  
*A. RESECTUM*, Wall. Common on trees in mountainous places. Ta-ök.  
*A. MACROPHYLLUM*, Sw. Kamorta, Kurz.  
*A. FALCATUM*, L. Ta-ök.  
*A. HIRTUM*, Kaulf. Madremacam, Mergui.  
*A. ERECTUM*, Bory. Ta-ök.  
*A. TENERUM*, Forst.  
*A. LONGISSIMUM*, Bl.  
*A. NORMALE*, Don. Ta-ök.  
*A. ENSIFORME*, Wall. Ta-ök.  
*A. (THAMNOPTERIS, Presl.) GREVILLEI*, Wall. On Tavoy Island.  
*A. (THAMNOPTERIS) NIDUS-AVIS*, L. On trees in wet jungles, sometimes  
 with fronds 6 feet long.

## BLECHNEÆ.

BLECHNUM, *Linnaeus*.

- B. ORIENTALE, L. Common. On the hill behind Maulmain.

## PTERIDEÆ.

LOMARIA, *Willdenow*.

- L. ADNATA, Bl.

CERATOPTERIS, *Brongniart*.

- C. THALICTROIDES, Brong.

PTERIS, *Linnaeus*.

- P. (LITOBROCHIA, Presl.) TRIPARTITA, Sw.  
 P. (DORYOPTERIS, J. Sm.) PEDATA, L. On limestone rocks near Maulmain.  
 P. (DORYOPTERIS) LUDENS, Wall. On limestone rocks near Maulmain.  
 P. (CAMPTERIA, Presl.) WALLICHIANA, Agardh.  
 P. (CAMPTERIA) BIAURITA, L.<sup>1</sup>  
 P. (PESIA, St. Hilare) AQUILINA, L. On all mountains at 4-5000 ft., and on the top of Patou, Mergui, only 800 ft.  
 P. (EU-PTERIS) PELLACENS, Ag.  
 P. EXCELSA, Gaudichaud.  
 P. LONGIPINNULA, Wall.  
 P. QUADRIACRITA, Retz. Common.  
 P. QUADRIACRITA, var. SETIGERA, Hook.  
 P. QUADRIACRITA, var. ARGYREA, Moore. Jungles on Shan border.  
 P. SEMIPINNATA, L. Mergui, up the Tenasserim River.  
 P. HETEROMORPHA, Fée.  
 P. PELLUCIDA, Presl.  
 P. LONGIFOLIA, L. Common everywhere. Nicobars, Kurz.

ONYCHIUM, *Kaulfuss*.

- O. AURATUM, Klf. Very frequent in deserted Toung-yas.

CHEILANTHES, *Swartz*.

- C. FARINOSA, Klf. Zwa-ka-bin. On rocks about Kulwee. Beloo-gewn.  
 C. ARGENTEA, Hook. Zwa-ka-bin.  
     var. *chrysophylla*, Hook. Zwa-ka-bin.  
 C. RUFA, Desv. Zwa-ka-bin.  
 C. TENUIFOLIA, Sw. Frequent. On the hill behind Maulmain.  
 C. VARIANS, Hook. Frequent. On the hill behind Maulmain.  
 C. FRAGILIS, Hook. Limestone rocks near Maulmain.

ADIANTUM, *Linnaeus*.

- A. FLABELLULATUM, L. Mountains of the Yunzalin.  
 A. CAPILLUS-VENERIS, L. On rocks in the Megatha River. South-east frontier.  
 A. CAUDATUM, L. Mya-wa-dee.  
 A. SOBOLIFERUM, Wall. Probably a var. of *caudatum* or *lunulatum*.  
 A. LUNULATUM, Burm. Ubiquitous in the plains.  
 A. PARISHII, Hook. Zwa-ka-bin.

## LINDSAYÆÆ.

LINDSAYA, *Dryander*.

- L. LANTGINOSA, Wall. On Palmyra trees, Tavoy. Extremely rare.  
 L. TRAPEZIFORMIS, Dry.  
 L. FLABELLULATA, Dry.

<sup>1</sup> *Pteris repandula*, Link, of Kurz's collection = *Pt. aurita*.

- L. *CULTRATA*, Sw. Common, in stony or rocky places.  
 L. *LOBBIANA*, Hook. Doubtfully distinct from preceding. Madremacam, Mergui.  
 L. *ENSIFOLIA*, Sw. Common. On the hill, Manlmain.  
 var. *Griffithiana*, Hook. An undeveloped state of *ensifolia*.

DAVALLIEÆ.

CYSTOPTERIS, *Bernh.*

- C. *SETOSA*, Beddome. Ferns Brit. Ind. tab. 312. A doubtful plant. By the spring, at the top of Moolee-it, 6000 feet.

DAVALLIA, *Swartz.*

- D. (*STENOLOMA*, Fée) *TENTIFOLIA*, Sw. Mountains. Rare. Dauna-toung, 5000 feet.  
 D. (*MICROLEPIA*) *SPELUNCÆ*, Baker = D. *POLYPODIOIDES*, Hook.  
 D. (*MICROLEPIA*) *STRIGOSA*, Sw. = D. *KHASIYANA*, Hook. Ascent of No-a-la-bo.  
 D. (*MICROLEPIA*) *PINNATA*, Car. Mergui, Archipelago.  
 D. (*EU-DAVALLIA*) *BULLATA*, Wall. On trees, Mergui.  
 D. *ELEGANS*, Sw. Common. Abundant on Cocoa-nut and Palmyra trees, Mergui.  
 D. *SOLIDA*, Sw. Common. Abundant on Cocoa-nut and Palmyra trees, Mergui.  
 D. *GRIFFITHIANA*, Hook. Mergui.  
 D. *DECURRENS*, Hook. Mergui.  
 D. (*LEUCOSTEGIA*) *CHEROPHYLLA*, Wall. Kala-ma-toung. Martaban.  
 D. (*LEUCOSTEGIA*) *IMMERSA*, Wall.  
 D. (*LEUCOSTEGIA*) *HYMENOPHYLLA*, Parish. Limestone rocks. Maulmain.  
 D. (*HUMATA*, Crv.) *PEDATA*, Sm. Mergui, thence southward.  
 D. (*HUMATA*) *PARALLELA*, Wall. Mergui, thence southward.

HYMENOPHYLLEÆ.

TRICHOMANES, *Smith.*

- T. *RIGIDUM*, Sw.  
 T. *JAVANICUM*, Bl. On wet banks by streams. Madremacam. Mergui.  
 T. *PYXIDEFERUM*, L.  
 T. *HUMILE*, Forster, *fide* Kurz. Nicobars.  
 T. *FILICULA*, Bory. Common.  
 T. *PUSILLUM*, Sw.  
 T. *MUSCOIDES*, Sw., *fide* Kurz. Katchall.  
 T. *HENZAIANUM*, Parish. On trees about Henzai basin.

HYMENOPHYLLUM, *Smith.*

- H. *DENTICULATUM*, Sw.  
 H. *TUNBRIDGIENSE*, Smith.  
 H. *POLYANTHOS*, Sw.  
 H. *JAVANICUM*, Spreng.  
 H. *ENSERTUM*, Wall.  
 H. *PARVIFOLIUM*, Baker. Toung-kyá-'tsakan, between Karkaret and Mya-wa-dee.

DICKSONIÆ.

DICKSONIA, *L'Heritier.*

- D. (*CIBOTIUM*, Kaulf.) *BAROMETZ*, Link. Madremacam, Mergui.

CYATHIÆ.

DIACALPE, *Blume.*

- D. *ASPIDOIDES*, Bl. Abundant at 5-6000 feet on the ground.

ALSOPHILA, *Brown.*

- A. *LATEBROSA*, Hook. Tree Ferns. Mountainous districts.

- A. GLABRA, Hook. Tree Ferns. Mountainous districts.  
 A. CONTAMINANS, Wall. Tree Ferns. Mountainous districts.  
 A. COMOSA, Hook. Tree Ferns. Mountainous districts. Near Tecmibōng,  
 ascent of Moolee-it.  
 A. ALBOSETACEA, Boddome, Suppl. Ferns B. India. Nicobars, Kurz.

Sub-order VI. *GLEICHENIACEÆ*.*GLEICHENIA*, Smith.

- G. DICHOTOMA, Willd. Frequent. Road to Kulween, Mergui. Amherst Cliff.  
 G. LONGISSIMA, Bl. Mountains. Nattoung.

## Order MARATTIACEÆ.

*ANGIOPTERIS*, Hoffm.

- A. EVECTA, Hoffm. Wet jungles, Toung-wine, near Maulmain.

The following brief account of the classification of the Acotyledonous orders is condensed from Maout and Decaisne's work, the arrangement of the Algae spurie being by Sir J. D. Hooker.

## Class THALLOGENS.

## Order ALGÆ.

Algae spurie are divided into five Tribes.

*CRYPTOCOCCIÆ*.

*These organisms are minute colourless globules found in vinegar and other fluids, and are probably only mycelia of certain fungi.*

*VOLVOGINIÆ*.

*Minute fresh-water Algae consisting of a number of permanently active zoospore-like bodies, associated in various forms, and surrounded by a gelatinous coat, with or without an enveloping membrane.*

This order embraces three genera, *Volvox*, *Stephanosphaera* and *Gonium*. *Volvox* is a pale greenish globule one-fiftieth of an inch in diameter. It consists of a membranous sac, studded with green points, and clothed with innumerable cilia. It is found in ponds and is in a state of constantly rolling motion. The green points consist of layers of zoospore-like bodies, coating the inside of the sac, with two cilia which project through the holes in the sac, and are further provided with delicate filaments, that extend from their sides and meet similar filaments, from the adjoining bodies. The zoospores are pyriform, have a reddish eye spot, and transparent contractile vacuole. Young *Volvoxes* occupy the centre of the sphere. *Stephanosphaera* has eight biciliated green cells placed at equal distances along the equator of a spherical cell. *Gonium* presents a flat frond of about sixteen cells. They display two forms of cells, an active and passive, the former having each a pair of vibratile cilia projecting through their hyaline envelope.

*PALMELLACIÆ*.

*Gelatinous or powdery crusts found on damp surfaces, and in fresh or salt water, composed of globular and elliptic cells aggregated in a gelatinous matrix. Reproduction by cell-division and ciliated zoospores.*

This tribe embraces six genera—*Chlorococcus*, *Palmella*, *Protococcus*, *Trypethallus*, *Glæocapsa*, and *Hormospora*. *Palmella cruentata* forms rose-coloured patches on damp walls. *Protococcus nivalis* is the celebrated red-snow of Arctic and Alpine regions. *Protococcus* includes various unicellular *Palmellaciæ*, which increase by division into two or four parts, which separate, but are connected by a semigelatinous layer. Sometimes its cells give rise to four-ciliated zoospores of two sizes, the larger of

which settle down and develop a cellulose coat, whilst the further development of the smaller is unknown.

#### NOSTOCHINIEÆ.

*Plants growing on damp moss or earth, and on stones in freshwater. They consist of slender moniliform tranquil or oscillating filaments, composed of cells placed end to end, immersed in a dense gelatinous matter, formed by the fusion of the gelatinous sheaths of the filaments. Reproduction by cell division.*

This order embraces seven genera—*Nostoc* (*Hormosiphon*), *Aphanizomenon*, *Spharozygga*, *Anabania*, *Spermoseira*, *Trichodesmium*, and *Monormia*.

A group of obscure plants, resembling *Collema* amongst Lichens, found all over the globe, even on ice or snow, often occurring in detached masses. *Monormia* forms floating jelly-like masses on brackish water, sometimes of great extent.

*Nostoc edule* is sold in China dried, and is used as an ingredient in soups. *Trichodesmium Ehrenbergii* resembles chopped straw, and floats on the ocean, and also on the surface of the Red Sea.

#### OSCILLATORIEÆ.

*Plants growing in fresh and brackish pools, hot springs, rivers and vegetable infusions. They are formed of transversely-striated filaments, sometimes spirally curled or sheathed in mucus, exhibiting a serpentine motion. Reproduction by transverse division. The order embraces fourteen genera: Oscillatoria, Ulothrix, Enactis, Spirulina, Calothrix, Leptothrix, Microcoleus, Sclerothrix, Bacterium, Lyngbya, Rivularia, Vibrio, Scytonema, Gloeotrichia. Vibrios are minute, colourless, active, jointed bodies, that abound in decomposing infusions, and like the still simpler Bacteria, which are mere inflexible rods, are probably rudimentary states of other Algæ.*

The knowledge that the presence in the blood of man and animals of microscopic rod-like bodies in various diseases, each disease having its concomitant and distinguishable organism, is likely to prove of practical advantage. For example, a horse is attacked with certain symptoms, which may be of no dangerous import, or may be the forerunner of the dangerous and highly contagious disease, termed 'Ludiana,' in Northern India. A drop of blood drawn from the sick animal is placed under the microscope, and if the organisms which are associated with the disease 'Ludiana' are seen to be present in the blood, the horse is at once slaughtered and buried, thereby probably arresting the spread of the disease to other animals; but if these organisms are not visible, the animal is simply watched, and may eventually prove to be only suffering from a trifling or curable ailment.

#### ALGÆ (Proper).

Cellular acotyledonous plants, aquatic or growing on damp ground, always exposed to the light. Reproduction either asexual by means of zoospores, or by means of atheridia and sporangia, monœcious or diœcious, and mostly producing motionless spores solitary or quaternary in the same sporangium.

True Algæ are divided by Decaisne into six orders, some of the lowest forms, however (*Diatomeæ*), have been referred to the animal kingdom.

#### DIATOMIEÆ.

*Microscopic organisms living in fresh or salt water, generally prismatic and rectangular, free, sessile, or pedicelled, naked, or immersed in mucilage, and divided into polymorphic fragments (frustules). The envelope is rigid, siliceous, two-valved, and finely striated.*

Besides their multiplication by spores (as in *Desmidiæ*) *Diatomeæ* are reproduced by fissuring. On the centre of each frustule, in the solitary species, and of each segment or joint in the aggregated forms, there is frequently visible on the young Diatom a line dividing it into two (or more) frustules, which become distinct and similar individuals. Certain species are parasitic; others form flakes or gelatinous

masses on rocks; others live in fresh and pure spring water; others cover the soil with a thick brown sticky layer. Diatoms abound in *guano*, and are often abundant in the crops of lamellirostrate birds, which resort to mud flats to feed, and wherever water collects in holes in wood or stone, the slime from such situations requiring only to be scraped up and dried, and the Diatoms it contains can then at any time be prepared for the microscope by boiling in sulphuric acid. Diatoms abound in a fossil state, and Ehrenberg discovered that '*Tripoli*,' or rotten stone, was entirely composed of the microscopic siliceous shells of these organisms, and they constitute considerable deposits in various parts of the world.

#### SYNSPORIEÆ, Decaisne.

*Conjugatæ*, Linklater.

*Freshwater Algaæ*, composed of cells of various forms, or chambered tubes, filled with green matter, either granular or disposed in spiral plates. Reproduction is effected by the union of the contents of two contiguous cells, by the effacement of their walls, simple or compound spores resulting from this fusion.

#### Sub-tribe DESMIDIEÆ.

*Microscopic green Algaæ*, composed of two hemispherical corpuscles, free, basally united or associated in flat or spiral bands enveloped in mucilage, varied and elegant, always symmetrical, and with either smooth or sculptured surface. Reproduction either by conjugation, as in *Synsporiæ*, or by fissuring, or by means of sporangia. The green matter of *Desmidiæ* is said to possess a circulation analogous to that of *Chara*.

#### SAPROLEGNIEÆ. (MYCOPHYCEÆ, Kützing.)

*Colourless, aquatic, filamentous plants*, growing on decomposing organic matter, resembling *Vaucheria* in structure. Reproduction by rounded mobile zoospores, resembling the spores of *Confervæ* and *Vaucheria*; and also by sporangia, containing spherical oogonia.

*Saprolegnia* is a minute *Alga*,<sup>1</sup> usually found coating the bodies of drowned animals with hyaline filaments, and is sometimes developed on the bodies of living fish. The filaments are filled with granules, which eventually become converted into zoospores, which are discharged from the end of the filament at first with impetuosity, and afterwards more slowly. These zoospores are turbinate in shape and biciliate. The filaments also produce lateral sacs, bearing sporangia, thereby illustrating two methods of reproduction in the same plant.

#### VAUCHERIEÆ.

*Green fragile Algaæ*, formed of simple, not septate filaments. Reproduction as in *Saprolegnia*, either by zoospores, or by a sporangium which, after receiving the antherozoa, becomes detached and sinks into the mud, where it gives birth to a fresh individual.

#### CHLOROSPORIEÆ, Thuret.

*CONFERVÆ*, Agardh.

*Green Algaæ*, marine or freshwater. Reproduction by means of zoospores produced by the concentration of the green matter, and with or without the formation of antheridia.

#### Sub-Tribe EDOGONIEÆ.

*Green Algaæ*, very simple in structure, consisting of a series of simple or branched cells.

#### Sub-Tribe CONFERVIEÆ.

##### Section a. Unicellulares.

Each cell producing several spores furnished with vibrating hairs.

##### Section b. Umferreæ.

Tubes or cells containing ovoid spores, furnished with 2-4 vibrating hairs.

<sup>1</sup> Some authors have classed *Saprolegnia* among *Fungi*.

## PHLEOSPOREÆ AND FUCACEÆ. Thuret.

(Aplosporeæ, Dene. Melanosporeæ, Harv.)

*Marine Algæ, brown or olive-coloured, mucilaginous, variable in shape. Frond with or without nerves, entire, or variously cut, sometimes pierced with holes, or twisted into a spiral or furnished with floating bladders, or with a fistular stem. Reproduction by sporangia, with or without the development of antheria.*

Section a. *Fucaciæ.*

Reproductive organs male and female, contained in conceptacles. Spores motionless.

Section b. *Laminariæ.*

Reproductive organs superficial *sori*. Spores usually mobile, germinating without previous fertilization. In the section *Laminariæ* the *sporangia* are irregularly distributed over the surface of the frond, giving birth to ovoid *zoospores*, endowed with active motion, and which germinate immediately they become fixed. In the other section *Fucaciæ* ('wrack') the fructification usually corresponds to tubercles, dispersed over the frond, or united in special organs in terminal or axial racemes. Each tubercle indicates a fructiferous cavity or *conceptacle* in the thickness of the frond. This *conceptacle* is filled with mucilage, and bears on its inner wall a number of transparent ciliated cells. At the season of reproduction such of these cells as are to fructify, swell and give rise to numerous reproductive bodies which escape by a minute central orifice, and soon divide into two, four or eight spores, which quickly germinate. Sometimes the *antheridia* are developed on the same *conceptacle* with the *sporangia*, sometimes on distinct individuals, as the species may be monoecious or dioecious. The *conceptacles* are generally recognizable by their orange colour. On the *antheridia* being discharged from the *conceptacle*, each gives birth to numerous lageniform *antherozoa* marked with a single red granule, forming a dorsal protuberance, and moving briskly by means of two unequal very mobile hairs or cilia, the shortest in front and the other extending behind. When the *antheridia* and *sporangia* occupy the same *conceptacle*, the latter are found at the bottom, whilst the former line the upper half near the central aperture or point of issue.

## FLORIDIÆ, Lamouroux.

(Rhodospereæ, Harv. Choristospereæ, Dene.)

*Marine or very rarely freshwater Algæ. Rose, violet, purple, reddish-brown, or rarely greenish, often mucilaginous, and variously formed, either of simple or branched filaments (Dasya), or tubes united into a simple filamentous stem (Polysiphonia), or of irregular membranous fronds (Porphyra), or apparently foliaceous (Dessoria), or cartilaginous (Iridea), with or without nerves, entire or latticed (Hemitrema, Thuretia), or umbellate (Constantinia), or tomentaceous (Catenella), or Langermannoid (Leveillea, Polyzonia), or sometimes encrusted with lime and fragile (Corallina). Reproductive organs monoecious or dioecious. Sporangia either superficial or sunk in the frond, and contained in variously-shaped conceptacles. Spores rounded or oblong, solitary or in fours. Antheridia variously formed or constituting part of the tissue of the frond, composed of colourless cells each containing an antherozoid without vibratile hairs, and incapable of motion. In place of hairs, however, each antherozoid is furnished with a tubular organ called 'trichogyne.'*

## FUNGALÆ.

Usually terrestrial polymorphous plants, sometimes subterranean, often parasitic, destitute of chlorophyll or starch, of most varied form, colour, and consistence, sometimes reduced to a few filaments or cells. Vegetative organs consisting of a *mycelium*, or tissue of slender simple threads. Spores most minute, sometimes superficial, at others borne upon projections called *basidia*, at others enclosed in cells or sacs.

Fungi are divided into six tribes.

## ARTHROSPORIEÆ.

*Receptacle filamentous, fistular, simple, branched or almost obsolete; contiguous or chambered. Spores naked, terminal, jointed end to end, continuous or chambered, separating more or less easily.*

*Arthrosporiceæ* embrace minute forms, a few only of which are of economic importance to man, as *Torula cererisicæ*, the yeast plant, developed during the manufacture of beer, and indispensable thereto. The *Oidium Tuckeri* is an equally well-known example, and the scourge of the vine cultivator all over Europe. *Fumarago* is another familiar example of a microscopic fungus, which coats the surface of public buildings, statues, and the like with a dark film something like a coating of soot.

## TRICHOSPORIEÆ.

*Receptacles filamentous, simple or branched, fistular, continuous or chambered. Spores very various in form, simple or compound, clustered, at the extremity of the branches or around the receptacle.*

*Trichosporiceæ* also include a multitude of microscopic fungi, some of them extremely formidable to man, as *Peronospora infestans*, the proximate cause of the potato disease, and *Botrytis Bassiana*, whose presenee in the body of the silkworm gives rise to the formidable disease of that insect, *Muscardine*, for which no remedy seems known save isolation, and which has in some years almost ruined the silk producing industry in some parts of France.

## CYSTOSPORIEÆ.

*Receptacles flocculent, continuous or chambered, simple or branched, terminated by a vesicular sporangium.*

*Cystosporiceæ* are minute organisms or moulds, which find a habitation on decaying vegetable substances or the excrements of animals, and claim no particular notice—though they well repay the trouble of studying their forms and development.

## CLINOSPORIEÆ.

*Spores springing from a clinodium, covering wholly or partially the surface of the receptacle, or enclosed in a conceptacle. Two sections are recognized.*

a. (*Endoclinal*) *Conceptacle* membranous, more or less thick, fleshy, coriaceous or horny, sessile or pedicelled, opening variously and enclosing the clinodium.

b. (*Ectoclinal*) *Receptacle* fleshy, sessile or pedicelled, convex or concave, covered by the clinodium.

*Clinosporiceæ* are common fungi, some of which, known as ‘rust’ or ‘smut,’ have a special interest as affecting various cereals used for food. The ‘smut,’ *Ustilago segetum*, attacks the ovule, floral envelopes, and spikelets, reducing them to a black powder, and wheat, barley, oats, millet, and sorghum are all liable to be attacked by it. The only useful member of this tribe is the Ergot of Rye (*Secale cornutum*), which is a valuable uterine stimulant in tedious labours, and of service in arresting undue hæmorrhage. It is however, when accidentally consumed in flour made from affected grain, extremely injurious, and gives rise to formidable results and even death in some cases.

## THECASPORIEÆ.

*Spores usually contained by eights in cells (thecæ, sporangia), covering wholly or partially the surface of a receptacle, or the interior of a conceptacle. Thecæ, accompanied or not by paraphyses, and opening at the top by an inconspicuous operculum for the emission of simple or chambered spores.*

Two sections are recognized—

- a. *Endothecal*. *Thecæ* rounded, ovoid, clavate or cylindric, enclosed in a conceptacle.
- b. *Ectothecal*. *Thecæ* elongated, covering the surface of a receptacle.

*Thecasporiceæ* are of prime importance, as embracing some of the most highly valued of the edible species, as, for example, the common Morel (*Morchella esculenta*) and the Truffle (*Truber cibarium*). The truffle, however, so lauded by the Roman

poets, was (as I am informed by C. E. Broome, Esq.) an allied smooth yellow species, called *Terfez* by the Arabs, and *Terfezia leonis* by botanists. It is this species to which Juvenal alludes—

“Tibi habe frumentum, Alledius inquit  
O Libye: disjunge boves, dum tubera mittas!”—*Sat. V.* 118.

We know, however, from Martial that in the esteem of some they held a place gastronomically speaking below mushrooms:

“Rumpimus altricem tenero quæ vertice terram  
Tubera,—boletis poma secunda sumus.”

Another curious member of this tribe is the genus *Sphæria*, which germinates within the body of a caterpillar, giving rise to the foolish idea entertained by some of the change of the animal into a vegetable growth, as in the *S. Robertsii* from New Zealand.

#### BASIDIOSPORIÆ.

*Spores simple, borne on rounded semielliptic or conical cells, named basidia, which terminate in 2-4 points (sterigmata), each bearing a spore; the basidia are often accompanied by other large projecting cells, transparent, acute, or obtuse, always deprived of sterigmata, to which have been given the name of cystides. The basidia are borne on the gills, folds, veins and processes of the receptacle; sometimes in conceptacles, the cavities of which they line.*

*Basidiosporiæ* embrace the familiar ‘puff-balls’ and the common mushroom, *Agaricus campestris*, the only species which is habitually and easily cultivated. Several species of this tribe are edible, and some are very poisonous; but it is a tolerably safe plan to follow the indications afforded by the natives of a country, who generally are well aware of the properties of the edible species, though in England far more ignorance on this matter prevails among its rustic inhabitants than among a similar class in foreign countries. The edible fungi of Burma are, however, as yet hardly known, or the place where they are found, or the vernacular names they are known by.

#### Order LICHENES.

Terrestrial plants. Thallus coriaceous and irregularly lobed, or erect, or a mere crust, various in colour and consistence. Fructification of two sorts. 1. *Apothecia*, which are superficial, marginal, or sunk in the fronds, and contain or consist of vertical densely-packed tubes or sacs (*sporangia*), containing two to four spores. 2. *Spermogonia*, which are spherical bodies sunk in the substance of the frond, whose inner surface is lined with filaments (*sterigmata*), which support slender transparent corpuscles called *spermatia*, the functional homologues of the *antheridia*.

The systematic position of Lichens has given rise to much discussion, and some botanists hold that their separation from *Fungi* is uncalled for. This view is supported by the curious behaviour of antherozoids of *Lichens* and *Fungi* under the influence of electricity from an induction coil (for static and Voltaic currents do not excite the phenomena), nothing like which is observable in the *antherozoids* of *Hepaticæ* and *Mosses*. Observed in water, under the microscope, these bodies execute two extremely quick movements, one oscillatory, the other progressive, though no vibratile hairs can be detected. To observe the effects of electricity, the glass plate for the object should be traversed by two grooves, crossing at right angles; in each groove a metallic thread should be firmly cemented, and the thread leave in the middle of the glass a free space, wherein the corpuscles swim. The induction apparatus is a reel, the generator being a simple cell of bichromate of potash. Now with *antherozoids* of *Hepaticæ* and *Mosses* in the field of the microscope, no result in their movements is produced by the induced current, and their relative positions remain unchanged, even when on the direct path of a strong current. Very different, however, is the behaviour of the *antherozoids* of *Lichens*

and *Fungi*. The moment the small embedded threads on the object glass are connected with the points of the induction coil, the corpuscles visible in the field of the microscope place themselves parallel to the current, that is, with their longest diameter in a straight line between the points, their progressive movement is wholly arrested and their oscillatory motion is but feebly maintained. If the current is now passed in a perpendicular direction, the corpuscles, instead of end to end, range themselves side by side. If the current is arrested, the corpuscles resume their irregular motions, and again fall into line as soon as its influence is perceptible.

## Class ACROGENS.

### MUSCALES.

Plants composed of cellular tissue only. No *prothallus*.

### Order HEPATICEÆ.

Stems leafy, with alternate or distichous leaves, or frondose. *Antheridia* consist of delicate open sacs, full of cells, each enclosing an *antherozoid*. The *archegonia* consist of a flask-shaped body enclosing a vesicle which, after fertilization, develops a stalked urn-shaped *sporangium*, full of spores. Both *antheridia* and *archegonia* may be terminal, axillary, attached to the under-surface of a stalked disk, or embedded in the substance of the frond. *Spores* usually mixed with spiral filaments called *elaters*.

*Hepaticeæ* are divided into five tribes.

#### ANTHOCERIEÆ.

*Sporangium*, siliculose, 2-valved, furnished with a central *columella*, covered with *elaters*.

#### MARCHANTIEÆ.

*Sporangium* furnished with *elaters*, but no *columella*.

#### RICCIEÆ.

*Sporangium* without *columella* or *elaters*.

#### MONOCLEIEÆ.

*Sporangium* solitary, opening longitudinally, without *columella*; the *elaters* carried away with the spores.

#### JUNGERMANNIEÆ.

*Sporangium* furnished with *elaters*, but no *columella*: *archegonia* and *antheridia* developed at the extremity of the stem.

### Order SPHAGNA.

Moss-like plants, differing from mosses in their regular fasciated branches, arising from the stem by the sides of the leaves, by some peculiarities in the structure of the stem and leaves, and stalk of the *sporangium*, and by having dimorphic spores.

### Order MUSCI.

Stems leafy, leaves alternate or distichous. *Antheridia* consisting of delicate open sacs full of cells, containing an *antherozoid*. *Archegonia* consisting of a flask-shaped body, enclosing a vesicle which, after fertilization, develops a stalked urn-shaped *sporangium* full of spores.

#### ANDREACEÆ.

*Schistocarpons mosses*. Capsule borne on a *pseudopodium* not operculate, but opening by four longitudinal fissures, forming four valves cohering by their lips (*Andræa*) or free (*Acroschisma*).

## BRYACEÆ.

*Mosses proper.* Capsule sessile or pedicelled, indehiscent, or with a separable operculum. Mouth with or without an annulus, naked, or with a simple or double peristome.

## Order CHARACEÆ.

Aquatic branched plants, with whorled branches, consisting of a series of long superimposed fascicles of inarticulate tribes. *Antheridia* consisting of spherical vesicles containing articulate tubes, each joint (cell) of which contains an *antherozoid*. *Archegonia* consisting of a single spore, covered with spirally arranged tubes, and fertilized in situ.

## Order FILICALES.

Plants with both cellular and vascular tissue. *Antheridia* or *archegonia*, or both, formed on a *prothallus* that is developed from the spore on its germination.

a. Spores of two kinds, one containing *antherozoids*, the other developing a *prothallus*, with *archegonia*.

## ISOETEÆ.

Submerged or terrestrial plants, with a tumid caudex, clothed with the sheathing bases of elongated fronds. *Sporangia* enclosed in the bases of the fronds, those of the outer frond bearing macrospores, of the inner, microspores. In germinating, the macrospores produces a *prothallus* bearing *archegonia*.

## Order LYCOPODIACEÆ.

Stem simple or branched, erect, prostrate, pendulous, or sometimes with a creeping rhizome, covered with small uniform or biform leaves, rarely leafless. *Sporangia* solitary, placed at the base of the leaves, or in the scales of terminal cones bi- or trivalved, containing either quaternary microspores full of *antherozoids*, or sub-globose macrospores, with a trirural mark on one hemisphere, and developing on germination a *prothallus*, which produces *archegonia*.

The uses to man of the *Lycopodiaceæ* are few and unimportant. The dust filling the *sporangia* of some species is called, from its inflammability, vegetable sulphur, and is used to produce theatrical lightning, and also as a desiccator, or substitute for violet powder, to mitigate and prevent excoriation of the skin of infants. Medical properties are attributed to some, but they do not deserve enumeration.

## Order SALVINEÆ.

Fronds floating; margins recurved in veneration. *Sporangia* and *antheridia* contained in separate capsules produced at the base of the fronds. *Prothallus* producing a single *archegonium*.

## Order MARSILIACEÆ.

Fronds slender, from a creeping rhizome, simple and filiform, or with four terminal wedge-shaped leaflets, circinate in veneration. *Sporangia* and *antheridia* together, contained in coriaceous globose capsules, produced on the rhizome. *Prothallus* as in *Salvinææ*.

b. Spores of one kind. *Antheridia* and *archegonia* both produced upon a *prothallus*.

## Order EUISETACEÆ.

Cylindric, jointed, leafless plants, with hollow internodes, terminated by a toothed sheath. Fructification a cone of peltate scales, which bear on their under-surface several dehiscent *sporangia*. Spores furnished with two filaments that are at first coiled round them. *Prothallus* unisexual.

*Equisetum* is in most cases dioecious. The *prothallus*, which bears well-developed *archegonia*, rarely bears *antheridia* as well; and if *archegonia* occur on a *prothallus* bearing *antheridia*, the former are generally sterile.

#### Order OPHIOGLOSSÆ.

Fronds straight in vernation. *Sporangia* globose, coriaceous, bivalved, arranged in a peduncled or sessile spike. *Prothallus* bisexual.

*Ophioglosseæ* are separated from true ferns by the nature of their rhizome, or by their fronds not being rolled up in vernation, crozier-fashion, but straight, and by their *sporangia* being arranged longitudinally on a sort of scape, forming either a simple terminal spike (*Ophioglossum*) or a raceme (*Botrychium*).

The *sporangia* have no ring, and contain smooth triangular spores indicating an alliance with *Lycopodiaceæ* through *Phylloglossum*.

#### Order FILICES.

Fronds circinnate in vernation, bearing *sporangia* on their under surface, or margins, or on separate fronds. *Prothallus* bisexual.

Ferns embrace eight tribes, and, according to some authors, in round numbers, three thousand species.

#### MARATTIÆ.

*Sporangia* free, appressed, in 2 rows, or in a circle or confluent, and together resembling a several-celled capsule, deprived of rings, each opening by a slit or pore.

#### OSMUNDIÆ.

Elastic ring embracing a part of the circumference of the *sporangium*, or reduced to a small disk of cells with thick walls.

#### LYGODIÆ.

*Sporangia* sessile, ovoid, or turbinate. Elastic ring replaced by a sort of cap with radiating stræ, occupying the end of the *sporangium*, opposite to the point of attachment.

#### GLEICHENIÆ.

*Sporangia* solitary, or grouped in definite numbers (2-3), sessile, globose. Elastic ring perfect, but not corresponding to the point of attachment of the *sporangium*.

#### CERATOPTERIDIÆ.

Elastic ring large, formed of vertical cells, not completely surrounding the *sporangium*, which is sessile.

#### HYMENOPHYLLIÆ.

Elastic ring oblique and completely surrounding the *sporangium*, and on a plane nearly perpendicular to the point of attachment of the *sporangium*. *Sporangia* nearly globose.

#### CYATHACIÆ.

Elastic ring nearly as in *Hymenophylliæ*. *Sporangium* often compressed, sessile, or pedicelled, not continuous with the ring.

#### POLYPODIACIÆ.

Elastic ring generally narrow, prolonged from one side of the rather long pedicel, interrupted at the top or the opposite side near the pedicel.

## Sub-Kingdom II. PHÆNOGAMS, COTYLEDONOUS OR FLOWERING PLANTS.

Plants furnished with flowers, and propagated by seeds.

### CLASS III. MONOCOTYLEDONS.

STEM, WHEN WOODY, UNIFORMLY CONSISTING OF BUNDLES OF FIBRES IRREGULARLY IMBEDDED IN CELLULAR TISSUE, WITH A FIRMLY ADHERENT BARK ON THE OUTSIDE. EMBRYO WITH ONE UNDIVIDED COTYLEDON, THE YOUNG STEM BEING DEVELOPED FROM A SHEATH-LIKE CAVITY ON ONE SIDE. FLORAL PARTS USUALLY TRIPLE, THE CALYX AND COROLLA, IF PRESENT, USUALLY ALMOST CONFORM IN STRUCTURE, FORMING OFTEN A SEX-PARTITE PERIANTH.

#### Division A. OVARY SUPERIOR.

Sub-division *a*. OVARY SYNCARPOUS.

(rarely apocarpous in some Palms).

##### GLUMALES.<sup>1</sup>

Flowers on the axils of scales, which are arranged in spikelets. Perianth none, or of minute scales, or hairs or bristles. Stamens 3, rarely more. Ovary 1-celled and 1-ovuled. Fruit a caryopsis.

Albumen fleshy or flowery. Embryo immersed, or not. Grasses or grass-like herbs.

##### Order GRAMINEÆ.

*Flowers* glumaceous, in spikelets, usually hermaphrodite. *Perianth* none. *Spikelets* 1-floral or many-floral, with 1 or 2 bracts or glumes at their base, glumes rarely wanting. Reproductive organs naked, or surrounded by 2 or 3 minute scales called 'lodicules' enclosed between two oppositely alternating chaff-like concave scales, called upper and lower valves, or '*paleas*'; those of the lower, or the uppermost ones often barren or suppressed altogether. *Stamens* hypogynous, usually 3, rarely reduced to 1 or 2, or (in bamboos chiefly) increased to 6 and more. *Anthers* versatile, 2-celled. *Ovary* 1-celled, with 1 ovule; *style* bi- or tri-lobed, or more frequently divided down to the base into 2 or 3 more or less feathery styles. *Fruit* 1-seeded and seed-like, called usually a *caryopsis*, free or adhering to the persistent upper

<sup>1</sup> Dr. Mason's list of rushes and grasses is meagre in the extreme, embracing only 5 species of the former and 25 of the latter plants. The list given now is also very defective, especially as regards the Cyperaceæ, and is made up from the following sources. Kurz's list of the Bamboos of Burma and his other papers already quoted, and some additional species from Munro's Monograph communicated to me by the Rev. C. Parish; A list of Asiatic Panicaceæ in Balfour's Cyclopædia of India, from which I have extracted such species as seemed probably Burmese; the generic character, nomenclature, and synonymy of all species ranging to China and Ceylon, being given from Thwaites' 'Enumerator Plantarum Zeylanicæ,' and Bentham's Flora Hongkongensis, whilst the characters of the Tribes are those adopted by Maout and Decaisne. From these sources a tentative list of 52 Cyperaceæ and 182 Gramineæ is now offered.

valve, or enclosed within both hardened valves. *Pericarp* very thin, adhering to the seed, or rarely loose, coriaceous or crustaceous, or fleshy, or very rarely opening into 2 valves. *Embryo* small at the base of a mealy albumen. Herbs, or rarely shrubs or trees, with hollow stems, interrupted by solid septiform nodes. *Leaves* alternate, distichous, parallel-veined, sheathing the branches with their bases, or rarely (chiefly in bamboos) on longer or shorter petioles jointed with the sheath, the latter split open to the very base, and often terminating in a small scarious, fringed, or naked appendage called a *ligule*. *Spikelets* variously arranged in terminal *spikes*, *racemes* or *panicles*.

## TRITICIEÆ.

*Spikelets* all fertile or rarely polygamous, spicate, sessile or sub-sessile on the notches of the usually wared rachis. One to many-flowered, the upper flower usually arrested. *Glumes* two, rarely one, variable in length. *Glumelles* herbaceous, or sub-coriaceous, rarely membranous, the lower awned, at or below the top, or muticous; lower glumelle of the base of the spikelet answering to the lower glume. *Stamens* three, rarely one. *Stigma* sessile or sub-sessile, divergent, protruding from the sides, and often towards the base of the flower. *Caryopsis* with a linear hilary spot.

MANISURI, *Linnaeus*.

M. sp.

Nicobars (K.).

TRITICUM, *Linnaeus*.

1 \* T. SATIVUM, L. (M.)

Gyung-sa-bā. Wheat.

Wheat does not grow in Pegu, but it grows largely in the neighbourhood of Ava.

HORDEUM, *Linnaeus*.

\* H. HEXASTICHON. (M.)

Mu-yan.

This is the species said by Craufurd to grow in the Malay countries, but not to be generally known by the natives. Mason observes: "Notwithstanding this testimony, the Burmese have a name for Barley, which frequently occurs in their books. It constitutes one of their seven kinds of *sa-bā*, or cereal grasses, and its corresponding Pali name is identical with the Sanscrit name of barley."

Barley, the main source of European beer, belongs to this tribe, but barley is not the only grain beer can be made from. The process of preparing beer from a cereal is as follows: The grain is first steeped and exposed to moist heat till it germinates, thereby converting its starch into sugar. Germination is now arrested by drying it in a kiln, and the dried and saccharine product, or malt, is then infused in boiling water, whence results sweet wort. To this a bitter decoction of some sort is added, that of hops being the best, and the whole is then subjected to a gentle fermentation, and the result is beer. Distillation of the fermented grain yields a spirit variously known as arrack, whisky, or brandy as the case may be.

ROTTBOELLIA, *Linnaeus*.

R. EXALTATA, L.

India.

R. GLABRA, Roxb.

Bengal.

## PELTOPHORUS.

P. (MANISURI) GRANULARIS, L.

India.

P. MYRUS, L.

Coromandel Coast.

OPHIURUS, *R. Browne*.

*Spikelets* 1-flowered, awnless, singly sessile in notches on alternate sides of a simple spike, the axis articulate at each node. *Lowest* empty glume hard, the two

1 \* distinguishes cultivated or introduced species.

next empty ones, the *flowering glume*, and the *palea* all very thin and transparent, and completely enclosed under the outer one.

O. CORYMBOSUS, Gaert.

#### THYRIDOSTACHYUM.

T. PERFORATUM, Nees.

Bengal.

#### OROPHEIUM, Trinius.

O. THOMÆUM, Trin.

#### HEMARTHRIA, R. Browne.

*Spikelets* 1-flowered, usually awnless, inserted in pairs, one sessile, the other pedicellate in notches on alternate sides of a simple spike, the axis not articulate. *Lowest* empty glume keeled, rigid, several-nerved; the second similar, but more pointed in the pedicellate flower, thinner and half-transparent in the sessile one, and more or less cohering to the concave pedicel of the other; the third *empty glume*, *flowering glume* and *palea* all very thin and transparent.

H. COMPRESSA, R. Br.

Bengal.

H. FASCICULATA, Kth.

South China.

#### FESTUCIÆ.

*Spikelets* all fertile, pedicelled, or rarely sub-sessile, in a branched, spreading, or spicate panicle, or more rarely in a raceme or spike, 2- to many-flowered, the upper or lower flower often rudimentary or male. *Glumes* 2, often shorter than the contiguous flower. *Glumellæ* 2, membranous, or somewhat coriaceous, the lower awned at, or below the top. *Awn* not twisted or mucous. *Lower glumelle* of the flower at the base of the spikelet answering to the lower glume. *Stamens* 3, rarely 2-1. *Stigmas* usually sessile or sub-sessile, divergent, protruding at the sides, and usually towards the base of the flower. *Caryopsis* with a linear or punctiform hilary spot.

*Bamboos*, with articulate-inserted petioled leaves and woody stems.

\* *Stamens* 3. *Shrubby Bamboos*.

#### ARUNDINARIA, Palisot de Beauvois.

*Spikelets* 2, many-flowered, the florets imbricately distichous. *Glumes* 2, distinct, or the lower one aborted. *Valves* 2, the inner one bicarinate on the depressed and channelled back. *Stamens* always 3. *Lodicules* 3. *Stigmas* sessile or nearly so, 2 or 3, plumose. *Caryopsis* sessile, terete, with a furrow along the front.

A. ELEGANS, Kz.

Khakyen Hills. Nat-toung and hills east of Toung-ngoo at 5000 to 7500 feet.

An evergreen, tufted, shrubby bamboo; leaves linear, 4 to 5 inches long by  $\frac{1}{2}$  an inch broad, with about 4 nerves at each side, conspicuously tessellate, and spinulose-rough along the cartilaginous margins. *Spikelets* often steel blue on the sunny side, long and slender (to 1 inch), pedicelled, variable in the number of florets and forming a glabrous panicle-like raceme at the end of the leafy branchlets. *Glumes* 2, the outer 3-3 $\frac{1}{2}$  lines long, the inner narrower and shorter. *Outer palea* nearly 4 lines long, smooth and glossy, the nerves faint. *Inner palea* shorter, boat-shaped, pilose along the keels towards the bifid apex of the channelled back. *Lodicules* 2. *Stigmas* white. *Anthers* purple.

*Caryopsis* small, wheat-like, with a membranous pericarp closely adnate to the seed, the style caducous. *Filaments* free. *Stamens* 6 or more.

#### BAMBUSA, Schreber.

*Spikelets* 5, many-flowered. *Florets* distichous, the upper and lower ones incomplete, or the last altogether empty. *Glumes* none, or several, conform to the

paleas, but smaller. *Inner palea* of the hermaphrodite floreat bicarinate on the back. *Lodicules* 3, fewer, or none. *Stamens* 6, the filaments long and free. *Ovary* naked, the style elongate, simple, or bi- or trifid, caducous. *Caryopsis* with a membranous testa, mucronate.

*Stigmas white. Shoot-sheaths not, or obscurely, auricled at the mouth.*

*Unarmed bamboos.*

\* *B. NANA*, Roxb.

A native of China and Japan, cultivated about Rangoon and Maulmain.

Pu-lau-pinan-wā (Kurz).

Wā, generic for Bamboo. Leaves small, whitish pruinose beneath.

Internodes  $\frac{1}{2}$  a foot long or more. *Lodicules* 3, longer than the ovary, entire. Filaments elongate, exerted. Anthers yellowish, with purplish streaks, pendulous. Ovary rough at the apex. Style very short, persistent. *Stigmas* 3, pilose, white.

*Shoot-sheaths conspicuously auricled, or the blade decurrent into an auricle-shaped appendage. Auricles polished, without fringes.*

*B. AFFINIS*, Munr. (p. 93).

Eng forests East of the Tsit-toung.

Thaik-wā (Kurz).

Mouth of leaf-sheaths long, produced, the ligule as produced and as long as the petiole. Outer palea more than 20-nerved, inner one 7-nerved, between the 2-fringed angles of the depressed back. *Lodicules* 3, the 2 larger often united. Ovary nearly hairy at the apex, and tapering into a 3-cleft style.

*Auricles large, strongly fringed.*

*B. TULDA*, Roxb. (p. 91).

Arakan, Pegu and Tenasserim, cultivated in Chittagong.

Thaik-wā.

Shoot-sheaths white-powdered, or almost pruinose, the appressed bristles scanty, brown. Anthers yellow, angles of inner palea ciliate. Spikelets clustered, 2 or more; the lower 2 or 3 paleas gemmiparous, all the others hermaphrodite or rarely one of the lower ones male. Anthers yellow, blunt. Style short, trifid. *Stigmas* long, white, pilose.

*B. POLYMORPHA*, Munr. (p. 98).

Pegu and Martaban.

Kya-thôn-wā (Kurz).

Shoot-sheaths green and yellow, the appressed bristles white. Anthers purple; angles of inner palea quite smooth. Spikelets with 3 to 5 small empty glumes at the base, polished, steel-blue on the sunny side, the lower one or two florets reduced to empty paleas, the upper one female with a long, pedicelled rudimentary floret. Styles white, pilose.

*B. VILLOSLA*, Kurz.

Limestone hills of Upper Tenasserim.

Ta-dein-wā (Kurz).

Flowers unknown. Leaves whitish-glaucous and pubescent beneath. Leaf-sheaths long, and slenderly caudulate.

*Stigmas purple.*

*Thorny bamboos.*

*B. ARUNDINACEA*, Willd.

Chittagong and all over Burma.

Kyā-kat-wā.

Shoot-sheaths glossy, smooth, purple to scarlet. Leaves small. Angles of inner paleas tomentose-ciliate. Anthers yellow. Branchlets armed with recurved spines.

In Munro's monograph some other species occur not recognized by Kurz.

*B. MARGINATA*, Munr. (p. 114).

Wā-ni.

B. REGIA, Thomson (p. 116).

Hti-wā.

"This is a most elegant bamboo on account of the regularity of the nodes. It is brought to Maulmain in great quantities and used as handles for umbrellas."—*Brandis*.

B. SPINOSA, Roxb. (p. 105).

Mergui. Martaban. Pegu.

B. VULGARIS, Wendl. (p. 107).

*Filaments connate in a tube.*

GIGANTOCHLOA,<sup>1</sup> Kurz.

*Spikelets* crowded, quinquefloral to multifloral. *Glumes* none or conform to the lower paleas. *Inner palea* of fertile florets, boat-shaped. *Lodicules* none or incomplete. *Stamens* 6, or occasionally 7 to 9. The filaments united in a tube and exerted. *Ovary* membranous, the style simple, or bifid or trifid, caducous.

*Spikelets white-hairy. Stigmas white.*

G. (OXYTENANTHERA) ALBO-CILIATA, Munr. (p. 129). All over Pegu and Tenasserim.

Wā-hpyu-ga-le (Kurz).

Shoot-sheaths almost one-fourth the length of the internodes, spreading, tawny-hispid. Ligule nearly half an inch long, cross-toothed. Angles of inner palea white, pilose. Anthers yellow.

G. (OXYTENANTHERA) NIGRO-CILIATA, Munr. (p. 128). Martaban.

Not recognized by Kurz, and perhaps therefore regarded as a var. of the last.

*Spikelets black or brown-hairy.*

G. (DENOCHLOA) ANDAMANICA, Kz.

The Andamans and Nicobars.

*Spikelets*  $\frac{2}{3}$  to 1 inch long. Shoot-sheaths densely appressed, black-setose on the sides. Auricle smooth and polished, nude.

G. AURICULATA, Kz.

Southern Pegu. Cultivated in Arakan.

Ta-la-ku-wā (Kurz).

Like the last, but sheaths sparingly tawny-setose.

G. MACROSTACHYA, Kz.

Tree forests of Tenasserim, and

Wā-net.

cultivated in Arakan and Pegu.

*Spikelet*  $1\frac{1}{2}$  to 2 inches long. Shoot-sheaths densely appressed, black-setose. Auricles large, strongly tawny-fringed. Anthers purple. Stigmas white.

*Caryopsis* often rather large, the pericarp separating before ripening, into an outer firmly coriaceous or thick fleshy wall (epicarp), the inner cellular tissue in a dried state, more or less closely embracing the seed. The style persistent, rarely caducous.

*Inner palea* boat-shaped and 2-carinate, or deplanate with a 2-keeled apex.

*Caryopsis* rather small.

DENDROCALAMUS, Nees von Essenbeck.

Differs from *Bambusa* in the pericarp of the caryopsis being coriaceous or hard.

*Outer paleas* terminated by a pungent bristle or point. Anthers yellow. Stigmas purple.

<sup>1</sup> "Genus *Oxytenanthera*, Munro (excepta O. Thwaitesii) nullā notā differt a *Gigantochloa* nisi caryopside elongatā; valvula interior in omnibus speciebus a me examinatis deplanata et bicarinata evadit. *Gigantochloa* genus valde artificiale et filamentis connatis vix, ac ne vix a *Bambusa* differt. Habitus et spicularum structura in generibus *Bambusa* et *Gigantochloa* simili modo variat, et species ex habitu artissime affines, e.g. *B. polymorpha* et *Gigantochloa aspera* spiculis omnino inter se differant."—Kurz, J.A.S.B. 11, 1873, p. 251.

<sup>2</sup> Kurz remarks, "*Caryopsis Dendrocalami* non est baccata nec perigynio circumdata, sed epicarpium plane coriaceum vel subcrustaceum, nec membranaceum uti in *Bambusa* sensu stricto."—J.A.S.B. 11, 1873, p. 250.

*D. STRICTUS*, Nees (p. 148).

All over Burma.

Myin-wā.

Shoot-sheaths more or less pruinose, slightly tawny, appressed-setose, the mouth truncate. Angles of inner palea fringed. Bristle of outer palea nearly 2 lines long.

*D. CRITICUS*, Kz.

Summit of Kambala-toung in the Pegu Range.

Shoot-sheaths minutely appressed, silvery-setose. Auricles large, bristly-fringed, one turned upwards, the other downwards.

*D. MEMBRANACEUS*, Munro (p. 149).

Tree forests of Martaban.

Shoot-sheaths appressed, dark brown-setose. Auricle wavyly decurrent, stipose-setose inside. Angles of inner palea ciliate. Outer palea pungent-pointed.

*Outer paleas cucullate-mucronate, but not pungent. Spikelets green, membranous. Spikelets only 2½-4 lines long. Anthers yellow. Stigmas purple.*

*D. BRANDISH*, Munro (p. 109). Eastern slopes of Pegu Range up to 3500 feet.

Kyet-u-wā or Wā-bō (Kurcz).

Shoot-sheaths appressed, tawny-setose. Auricles waved-decurrent, stipose-fringed inside. Ligule narrow. Angles of inner palea minutely ciliate.

*D. LONGISPATHUS*, Kz.

Arakan, Pegu and Martaban.

Wā-yā.

Shoot-sheaths narrow, and nearly as long as the internodes, appressed dark-brown setose, only at one side of the mouth, with a small nude auricle. Ligule conspicuous, bristly-fimbriate. Angles of inner palea slightly pilose.

*Spikelets rather large, 6-7 lines or more. Leaves very large. Shoot-sheaths not known.*

*D. CALOSTACHYUS*, Kz.

Bhamo and Khakyen Hills at 3500 feet.

Mouth of leaf-sheaths not produced in an auricle. The ligule conspicuous, entire, or fimbriate. Angles of inner palea white-fringed. Anthers yellow. Stigmas purple.

*D. (BAMBUSA) GRIFFITHIANUS*, Munro (p. 99).

Mō-goung, Upper Burma.

Mouth of leaf-sheaths with large lunate, strong fimbriate auricles. Ligule large, usually ruptured. Angles of inner palea smooth. Lodicules long, fimbriate.

*D. GIGANTEUS*, Munr. (p. 150).

Wā-bō.

#### CEPHALOSTACHYUM, Munro.

*Style* long, stiff, and persistent. *Caryopsis* somewhat compressed. *Inner palea* deplanate, or complicate on the back, or towards the apex bicarinate. *Lodicules* 3. *Ovary* and the long style indurated, flask-shaped, and long-beaked. *Stigmas* 3, rarely 2, short, pilose. *Caryopsis* crustaceous or coriaceous, long-beaked.

*Spikelets very densely flowered, the rachille very short or reduced, 12-14 lines long in dense terminal heads.*

*C. PALLIDUM*, Munr. (p. 139).

Patkaye Range (Ava) at 5000 feet.

Spikelets glabrous.

*Spikelets ½ inch long, white-pilose, rarely pubescent; in dense clusters, forming interrupted spikes or panicles.*

*Stigmas white.*

*C. PERGRACILE*, Munr. (p. 141).

Pegu and Tenasserim.

Hti-wā.

Shoot-sheaths very short, black, from dense appressed bristles. Auricles large, stipose-fringed. Anthers purple.

C. FLAVESCENS, Kurz.

Pegu.

Shoot-sheaths appressed, white-setose. Auricles large, long-fringed, one bent downwards, the other upwards. Anthers pale yellow.

C. (MELOCANNA) VIRGATUM, Munr. (p. 133). Mo-goung.

Spikelets pilose, glabrescent. Anthers yellow. Stigmas purple.

*Spikelets glabrous, laxy, and sometimes almost remotely flowered, the rachillæ more or less elongate. Auricles more or less elongate, long, white-fringed.*

C. SCHIZOSTACHYOIDES, Kz.

Tree forests of South Andaman.

Spikelets cylindrical,  $\frac{1}{2}$  inch long. Inner palea smooth. Anthers purple. Stigmas white.

C. (TEINOSTACHYUM) GRIFFITHII, Munr. (p. 143). Chittagong and Wallaboon forests (Upper Burma).

Spikelets almost pedicelled, 2-3 lines long, almost remotely 7-8-flowered. Inner palea on the keels at apex, whitish-ciliate. Anthers yellow.

*Caryopsis the size of a wood apple, irregular, globular.*

PSEUDOSTACHYUM, Munro.

*Inner palea deplanate, and boat-shaped. Caryopsis very large, globular, the pericarp thin and coriaceous. Seed large, mealy-fleshy.*

Large semi scandent tufted bamboos, which die off after flowering.

C. COMPACTIFLORUM, Kz.

Hills East of Toung-ngoo at above 4000 feet.

Culms very strong, shoot-sheaths quite smooth. Auricles imate, reflexed, stiff-fringed. Ligule very narrow, entire. Spikelets 2-2½ lines long, clustered. Caryopsis irregular, globose. The size of a wood-apple (*Feronia*). Anthers yellow. Stigmas white.

P. (BAMBUSA) HELFERI, Munr. (p. 114).

The Pegu Range and Martaban up to 3000 feet.

Culms very hollow, and weak. Shoot-sheaths minutely white-setose. Auricles very small, long-fringed. Ligule conspicuous, 2-4 lines long, fringed.

*Inner palea concave or convolute. Caryopsis very large, thick-fleshy, acuminate-beaked.*

MELOCANNA, Trinius.

*Inner palea convolute. Stamens 6. Bamboos with very large fruits and uni-lateral spikelets in panicles.*<sup>1</sup>

M. HUMILIS, Kurz.

Arakan and Pegu.

Low bamboos, 8-20 feet high. Leaves roughish, pubescent beneath.

M. (BAMBUSA) BACCIFERA, Roxb. (p. 132).

Chittagong Hills and Tenasserim.

*M. bambuscoides*, Trin.

An arboreal bamboo 50 to 70 feet high. Leaves quite glabrous. Caryopsis ovate, the size of a guava or small pear. This is, I think, the Bamboo I found covering large areas in the Arakan Range. When I observed it, the fruit was formed, and pretty closely resembled a green guava, and internally was rather harder than a potato. This bamboo was reported by the natives to flower every 30 years. I again crossed this bamboo tract with some difficulty as it was on fire, and it was ticklish sort of work threading the lanes of crackling bamboos, as in places the heat and smoke were terrific; indeed I only got through with a few personal servants, my coolies, being more heavily laden, were cut off and separated from me till the next day, by what, ere they arrived at the

<sup>1</sup> Kurz remarks: "*Melocanna* a *Schizostachyo* differt caryopsidis epicarpio crasse carnosio et perigynii absentia."—J.A.S.B. 11. 1873, p. 252.

spot, was a veritable wall of fire, blocking all progress. The appearance a few days after of the ground was curious in the extreme. The entire face of the hills had been clean swept, and save an occasional smouldering stump, the ground where a dense forest had previously stood, was as bare as a fallow field in winter, the white ashes simulating with most weird effect a thick fall of snow. The next rainy season would see the ground covered with a dense growth of young Bamboos, and then for 30 years or so (if the natives may be credited) no such scene will be re-enacted, till the next dying-off of the Bamboo forest. Such a spectacle is of course only presented where the whole forest consists of Bamboos, as was the case in this particular area.

M. KURZ, Munr. (p. 134).

Andamans.

This species is not recognized by Kurz, and may be therefore synonymous with some other.

*Caryopsis* rather small, dry and coriaceous.

DINOCLOA, Buse.

*Inner palea* concave, short. *Caryopsis* terete, ovate, acuminate.

*Climbing Bamboos.*

D. ANDAMANICA, Kz. (p. 153). Tree forests of South Andaman.

*D. Tjangkorreh*, Buse, apud Munro.

Spikelets in a dried state straw-coloured, hardly a line long. Shoot-sheaths fugaceously white-setulose, not auricled, and narrowed towards the mouth.

Kurz remarks: "*D. Tjangkorreh* affinis, sed spiculis multo minoribus pallidis, (nec brunneis), filiis multo majoribus et ligulâ vaginalium differt. Specimina ex insulis Philippinis valvulâ interiore ciliatâ gaudentia, et a el Munro cum *D. Tjangkorreh* conjuncta, mihi est species nova, et etsi eam non vidi *D. ciliatum* nomino."—Kurz, J.A.S.B. II. 1873, p. 253.

D. (BAMBUSA) MACCLELLANDII, Muuro (p. 114). Chittagong and Eastern slopes of the Pegu Range, and Martaban.

Shoot-sheaths fugaceously silvery, not narrowed upwards, at the mouth thickened and polished green.

In Burma, as in most tropical countries, the bamboo is in great demand, and to the mass of the people is invaluable. Of bamboo alone a complete and comfortable house, absolutely proof against the tropical downpour of rain, can be erected, in a space of time that is incredibly short to those who have not witnessed the facility with which a Burman or Karen handles his 'dah,' or heavy knife, when working on such congenial material as bamboo. A roof made of large bamboos split in half and laid over and under, like tiles, is absolutely waterproof, should the days of Deucalion (as a Burmese mousoon sometimes seems to threaten) return. The drawback, however, of bamboo as a house material is, that it lasts but a few years, and is of course simply swept away by fire; but to a native of a country abounding in bamboos, from which in three days he can reconstruct his dwelling, this is a trifle. In cities, however, the use of bamboo in building is properly discouraged. Other every-day uses are scaffolding, bridging, fencing, and decoration, carts, boats, fittings, matting, and domestic utensils, and a variety of industrial and economic purposes too numerous to detail. A fine mat of split bamboo forms the basis of the exquisite Burma boxes, the one industrial speciality of Upper Burma. The young shoots of bamboo are edible and pickled by the Chinese, whilst the softer wooded species yield a highly promising material for the manufacture of paper. Silica is contained in large quantity in both the leaves and stem of bamboos, and is held in solution in the fluid contained in the growing stems of many species. This fluid is often limpid, and a grateful drink when no other water is procurable in the forest, but as it dries up it becomes milky, and finally deposits a cake of gelatinous opaline silica, at the bottom of the joint, known as 'tabasheer,' possessing curious optical properties. These little disks of 'tabasheer' may often be picked up in a bamboo forest, after

the bamboo which yielded it has decayed; and when a bamboo forest has been destroyed by fire, these white calvined disks form quite a noticeable feature of the ground, especially when a shower of rain has removed the white pulverulent ash.

Among other uses to which the bamboo is applied in Burma, not the least useful is that of producing fire by friction. For this purpose a joint of thoroughly dry bamboo is selected, about one and a half or two inches in diameter, and this joint is then split in halves. A ball is now prepared by scraping off shavings from a perfectly dry bamboo, and this ball being placed on some firm support, as a fallen log or piece of rock, one of the above halves is held by its ends firmly down on it, so that the ball of soft fibre is pressed with some force against its inner or concave surface. Another man now takes a piece of bamboo a foot long or less, and shaped with a blunt edge something like a paper-knife, and commences a sawing motion backwards and forwards across the horizontal piece of bamboo, and just over the spot where the ball of soft fibres is held. The motion is slow at first, and by degrees a groove is formed, which soon deepens, as the motion increases in quickness. Soon smoke arises, and the motion is now made as rapid as possible, and by the time the bamboo is cut through, not only smoke, but sparks are seen, which soon ignite the materials of which the ball beneath is composed. The first tender spark is now carefully blown, and when well alight the ball is withdrawn, and leaves and other inflammable materials heaped over it, and a fire secured.

This is the only method that I am aware of for procuring fire by friction in Burma; but on the hills and out-of-the-way parts, that philosophical toy, the 'pyrophorus,' is still in use. This consists<sup>1</sup> of a short joint of a thick woody bamboo, neatly cut, which forms a cylinder. At the bottom of this, a bit of tinder is placed, and a tightly-fitting piston inserted composed of some hard wood. The tube being now held in one hand or firmly supported, the piston is driven violently down on the timber by a smart blow from the hand, with the result of igniting the tinder beneath.

CENTOTHECA, Descaux.

C. LAPPACEA, R. and S.

Kamorta. Katchall. Trice and Track (K.).

ERAGROSTIS, Palisot de Beauvois.

*Spikelets* several-flowered, flattened, awnless, numerous, in a spreading or compact panicle. *Glumes* keeled, very regularly distichous, obtuse or pointed, but not awned, the 2 outer empty ones not longer, and often one or both smaller than the others. *Paleas* prominently 2-ribbed, often persistent after the glumes have fallen. *Axils* of the spikelet not hairy, and very rarely articulate.

E. (POA) UNIOLOIDES, Retz.	Kamorta (K.) (scarce). Ceylon.
E. <i>amabilis</i> , Wight and Arnott.	India. S. China.
E. ZEYLANICA, Nees.	Kamorta (K.) (common). Ceylon. India. S. China.
E. PLUMOSA, Link.	Katchall. Great Nicobar (K.). S. China. Ceylon.
Poa <i>amabilis</i> , L.	
P. <i>viscosa</i> , Kth.	
E. (POA) NUTANS, Retz.	Bengal. Ceylon.
Poa <i>Koenigii</i> , Kth.	
E. (POA) TENELLA, L.	Bengal. S. China.
E. <i>tenuissima</i> , Schrad.	
E. <i>aurea</i> , Steud.	
E. <i>verticillatus</i> , Nees.	
E. (POA) PILOSA, L.	India. S. China.
E. <i>verticillata</i> , Cab.	
E. BROWNEI, Nees.	

<sup>1</sup> It is also made of a solid cylinder of Buffaloes' horn, with a central hollow of three-sixteenths of an inch in diameter and three inches deep burnt in it. The piston, which fits very tightly in it, is made of iron-wood or some wood equally hard.

*Poa polymorpha*, Br.Perhaps a var. of *E. orientalis*, Trin.

E. (POA) DIARRHENA, R. et Schl.

India.

E. (POA) ELEGANTULA, Kth.

Bengal.

E. (POA) ROXBURGHIANA, Schultz.

Bengal.

E. (POA) PUNCTATA, L.

Bengal.

E. (POA) CYNOSUROIDES, Retz.

Bengal.

The Kusa grass, sacred to Siva, and which plays so important a part in the observances and sacrifices of the Hindus.

COELACHNE, *R. Browne*.

*Spikelets* 2-flowered, awnless, small and numerous, in a contorted panicle. The upper flower unisexual, usually female; the lower hermaphrodite. *Glumes* very concave and obtuse, the 2 outer empty ones smaller than the flowering ones. *Palea* rather smaller, 2-nerved. *Axis* of the panicle not hairy.

C. PULCHILLA, Br.

Tavoy. India. Ceylon. S. China.

*Panicum simpliciusculum*, W. et. A.LOPHATHERUM, *Brongniart*.

*Spikelets* 1-flowered, sessile on alternate sides of the simple branches of a panicle. *Glumes* keeled, green, with scarious edges, 2 outer empty ones obtuse or slightly pointed, the third or flowering one similar, but with a short stiff awn, and several smaller empty ones, with short awns terminating the axis. *Palea* transparent, folded, with 2 prominent green ribs. *Caryopsis* free.

L. GRACILE, Brong.

India. Ceylon. S. China.

## AVENTIELE.

*Spikelets* all fertile, pedicelled or sub-sessile, in a branched spreading or spicate panicle, more rarely in a raceme or spike; 2, many flowered, the upper or lower flower often male or rudimentary. *Glumes* large, sub-equal or unequal, usually completely embracing the flowers. *Glumelles* membranous or somewhat coriaceous, the lower usually awned. *Awn* usually dorsal, geniculate and bent below. Lower glumelle of the flower at the base of the spikelet, answering to the lower glume. *Stamens* 3, rarely 2. *Stigmas* sessile, or sub-sessile, divergent, protruding from the side of the flower. *Caryopsis* with a linear or punctiform hilary spot.

ERACHNE, *Nees von Essenbeck*.

E. CHINENSIS, Hance.

Kamorta, abundant (K.)

## CHLORIDIELE.

*Spikelets* all fertile, in unilateral digitate or paniced spikes, sessile on the inner face of a continuous rachis, laterally compressed, sometimes with several flowers, the 1 to 3 lowest hermaphrodite, the upper rudimentary, sometimes only one hermaphrodite flower, with or without the rudiment of a second. *Glumes* unequal, shorter than the flowers. *Glumelles* membranous, the lower answering to the lower glume. *Stamens* 3. *Stigmas* usually elongate, erect, protruding near the top or above the middle of the flower. *Caryopsis* with a punctiform hilary spot.

CYNODON, *Persoon*.

*Spikelets* 1-flowered, awnless, singly sessile in 2 rows on one side of the slender spike-like, almost digitate branches of a simple panicle. Outer empty glumes 2-keeled. Flowering glume thinner and broader. *Palea* narrower, folded, with a small bristle at its base, being the prolongation of the axis, and sometimes bearing a rudimentary glume.

C. (PANICUM) DACTYLON.

Burma, Kamorta (K.).

The Dub grass of Bengal and Northern India.

This grass is found in England, where it is called the 'dog's-tooth grass,' and is held in little esteem. In India, however, despite its somewhat dry and uninviting look, when grubbed up as is the fashion by the roots, it is the best grass for horses usually procurable, and such is its tenacity of life that it is not easily extirpated, though the grass-cutters are really in this instance 'grass-rooters,' grubbing up any and every particle of the plant that appears above the soil, and the roots as well. The resulting heap of bits is now well beaten by a stick to free the roots from the earth which adheres to them, and in this state, or better still after being well rinsed in water (though this is unusual), horses and cattle devour it greedily and thrive well on it.

DACTYLOCTENIUM, *Willdenow.*

*Spikelets* 2 or more flowered, very flat and closely imbricated along one side of the spike-like digitate branches of a simple panicle. *Glumes* spreading, keeled and compressed, transparent but stiff, the lowest smaller, the second shortly awned, the flowering ones gradually smaller and less pointed, the terminal one usually barren or rudimentary. *Palea* smaller, folded.

D. ÆGYPTIACUM, Willd.

Kamorta (K.). India. S. China.

ELEUSINE, *Gaertner.*

*Spikelets* 2 or more flowered, awnless, sessile, in 2 rows along one side of the spike-like, almost digitate branches of a simple panicle. *Glumes* keeled, usually obtuse, the 2 outer empty ones unequal, and shorter than the flowering ones. *Paleas* rather small, folded. *Axis* usually slightly continued beyond the last one. *Seed* transversely wrinkled.

E. INDICA, Gaert.

Kamorta and Katchall (K.).

Hsen-ngo-myit.

India, S. China.

E. STRICTA, Roxb.

E. CALYCINA, Roxb.

Coromandel.

CHLORIS, *Linnaeus.*

*Spikelets* with 1 or rarely 2 fertile flowers, and 1 or more empty or rudimentary glumes above it, singly sessile on one side of the spike-like digitate branches of a simple panicle. *Glumes* keeled, 2 outer empty ones pointed or shortly awned, the others usually awned, or the upper empty ones awnless. *Caryopsis* free.

C. BARBATA, Sw.

India. Bengal. S. China.

MICROCHLOA, *R. Browne.*

*Spikelets* 1-flowered, awnless, singly sessile on one side of a slender simple spike. *Outer glumes* 2, nearly equal, the lowest with a double nerve, the second keeled. *Flowering glume* and *palea* small, very thin, and transparent.

M. SETACEA, Br.

India. S. China.

ARACHNE.

A. VERTICELLATA, W. et A.

India.

LEPTOCHLOA, *Palisot de Beauvois.*

*Spikelets* 2 or more flowered, awnless, sessile or very shortly pedicellate, along one side of the slender or spike-like branches of a long panicle. *Glumes* keeled, pointed or obtuse, the two outer ones empty, the axis ending in a short pedicle above the last flower, bearing sometimes a rudimentary glume.

L. CHINENSIS, Nees.

India. Burma. S. China.

ARUNDINIEÆ.

*Spikelets* all fertile, in a branched or spicate panicle, sometimes with 1 hermaphrodite flower, with or without the pedicelled rudiment of an upper flower; sometimes many-

flowered. *Glumes* equalling or longer than the flowers. *Glumelles* usually surrounded at the base with long hairs, membrano-herbaceous, as are the *glumes*, the lower awned, or mucicous, and facing the lower glume. *Stamens* 3 or rarely 2. *Stigmas* sessile or sub-sessile, protruding from the sides or towards the base of the spikelet. *Caryopsis* with a punctiform or linear hilary spot.

#### ARUNDO, *Linnaeus*.

*Spikelets* 2 or more flowered, with long silky hairs on the axis and flowering glumes, all pedicellate in a large much-branched panicle. *Glumes* thin, keeled, distichous, and distant, 2 outer ones empty, the flowering ones as long or rather longer, pointed or shortly awned, the terminal one small, empty or rudimental. *Paleæ* small. Tall reeds.

A. MADAGASCARIENSIS, Kth.

India. S. China. Philippines.

#### PHRAGMITES, *Trinius*.

Characters of *Arundo*, only no silky hairs on the glumes, and the lowest flower is usually male.

P. (ARUNDO) ROXBURGHII, Kth.

Kamorta. Kar Nicobar (K.). Ceylon.

*A. karka*, Roxb.

*P. Nepalensis*, Nees.

#### AMPHIDONAX, *Nees von Essenbeck*.

A. BENGALENSIS, Nees.

A. BIFARIA, Lind.

Mason gives the following vernacular names for species of *Phragmites* (*Arundo*), though observing that the same names are sometimes applied to species of *Saccharum* also: Phoung. Pyu. Kyu. Lai. A-lo-kyu.

#### STIPIEÆ.

*Spikelets* all fertile, sub-cylindric or compressed, in panicles containing one hermaphrodite flower. *Glumes* subequal or unequal, equalling or longer than the flower. *Glumelles*, when ripe, coriaceous, the lower answering to the lower glume, often convolute, awned at the tip. *Awn* simple or trifid, rarely mucicous. *Stamens* 3. *Stigmas* protruding laterally, towards the base of the spikelet. *Caryopsis* with a linear hilary spot; towards its middle or near its top.

#### CHETARIA.

C. HYSTRIX, Beauv.

India.

#### ARISTIDA, *Linnaeus*.

A. sp. (M.)

#### AGROSTIDIEÆ.

*Spikelets* all fertile, more or less laterally compressed in a branched or spiked panicle, with a single hermaphrodite flower, rarely accompanied by the pedicelled rudiment of a second upper flower. *Glumes* subequal or unequal, usually longer than the flower. *Glumelles* and *glumes* between chartaceous and herbaceous, the lower mucicous or aristate. *Awn* usually dorsal and facing the lower glume. *Stamens* 3, rarely 1 or 2. *Stigmas* usually sessile, protruding laterally at the base of the spikelet.

#### SPOROBOLUS, *R. Broune*.

*Spikelets* small, 1-flowered, awnless, in a loose spreading, or rarely spike-like panicle. *Outer glumes* 2, keeled, one or both usually shorter and never longer than the acute flowering glume. *Palea* nearly as long, usually 2-nerved. *Caryopsis* free, short, deciduous, the seed separating from the thin pericarp.

S. sp. (*vide* *Diedrichsen*).

Nicobars (K.).

S. DIANDER, Beauv.

Bengal.

S. INDICUS, Br.

S. China.

## PHALARIDIEÆ.

*Spikelets hermaphrodite, monœcious, or polygamous, in a spicate panicle, or in spikes with 2 flowers, hemaphrodite, female or male, or with 2 or 3 flowers, the upper only fertile. Glumes usually equal. Glumelles more or less hardened after flowering. Lower glumelles of the fertile flower facing the lower glume. Stamens 3 or 2. Caryopsis with a linear or punctiform spot. Stigma long or filiform, protruding at the top or sides of the flower.*

## ZEA.

\*Z. MAYS.

Pyoung-bi. Maize. Indian Corn.

COIX, *Linnaeus*.

C. LACRYMA, L.

Burma. Ceylon.

Job's tears.

Dr. Mason enumerates several vernacular names for species of *Coix*: Ka-le-thi. Ka-le-pouk-pouk. Ka-le-hmen. Ka-le-shi. Ka-le-theing. And in *Sgau Karen*, Ben-wai-thu.

The *Coix* affords a good example of the results of cultivation on a wild plant, the seed of which is of a stony hardness, but which is soft in the cultivated form and the kernel sweet. It is much cultivated by the Red Karens, and may be often seen for sale parched in the bazaars. Dr. Mason adds: "The Karens in the Southern Provinces cultivate one or two species of Job's tears for the seed. The Pwos plant a species with round seeds, which are used to ornament the borders of their tunics, but they are never seen on a woman's gown. The Sgaus on the contrary cultivate a species bearing an oval seed and use them merely for embroidering female dresses. In Amherst Province, the Pwos seldom appear in their native costume, and many deny that their tribe ever had any other than that which they now wear, which is Burmese."

C. GIGANTEA, Kon.

Bengal.

C. AQUATICA, Roxb.

Bengal (Srirampur).

C. HETEROCLITA, Roxb.

Bengal (Srirampur).

CHIOSACHNE, *R. Browne*.

C. (COIX) KOENIGII, Spreng.

India. Ceylon.

*Coix barbata*, Roxb.

## ORYZIEÆ.

*Spikelets all fertile, in a raceme or panicle, one-flowered, often with arrested glumes, or 2 or 3-flowered, the lower neuter, with 1 glumelle, the terminal only fertile. Glumelles chartaceous, stiff. Stamens usually 6, often 3 or 4, rarely 1. Caryopsis with a linear hilary spot. Stigma divergent, protruding at the sides of the flower.*

ORYZA, *Linnaeus*.

\*O. SATIVA, L.

Sa-bā. Rice.

"Rice (Dr. Mason remarks) is universally cultivated, and its cultivation has produced many varieties. The Karens have distinctive names for more than forty, and Karen mountain rice is preferred by many to that which is raised by the Burmese on the low lands, yet it is said not to be so nutritious, and on this account bears a less price in the Bazaar. It is of all colours, from ivory-white to coal-black. Of the black rice the Karens prepare a kind of bread, which to them supplies the place of gingerbread. A portion of seethed rice is poured into a large mortar with a prodigious quantity of sesamum seeds. Two women then take their strong ebony pestles and pound it, striking alternately till it becomes a light-bounding mass. It is then thrown upon the eating stand, when the whole family seat themselves round it, in Oriental style, and dis sever it with their sabres.

"The Karens have another mode of preparing this kind of rice, which is particularly convenient for travellers. A quantity unboiled is thrust into joints of a small bamboo, a little water added, and the orifice closed up. It is then roasted, and if eaten with butter and salt is most delicious. The Karens select only two varieties of Bamboo for this purpose, and these impart to the rice a sweet delicate flavour."

The Burmese adopt a similar plan with other sorts of rice. The dry rice and a little water is put into the joint of a bamboo, which when plugged is then set on a large fire. The rice in cooking swells, and when cold, the bamboo is broken away and a solid cylinder of cooked rice extracted like a sausage, which is frequently carried, as a convenient form, on a journey.

Rice can be sown broadcast in inundated fields, but the more common plan is to transplant it when some six inches high. For this purpose the seed is sown very thickly in nurseries, from which it is removed, and hand planted in the mud of the prepared field root by root. In the hills the Karens, however, raise rice just as other grains are raised, by dibbling the seeds in holes made with a spud, and as this mode of cultivation is commonly practised on the virgin soil of a hill clearing, well manured with the ashes of the burnt forest, the yield is very abundant.

Rice contains a much less per-centage of nitrogenous compounds than wheat and many other cereals; hence rice flour is certainly not so well adapted for infants' food as the flour of other cereals, and particularly that known as entire wheat flour, which is richer in phosphates than ordinary flour. At the same time rice flour has some recommendations, as, from its translucent gelatinous appearance when cooked, it is extremely well adapted for pretty and ornamental dishes like blanchmange and puddings. Whoever has travelled in Ceylon will doubtless recall to mind the transparent 'hoppers' or white gelatinous pancakes made of rice flour, and will at once recognize the familiar rice flour in many of the well-puffed 'Corn flours,' which the public are urged to consume. Many may have seen the denunciatory advertisements of rival 'Corn flours.' "*Rice flour is not corn flour*;" "*Rice flour is corn flour*," which forces one to question if wholesale equivocation does not pay better than simple truth. Of course, if by '*corn*,' we mean cereals in general, then the flour of Rice or Maize is corn flour; but if, as most English people understand the word, '*corn*' is used to signify wheat (when not otherwise specified), then I fear greatly that many vaunted Corn flours have small claim to the title which they bear. Let every one judge for himself. If a corn flour, when mixed into a thin paste and cooked on a 'griddle' like a Ceylon '*hopper*,' which we know is made of rice flour, produces an article identical in appearance, we shall not be far wrong in the conclusions we draw from the experiment, the more so if we compare the article in question with the similar one made of what we know to be genuine flour of wheat. By all means therefore let careful parents make as much blanchmange and puddings as they choose of 'Corn flour,' but see that their children are fed on the flour of wheat.

For an interesting account of the various legends and superstitions connected with rice, consult '*Mythologie des Plantes*,' by Angelo de Gubernatis, who remarks: "Le riz joue, dans les croyances populaires orientales, à peu près le même rôle que le blé dans la tradition européenne: il est essentiellement un symbole de vie, de génération, d'abondance."—II. p. 311. A familiar example of the use of rice, as a symbol, is where in modern weddings it is showered over the bride, as a token of the fruitfulness her friends hope she will display. This custom of throwing grain over a bride is very old, and is alluded to in the curious ballad of the '*Wedding of the Cid*,' translated by Lockhart—

"Then comes the bride Ximena, the King he holds her hand;  
And the Queen, and, all in fur and pall, the nobles of the land;  
All down the street, the ears of wheat are round Ximena flying,  
But the King lifts off her bosom sweet, whatever there is lying."

It may, however, be questioned if all our modern fine ladies who join in the fun of rice-throwing, fully comprehend the meaning and significance of their own act.

## HYGRORYZA, Nees von Essenbeck.

H. (LEERSIA) ARISTATA, Roxb.

India. Ceylon.

*Potamochoila Retzii*, Griff.

H. CILITIA, Nees.

## PANICIEÆ.

*Spikelets all fertile in a spicate, or branched, sometimes digitate panicle composed of an upper hermaphrodite and a lesser male or neuter flower. Glume, the lower smaller than the upper, often minute or arrested. Glumelles usually cartilaginous, shining. Lower glumelle as in Andropogoneæ. Stamens 3. Caryopsis with a punctiform hilary spot. Stigmas as in Andropogoneæ.*

PANICUM,<sup>1</sup> Linnaeus.

*Spikelets* usually small, 1-flowered, or with a second male flower below it, awnless or rarely awned, either along one side of the simple branches of a panicle, or in a loose branching or close and spike-like panicle. *Glumes* always 4, the lowest small, sometimes very minute and empty, the next usually larger and always empty, the third empty, or with an imperfect or male flower, in its axis, the innermost or flowering glume of a firmer texture, smoother and more faintly 3-nerved. *Palea* like the flowering glume, but smaller, and more or less 2-nerved. *Caryopsis* inclosed in the hardened flowering glume and palea.

\* P. JUMENTOSUM, Pers. (M.).

Cultivated.

Nan-ka-than-hau. Guinea grass.

An excellent and luxuriant fodder, but which requires constant watering, and when well weeded and kept, may be cut every two months, or even more frequently. It is easily propagated, and thrives best when planted in tufts a couple of feet apart. When cut, the stalks should be left about 9 inches long.

P. GLAUCUM, L.

Kamorta (K.). Ceylon. S. China.

P. COLONUM, L.

Kamorta (K.). Ceylon.

P. JAVANICUM, Pers.

Kar Nicobar (K.). Ceylon.

*Urochloa panicoides*, Beauv.

P. HUMILE, Nees.

Kamorta (K.). Ceylon.

P. SANGUINALE, L.

Maulmain (P.). Ceylon.

*Ægyptiacum*, Retz.

P. HELOPUS, Trin.

Bengal. Ceylon. S. China.

*Urochloa pubescens*, Kth.

P. COMPOSITUM, L.

Kamorta. Katchall (K.). Ceylon. S. China.

P. LANCEOLATUM, Kth.

Bengal.

P. BURMANI, Retz.

Bengal. Ceylon.

P. FRUMENTACEUM, Roxb.

Bengal.

P. STRICTUM, Schultz.

Bengal.

P. CRUS-GALLI, L.

India. Ceylon. S. China.

*O. stagninum*, Kth.var. β. *P. colonum*, L.

P. DISTACHYUM, L.

India. S. China.

P. SARMENTOSUM, Roxb.

Assam. China. Philippines.

P. MONTANUM, Roxb.

India. Burma. China. Philippines.

P. OVALIFOLIUM, Pers.

S. China. India.

P. CURVATUM, L.

Ceylon.

P. COMMUTATUM, Nees.

Bengal. S. China.

P. CORYMBOSUM, Roxb.

Coromandel.

P. REPENS, L.

Bengal. Ceylon. S. China.

*P. paludosum*, Roxb.*P. ischamoides*, Retz.<sup>1</sup> Digitaria, Juss. Ophimuncus, Beauv. Setaria, Beauv.

P. FLUITANS, Retz.	Bengal. Ceylon.
<i>P. affine</i> , Nees.	
P. BIZZOIDES, L.	Bengal. Ceylon.
<i>P. flavidum</i> , Retz.	
P. HISPIDULUM, Retz.	Bengal.
P. HELVOLUM, L.	Bengal.
P. INTERRUPTUM, Willd.	Bengal. Ceylon.
P. MILIACEUM, L.	Ceylon.
<i>P. miliare</i> , Lam.	
P. Plicatum, Lam.	Ceylon. S. China.
<i>P. Nepalense</i> , Spreng.	
<i>P. costatum</i> , Roxb.	
P. EXCURRENS, Trin.	S. China. Himalayas.
P. TRIGONUM, Retz.	Kamorta and Pulu Milu (K.).
<i>P. radicans</i> , Retz.	
<i>P. filipes</i> , Nees.	
P. NODOSUM, Kth.	India. Ceylon. S. China.
<i>P. Arnottianum</i> .	
P. TOMENTOSUM, Roxb.	
P. ULIGINOSUM, Roxb.	
P. MYRUS, Lam.	India. Ceylon.
<i>P. serrulatum</i> , Roxb.	
Thwaites remarks: "I can find no sufficient specific difference between the Ceylon plant and a specimen of <i>P. myurus</i> from Guiana."	
P. INDICUM, L.	China. Ceylon.
<i>P. angustum</i> , Trin.	
<i>P. contractum</i> , Nees.	
P. BARBATUM, Kth.	India. S. China.

PASPALUM, *Linnaeus*.

*Spikelets* 1-flowered, not awned, not callous at the base, solitary, or in pairs, along one side of slender spikes, either forming the branches of a simple panicle, or rarely solitary. *Outer glumes* 2, both empty. *Flowering glume* concave, of a firmer texture. *Palea* like the flowering glume, but smaller, and usually 2-nerved. *Caryopsis* inclosed in the hardened palea and flowering glume.

P. BREVIFOLIUM, Flüggé.	India. S. China.
<i>Chinense</i> , Nees.	
P. SCROBICULATUM, L.	Kamorta (K.). Ceylon. S. China.
<i>P. Kora</i> , Willd.	
<i>P. orbiculare</i> , Forst.	
P. FLEXUOSUM, Klein.	Kamorta (K.).
P. CONJUGATUM, Retz.	Kamorta (K.).
P. FILIFORME, Roxb.	Kamorta. Katchall (K.). Ceylon.
<i>P. filiculme</i> , Nees MS.	

Kurz refers this species to *Digitaria*, J.A.S.B. II. 1876, p. 160.

THYSSANOLENA, *Nees von Engenbeck*.

*Spikelets* 1-flowered, minute, awnless, crowded along the slender branches of a large panicle. *Glumes* 4, the 2 outer empty, and very short, the third also empty, but much longer and more pointed; the flowering glume rather smaller and thinner, with a very small point, and edged with long spreading hairs.

T. ACARIFERA, Nees.	Kamorta. Nankowry. Kar Nicobar (K.).
<i>Melica latifolia</i> , Roxb.	S. China. Himalayas.
<i>Agrostis maxima</i> , Roxb.	

ISACHNE, *R. Brongn.*

*Spikelets* 2-flowered, the upper flower female, or rarely hermaphrodite, the lower male, or sometimes hermaphrodite, and both articulate on the rachis. *Outer empty glumes* 2, nearly equal and often very deciduous. Both the flowering glumes, as well as the palea, of a firmer consistence than the outer ones, all awnless. *Caryopsis* inclosed in the glumes and palea, as in *Panicum*, but very frequently those of both flowers obtain maturity.

I. PULCHELLA, Roth.

Burma. India. Ceylon. China.

I. MYOSOTIS, Nees.

Kamorta. West of Enaea (K.).

I. AUSTRALIS, R. Br.

Ceylon.

*I. miliacea*, Auct. (non Roth?)*I. Batavicum* and *Benjamini*, Steud.var. *humilis*.

Kamorta (K.).

I. PULCHELLA, Roth.

India. Silhet. Ceylon. S. China.

THOUAREA, *Persoon*.

*Spikelets* in short one-sided androgynous spikes, in the axil of a sheathing bract. Upper spikelets with 2 male flowers, lower one with a terminal hermaphrodite and lower male flower, and all with only one outer empty glume.

T. SARMENTOSA, Pers.

Beaches on West coast of Katchall (K.).

*Ornithocephalochloa arenicola*, Kz.

Ceylon. China.

SPINIFEX, *Linnaeus*.

*Spikelets* diœcious, sessile, awnless. Barren ones in spikes, each one with 2 male flowers, and 2 outer empty glumes. Fertile spikelets solitary, with 2 outer empty glumes, the third empty, or with a male flower, the terminal one with a hermaphrodite flower. *Spikes* in the male plants, and single flowers in the fertile ones, collected in dense globular clusters, intermixed with long, stiff, often prickly bracts.

S. SQUARROSUM, L.

Sandy shores of Burma and China.

Of this plant Dr. Mason remarks: "The sea pink or ground rattan is one of the most curious grasses in the country. It may be seen on all the sandy beaches, but more particularly at Moumagon, where it covers the sands with its creeping stems and spiny leaves, and its loose umbels running about like things of life. The male spikes congested into an umbel (says Dr. Cleghorn) are carried by the wind to the female flowers, which are fasciated on a distinct plant, and being light and spherical, the Dutch call them 'wind-ball.' Rumphius alludes to this plant, as being connected with a superstition among the natives, who seeing the *capitula* (umbels) carried along the shore by the sea-breeze, think they are propelled by the Devil. This grass is cultivated on the sea-beach at Madras for the sake of its sand-binding properties and for its tendency to increase the land."

According to Dr. Mason the Burmese books recognize seven kinds of *Sabā* or cereals, in which however they include beans. They are Rice (*Sabā*), Wheat (*Gyungsa-bā*), Barley (*Mu-yau*), Millet (*Pyoung-leh-kouk*), Paspalum (*Lu*), Sorghum (*Pyoung*), and Peas and Beans (*Peh*).

## ANDROPOGONIÆ.

*Spikelets* geminate or in threes, polygamous, the lateral male or neuter, very rarely all fertile. Fertile spikelets composed of a hermaphrodite flower with a lower male flower. *Glumes* subequal, or rarely unequal, the lowest largest. *Glumelles* membranous, rarely cartilaginous, lower glumelle of the hermaphrodite flower facing the upper glume. *Stamens* 3. *Caryopsis* with a punctiform hilary spot. *Stigmas* long, protruding at or under the top of the flower.

ANDROPOGON, *Linnaeus*.

*Spikelets* 1-flowered, in pairs, 1 sessile, the other pedicellate, on a simple spike or along the spike-like branches of a simple or compound panicle, the rachis articulate at

each pair, and at the terminal article 2 pedicellate spikelets, one on each side of the sessile one. *Sessile spikelets* hermaphrodite, the lowest glume stiff, with 2 of the lateral nerves most prominent, the second keeled, third empty glume very thin and transparent. *Flowering glume* small and transparent, with a long twisted awn. *Palea* very small and thin, or none. *Caryopsis* inclosed in the outer glumes.

\* *A. MURICATES*, Retz. (M.).

Burma. Ceylon. India.

Pan-yeu.

The Khus Khus grass of India.

\* *A. ESCULENTUS*, MacClell. (M.).

Burma.

Sa-ba-len.

*A. MARTINI*, Roxb.

India. Ceylon. S. China.

*A. flexuosus*, Nees.

Yields the Ceylon Lemon-grass oil.

*A. GLABER*, Roxb.

Bengal.

*A. PERTUSUS*, Willd.

Bengal. Ceylon.

*A. punctatus*, Roxb.

*A. fascicularis*, Roxb.

*A. SCANDENS*, Roxb.

Bengal.

*A. TRISPICATUS*, Schultz.

Bengal.

*A. BLADHII*, Retz.

Bengal.

*A. BREVIFOLIUS*, Sw.

Silhet. S. China.

*A. MONTANUS*, Roxb.

India. S. China. Philippines.

*A. TROPICUS*, Spreng.

India. S. China. Ceylon. Philippines.

*A. ROXBURGHIANUS*, Schultz.

Bengal.

*A. CONJUGATUS*, Roxb.

Bengal.

*Andropogon Schananthus* (a native of Arabia, and the source of the true 'lemon grass oil') is cultivated all over India for the stimulating and scented oil yielded by it. *A. muricatus* affords the fragrant roots of which the screens and tatties are made, which in the hot winds of Upper India so largely contribute to make life endurable to the European settler, the beneficial effects being proportionate to the heat and dryness of the air, so that, although much used in Calcutta, their efficiency and value there is not to be compared with that developed in the parched and drier region of Upper India. Other 'lemon grass oils' are yielded by *A. calamus-aromaticus*, *A. esculentum*, and *A. invarancusa*, the last furnishing the celebrated *Roosa grass* oil, and the first the grass oil of Nimar. The perfume of these oils is very refreshing, and the oil itself is valuable in rheumatism if well rubbed into the affected part by the palm of the hand, with a little common oil to form a liniment. Ceylon 'lemon oil' is distilled, says Thwaites, from the leaves of a cultivated variety of *A. Martini*, Roxb. Lemon grass cut up small is also used by some people to flavour tea with, and if the tea happens to be musty and poor, it may perhaps improve it by disguising its shortcomings and musty taste.

#### CHRYSOPOGON, *Trinius*.

*Spikelets* 1-flowered, narrow-lanceolate, 3-together, terminating the branches of an erect panicle, the central one sessile and hermaphrodite, the 2 lateral ones pedicellate and male. *Glumes* and flowers of *Andropogon*, from which this genus differs in all the spikes being reduced to the terminal article.

*C. ACICULATUS*, Trin.

Kamorta. Ceylon. India.

*Rhaphis trivialis*, Lour.

S. China. Philippines.

*Andropogon acicularis*, Retz.

*A. (Rhaphis) Javanicus*, Nees.

Ngung-myit. Spear-grass.

A coarse grass which cattle will scarcely touch, and one of the most notable pests in India to people who wear clothes or stockings, from the certainty with which its ripe barbs penetrate to the skin, causing distressing irritation, and even sores if

neglected. Corduroy or canvas clothes and leather leggings are the best protection from the annoyance caused by this pestilent plant.

#### HETEROPOGON, *Persoon*.

*Spikelets* monœcious, 1-flowered, in pairs, in a simple 1-sided spike, the rachis articulate, at least towards the top. *Female spikelets* sessile, cylindrical, turned to one side of the spike, the outer glume hard and convolute, the second keeled, the third very thin and transparent, the flowering glume reduced to a long, stiff, twisted awn. Palea small or none. *Male spikelets* lanceolate, herbaceous, awnless, imbricate on the other side of the spike on short pedicels. At the base of the spike, the spikelets are often all male or neuter.

H. (ANDROPOGON) CONTORTUS, L.

Kamorta (K.). Ceylon. S. China.

H. *hirtus*, Pers.

H. TENELLUS, Schultz.

Bengal.

#### PEROTIS, *Aiton*.

*Spikelets* 1-flowered in a simple spike-like raceme. *Outer empty glumes* 2, linear, stiff, with terminal awns. *Flowering glume* and *palea* very small, thin, and transparent. *Caryopsis* longer than the flowering glume, inclosed in the two outer ones.

P. LATIFOLIA, Ait.

Ceylon. India. S. China.

P. *patula*, *longiflora* and *hordeiformis*, Nees.

P. *glabrata*, Steud.

#### SPODIOPOGON, *Trinius*.

*Spikelets* in pairs, 1 sessile, the other pedicellate, in simple, branched or paniculate spikes, both 2-flowered, the lower flower male, the rachis angular and articulate, at least at the top. *Outer glumes* stiff, the lowest convex, the second keeled. *Flowering glumes* and *palea* very thin and transparent, the glume of the fertile flower with a twisted awn.

S. OBLIQUIVALVIS, Nees.

Bengal. Ceylon. S. China.

*Andropogon malacophyllus*, Hochs.

A. *Macraei*, *Blumei* and *bifidus*, Steud.

*Ischæmum geniculatum* and *tenellum*, Roxb.

Kurz records a smooth species of *Spodiopogon* from Kar Nicobar, and a villous species from Kamorta, perhaps belonging to the above very variable species.

#### SCHIZACHYRIUM.

S. BREVIFOLIUM, Nees.

Kamorta (K.).

#### ISCHÆMUM, *Linnaeus*.

*Spikelets* in pairs, 1 sessile, 2-flowered, the lowest flower male, the other pedicellate, usually male or rudimentary, in a simple spike, or in the spike-like sessile branches of a simple panicle. The rachis articulate, at least towards the top. *Outer glumes* 2, stiff and awnless, the lowest with 2 prominent lateral nerves, the second keeled. *Flowering glumes* and *paleæ* smaller, thin and transparent, all awnless, or the glume of the terminal flower with a twisted awn.

I. BARBATUM, Retz.

China and Archipelago.

*Meoschium lodiculare*, Nees.

M. *Meyenianum*, Nees.

I. MUTICUM, L.

Nicobars (K.). Ceylon.

I. RUGOSUM, Salis.

Bengal. Ceylon.

I. *segetum*, Trin.

*Andropogon tong-dong*, Steud.

DIMERIA, *R. Browne.*

*Spikelets* 1-flowered, almost sessile, inserted singly on the alternate notches of slender unilateral spikes, which are either solitary or more frequently 2 or 3 together on a terminal peduncle. *Rachis* not articulate, and a tuft of short hairs under each spikelet. *Outer empty glumes* 2, linear, stiff, keeled, not awned: *third empty glume* smaller, thin and transparent, not awned; *flowering glume* thin and transparent, notched, or 2-lobed, with an intermediate awn, twisted at the base, and bent back at or below the middle. *Palea* minute or none. *Seed* free, but inclosed in the outer glume.

*D. FUSCESCENS*, Trin.  
*D. sp.*

Nipal. Ceylon. S. China.  
Kamorta (K.).

UPLUDA, *Linnaeus.*

*Spikelets* with 1 fertile and 1 male flower, sessile, between 2 flattened pedicels, bearing each a rudimentary glume, or one of them a perfect spikelet, the whole embraced by a sheathing bract, the bracts clustered on the branches of a leafy panicle. *Lowest glume* of the sessile spikelet concave and striate, the second keeled, transparent but stiff; *flowering glumes* very thin and transparent, the terminal one often awned. In the pedicellate flower both the glumes concave and striate.

*A. MUTICA*, L.  
*A. ARISTATA*, L.  
*A. rostrata*, Nees.  
*A. GENICULATA*, Roxb.

India. S. China.  
Bengal. Ceylon.  
Bengal.

ZOYSIA, *Willdenow.*

*Spikelets* 1-flowered, awnless, nearly sessile in a simple spike, the axis not articulate. *Outer empty glume* 1-keeled, stiff, shortly pointed, the edges often united below round the flower. *Flowering glume* much shorter, thin and transparent. *Palea* very small or none. *Caryopsis* free, but inclosed in the outer glume.

*Z. FUNGENS*, Willd.  
*Z. tenuifolia*, Willd.  
*Z. Japonica*, Steud.  
*Z. aristata*, *Brownii*, *Griffithiana*, and *seloides*, C. Muell.

S. China. Ceylon. Australia.

ANTHISTIRIA, *Linnaeus.*

*A. CILIATA*, Retz.  
*A. POLYSTACHYA*, Roxb.  
*A. SCANDENS*, Roxb.  
*A. HETEROCLITA*, Roxb.

India. Ceylon.  
Bengal.  
Bengal.  
Bengal. Ceylon.

IMPERATA, *Cyrtilli.*

*Spikelets* 1-flowered, awnless, mostly pedicellate, in a dense cylindrical spike-like panicle. *Rachis*, not articulate. *Glumes* all thin and transparent, 2 outer empty ones keeled, covered with very long silky hairs, third also empty, smaller, without hairs; *flowering glume* and *palea* still shorter, often jagged at the top. *Caryopsis* free, inclosed in the outer glumes.

*I. CYLINDRICA*, Beauv. (M.).  
Thek-keh-nyen. Thatching grass.

*I. ARUNDINACEA*, Cyr.  
*I. Koenigii*, Beauv.

Kamorta (K.). Ceylon. S. China.

RATZEBURGIA, *Kth.*

*R. PULCHERRIMA*, Kth. (M.).

Burma.

## SORGHUM.

\* *S. vulgare*, Pers. (M.).

Pyoung. Red Jowar of India. Cholam in Tamil.

\* *S. saccharatum* (M.).

Valaiti Jowar of India. Deo-dhān of Bengal. Imphee of Natal.

This is one of the most estimable food and fodder plants we have, and when carefully cultivated, a promising source of sugar. One remarkable character it is said to possess is that it is not attacked by white ants, which are so troublesome to the sugar-cane. It is said, too, that this crop is fit to cut in less than four months, after which another will spring from the same roots, in the same time, and occasionally even a third. The yield of sugar per acre is two tons. As a fodder plant it is unsurpassed, and it has been said to yield as much as nine tons of dry fodder per acre. The plant is hardy, and will thrive wherever Maize will grow. In good soil and when well watered, it will run up to 16 feet in height. (See article in Balfour's Cyclopædia of India.)

SACCHARUM, *Linnaus*.

*Spikes* 1-flowered, awnless, surrounded by long silky hairs, in pairs, both sessile, or 1 pedicellate along the branches of a large panicle. *Rachis* articulate at each pair. 2 *outer empty glumes* keeled, thin but rather stiff. Third *empty glume*, *flowering glume*, and *palea*, all smaller and very thin and transparent.

\* *S. officinarum*, L. (M.).

Cultivated. Unknown wild.

Kyan. Sugar-cane.

\* *S. violaceum*, Tussac. (M.).

Cultivated.

Otaheity cane.

*S. spontaneum*, L. (M.).

Burma. Kar Nicobar (K.). Ceylon.

*S. ægyptiacum*, Willd.*S. semidecumbens* and *caudiculatum*, Roxb.

Thek-keh-gyi. Greater thatching grass.

*S. procerum*, Roxb.

Bengal.

*S. canaliculatum*, Roxb.

Bengal.

*S. sara*, Roxb.

Bengal.

Sāra or Sarpat of India.

*S. fuscum*, Roxb.

This species yields the best native pen or *kalam*, and the stems are also used for light fences.

*S. munja*, Roxb.

Bengal.

This grass is largely employed in India for ropes, the leaves forming the *munj* rope, and the culms that called *sirki*. Before making up, the leaves are wetted and beaten, so as to separate the fibres, and the ropes are supposed to stand alternate wetting and drying well, but to require to be kept moistened, and the same remarks apply to other species, as *S. sara*, *S. procerum*, and others.

Dr. Mason also gives other vernacular names for different species of *Saccharum*. La-man-myit. Kaing. Kyān-mai. Kyān-men. Bōng-kyān. Hti-pō-ka-hsai-hsā. The "*Kaing*" grass is what Europeans commonly call Elephant-grass, and is, I think, correctly referred to a species of *Saccharum*, rather than to *Typha*, as Elephant-grass is called in Balfour's Cyclopædia—a confusion probably arising from the specific name of *T. elephantina*!

## BATRATHERIUM.

*B. lanceolatum*, Schultz.

Coromandel.

## LIFEOCERCIS.

*L. selrata*, Trin.

Bengal.

The Order Gramineæ is of all others the most useful to man, furnishing, as it does, the chief sustenances of the human race, and rendering civilization, which has ever gone hand in hand with agriculture, possible. The cereal grasses, besides starch, sugar, and mucilage, afford certain azotized matters essential to the sustenance of animals, as *fibrine*, *casscin*, and *albumine*, together with phosphate of lime, so valuable in the formation of bone in young and growing animals. The principal cereals cultivated in temperate regions are wheat, *Triticum sativum*; rye, *Secale cereale*; barley, *Hordeum vulgare* and *H. distichum*; oats, *Avena sativa*; whilst in warm countries rice, *Oryza sativa*, and millets, *Panicum miliaceum*, *P. frumentaceum*, *P. pilosum*, and *Eleusine coracana*, take their place as the chief staples. *Zea Mays*, a native of America, is now spread over the whole world, whilst *Sorghum vulgare*, *S. saccharatum*, and *Penicillaria spicata*, are chiefly cultivated by the negro races of Africa.

The cultivation of food grains dates from the remotest antiquity; and when we consider that different regions of the earth have each their appropriate plants, rice, wheat, barley, maize, rye, and so on, we must suppose that the art of agriculture was spontaneously developed at different spots under the pressure of Necessity, guided by Intelligence. Ovid, in the Fourth Book of 'Fasti,' describes Ceres as first teaching the cultivation of corn:

"Prima Ceres, homine ad meliora alimenta vocato

Mutavit glandes utiliore cibo.

Illa iugo tauros collum præbere coegit

Tum primum soles eruta vidit humus."—Fasti IV. 401.

But the whole passage, though matchless as a poetic picture, is a wide deviation from the old original Myth, as embodied in the Hymn to Dēmētēr, which records, not the gift to man of corn by Ceres, but the institution of the Eleusinian Mysteries at that time when, in anger with Zeus and all the immortals, she traversed the earth, sorrowing for her lost daughter, the slender-ankled Persephone, till, hiding the tearless eyes of Divinity in mortal guise, she at last entered in humble capacity the house of Cēleus:<sup>1</sup>

Χωσαμένη ἐὲν ἔπειτα κλεινῆφ' ἑὶ Κρονίωνι  
νοσφισθεῖσα θεῶν ἀγορήν καὶ μακρὸν Ὀλυμπον  
ἠέχετ' ἐπ' ἀνθρώπων πόλιν καὶ πτόλιν ἔργα  
εἴς οὐ ἀπαλύνουσα πολὺν χρόνον οὐδέ τις ἀνθρώπων  
εἰσορόων γέγνωσκε, βαθυζώνων τε γυναικῶν  
πρὶν γ' ὅτε ἐλὼν Κελεῶν εὐαῖρος ἔκτετο δῶμα  
ὅς τ' ὅτ' Ἐλευσίνος θουόσσης κοῖματος ἦεν.

Hymn to Demeter, l. 91.<sup>2</sup>

Here the wife of Keleos, the fair girdled Metanira, proffers her by way of welcome a cup of wine, which the sorrowful Goddess rejects, but asks in its stead for a draught of *water, mingled with flour* and Penny royal (*Mentha pulegium*), which was at once given to her:

Τῇ δ' ἐὲν ἔπας Μετάνειρα εἶχον μυλῆος οἶνον  
πλήσας ἥ ε' ἀρένυσ'· οὐ γὰρ θυμὸν οἱ ἔφασκεν  
πίνειν οἶνον ἐρυθρόν· ἀνέχετ' εἰς ἄρ' ἄλφι καὶ ὕωρ  
εἶναι μῖξασαν πύρρον γλήχωνι τρεῖναι.

Hymn to Demeter, l. 206.<sup>3</sup>

<sup>1</sup> See also Mythology of the Aryan Nations, by Rev. G. W. Cox.

<sup>2</sup> Then indeed, in dudgeon with Kronion, king of the clouds, did she withdraw herself from the assembly of the Gods, and from high Olympus, and went forth among the cities and fruitful husbandries of men for a long space, disguising her beauty, so that none that looked upon her knew her (for a goddess) either of men or deep-girdled women, till it came to pass she reached the house of the prudent Keleos, who in those days was a leading chief in fragrant Eleusis.

<sup>3</sup> To her Metanira proffers a brimming cup of honey-sweet wine; but she declines it, saying it was not meet for her to quaff the red wine, but begs (in its place) may be given her a draught of water mixed with meal and (flavoured with the herb) "penny royal."

Whilst therefore we see the use of flour was well known at this time, no mention is made in the Hymn of the introduction of cereals by the Goddess. Farther on, the Hymn describes the effect which the anger and retirement of the Goddess from all exercise of her beneficent functions had on the fruits of man's industry.

For though Demeter is not described, even in that sub-kingdom of History as it may be called which is occupied by myth, as actually revealing to man the cultivation of cereals; yet as Goddess of Agriculture, she no sooner abdicated her functions in wrath, than Earth felt the shock, and had her anger remained unappeased, the human race it was believed would have perished:

Αἰνότατον εἴ ἐναντιὸν ἐπὶ χθόνα παυλοβότριναν  
ποιήσ' ἀνθρώποις καὶ κύντατον, αἰεὶ τι γαῖα  
σπέρει' ἀνέει' κρέπτεται γὰρ ἐστέφανος Δημήτηρ.  
Πολλὰ δὲ καμπύλ' ἄροτρα μάτην βόας ἔλαον ἀρούρας  
πολλὸν δὲ κρή λευκὸν ἐτώσιον ἔμπισσι γαῖῃ.

Hymn to Demeter, l. 306.<sup>1</sup>

It is indeed not a little suggestive of the vast antiquity of the culture of cereals that no specific Myth exists regarding the introduction of most of them like that which records the origin of maize in the legend of 'Hiawatha,' or the origin of the olive and horse as the direct gifts to man respectively of Pallas and Poseidon. We may therefore safely conclude that at the dawn of history, the origin of the cultivation of cereals for food was as much shrouded in the dim past as it is to ourselves.

From the earliest ages down to our own, harvest time has always been regarded as one of rejoicing and thankfulness, and Virgil gives a charming picture of the observance paid to Ceres at the time of gathering in the harvest in his day.

Imprimis venerare deos, atque annua magnæ  
Sacra refer Cereri, latis operatus in herbis,  
Extremæ sub casum hyemis, jam vere sereno.  
Tunc agni pingues, et tunc mollissima vina;  
Tunc somni dulces, denseque in montibus umbræ.  
Cuncta tibi Cererem pubes agrestis adoret.  
Cui tu lacte favos, et miti dilue Baccho,  
Terque novas circum felix eat hostia fruges:  
Omnis quam chorus et socii comitentur evantes,  
Et Cererem clamore vocent in tecta. Neque ante  
Falcem maturis quisquam supponat aristis  
Quam Cereri, tortâ redimitus tempora quereu,  
Det motus incompressos, et carmina dicat.—I. Georgie, l. 338.

Doubtless the crown of oak leaves was to commemorate the change from acorns to corn, as the 'motus incompressiti,' such as are seen in the frisky gambols of a young kid, were to illustrate the heartfelt delight of the pious rustic at the good gifts of a kindly Power.

#### Order CYPERACEÆ.

*Flowers* glumaceous, hermaphrodite or dielinate. *Perianth* none, or replaced by bristles. *Stamens* hypogynous, usually 3 or 2. *Anthers* basifixed. *Ovary* 1-celled, 1-ovuled. *Styles* 3 or 2. *Ovule* basilar, anatropous. *Achene*. *Seed* albuminous. *Embryo* minute. *Stem* usually angular, without nodes, often hypogeal, solid when young, fistular when adult. *Leaves* grass-like; sheath very rarely split. *Flowers* in spikes.

#### CARICINIEÆ.

*Flowers* monœcious or diœcious, in spikes with glumes imbricate in several rows.

<sup>1</sup> Dire to man and terrible, were the days which she now caused to ensue throughout the fruitful earth, nor any longer can the soil yield seed, which gloriously-crowned Demeter withholds. Many were the crooked ploughs which the oxen fruitlessly dragged through the cornlands, and fruitlessly did much white barley fall to earth from the hand of the sower.

*Perianth none. Male spikes simple. Stamens 3 or 2. Female spikes simple or compound. Pistil embraced by an inner scale with its back to the axis, bicarinate (analogous to the upper glumelle of the Gramineæ), with edges usually joined, and thus forming an envelope, persistent and accrescent, and enclosing either the ovary only, or the ovary accompanied by a sterile setiform pedicel.*

#### CAREX, *Linnaeus.*

*Flowers unisexual, the males and females in distinct spikelets, or in different parts of androgynous spikelets. Glumes imbricated all round the axis. Stamens 3, or rarely fewer, without scales or bristles. Ovary enclosed in a bottle-shaped or inflated utricle, contracted at the top, with a small oblique or 2-toothed opening, through which protrudes the style, which is 2- or 3-cleft. Achene enclosed in the persistent utricle. Leaves grass-like, mostly radical, or on the lower part of the stem. Spikelets either solitary or few, one terminal, the others mostly distant, or stalked, or forming a terminal compound spike or panicle.*

C. LONGICARISTATA, Boott.  
C. BENGHALENSIS, Roxb.  
C. CRYPTOSTACHYA, Brong.

Tillanchong (K.).  
India. S. China.  
Pinang. S. China.

#### SCLERIEE.

*Spikelets dichinous, the male many-flowered. Glumes imbricate in 2 or several rows, the lower ones sometimes empty. Perianth none. Stamens 1 or 3, rarely 5. Female spikelets 1-flowered, with glumes imbricate in several rows. Perianth none. Style trifid, equal at the base. Achene bony or crustaceous, usually seated on a trilobed disk.*

#### SCLERIA, *Linnaeus.*

*Flowers unisexual, in unisexual or androgynous spikelets, with several empty glumes below the flowering ones. Male spikelets several-flowered. Stamens 3, rarely fewer. Females 1-flowered. Style 3-cleft. Androgynous spikelets with the lowest flower female, the others male. Nut bony or brittle, seated on a thickened entire or 3-lobed disk. Grass-like herbs with leafy stems. Ligule, or projection of the leaf-sheath opposite the blade often very conspicuous. Spikelets in clusters, or small corymbose or oblong panicles, terminal, and in the upper axils, forming either an oblong leafy panicle, or an interrupted spike.*

S. LATRIFLORA, Boeck.  
VAR. GLABRA.

Kamorta (K.).

S. LITHOSPERMA, Willd. Kamorta. Katchall (K.). Ceylon. India and S. China.

S. SUMATRENSIS, Retz.

Kamorta (K.). Ceylon.

S. LEVIS, Retz.

Kamorta (K.). Ceylon. S. China.

S. TESSELATA, Willd.

India. Ceylon. S. China.

S. Steudeliana, Miq.

S. CHINENSIS, Kth.

Bengal. S. China.

S. ciliaris, Nees (non Mich.).

#### RHYNCHOSPORIEE.

*Spikelets usually few-flowered. Glumes imbricate in 2 or several rows, the lower empty. Flowers usually polygamous. Perianth none, or composed of 6 bristles, rarely less and very rarely more. Stamens 3 or 6. Achene often beaked by the persistent base of the style.*

#### RHYNCHOSPORA, *R. Browne.*

*Spikelets 1-2- (rarely 3-) flowered, oblong, more or less pointed. Glumes imbricate all round, several outer ones shorter and empty. Hypogynous bristles 6, sometimes more. Stamens 3, or fewer. Style 2-cleft. Nut globular or rarely flattened, crowned by the persistent continuous base of the style. Stems usually leafy. Spikelets usually clustered, and of a rich brown, in terminal or axillary heads or corymbs, sometimes forming large terminal leafy panicles.*

- R. GRACILLIMA, Thwaites. Kamorta (K.).  
 R. AUREA, Vhl. Kamorta (K.). Ceylon. S. China.  
 R. WALLICHIANA, Kth. Kamorta (K.). Ceylon. India. S. China.  
     *R. Honkei*, Presl.  
     *Morisia Wallichii*, Nees.  
     *Haplostylis Meyenii*, Nees.  
 R. LAXA, Br. India. S. China.  
     *R. chinensis*, Nees.

CLADIUM, *R. Browne.*

Characters of *Rhynchospora*, only the *nut* has a thick, almost fleshy outer coating, tapering at the top into the style, but without any distinct beak.

- C. MARISCUS, Br. India. S. China.  
     *C. Chinense*, Nees.

## HYPOLYTRIEÆ.

*Spikelets* 1-flowered, agglomerated in capitate heads or cymose panicles. *Flowers* hermaphrodite, each with 2, 4 or 6 closely imbricate glumes. *Perianth* none. *Stamens* 2 to 3, or 6 to 8. *Style* bi- or trifid, deciduous or the base persistent.

HYPOLYTRUM, *Rich.*

*Spikelets* 1-flowered, densely crowded in ovoid or cylindrical spikes, resembling spikelets, the imbricated glume-like bracts under each spikelet as long as the spikelets themselves. *Glumes* 2, very flat, acutely keeled. *Flowers* hermaphrodite, without hypogynous scales or bristles. *Stamens* 3, or fewer. *Style* 2- or 3-cleft. *Nut* slightly compressed, or coarsely 3-angled, falling away from the glumes when ripe. Herbs usually coarse. *Spikes* brown, resembling the spikelets of *Scirpus*, pedicellate in corymbose panicles, like those of *Rhynchospora*.

- H. LATIFOLIUM, Rich. Kamorta (K.). Ceylon. S. China.  
     *H. giganteum*, Wall.  
     *H. trinervium*, Kth.  
     *Albikkia scirpoides*, Presl.  
 H. TRINERVIUM, Wall. Great Nicobar (K.).

## SCIRPIEÆ.

*Spikelets* usually many-flowered. *Glumes* imbricate in several rows, very rarely distichous (*Androtrichum*, *Abilgaardia*), some of the lower often empty. *Flowers* hermaphrodite. *Perianth* none, or represented by bristles. *Achene* usually pointed or beaked by the persistent base of the style.

SCIRPUS, *Linnaeus.*  
(*Eleocharis*, Br.)

*Spikelets* several-flowered, the glumes imbricate all round, only 1 or 2 of the lowest empty. *Flowers* hermaphrodite. *Hypogynous bristles* usually 6. *Stamens* 3 or fewer. *Style* 2- or 3-cleft, either not thickened at the base, or breaking off above a small bulbous thickening which remains attached to the nut. *Stem* leafy, or leaves all radical, or reduced to a sheath at the base of the stem. *Spikelets* solitary or clustered, in terminal, or apparently lateral heads, or simple or compound umbels.

- S. SUBULATUS, Kth. Nicobars (K.).  
 S. CAPITATUS, Willd. S. China. India.  
 S. (ELEOCHARIS) AFFLATUS, Steud. (apud Bentham). Khasi Hills. S. China.  
 S. CHINENSIS, Muir. Khasi Hills. S. China.  
 S. JUNCOIDES, Roxb. India. Ceylon. S. China.

Fuirena, *Linnaeus.*

Characters of *Scirpus*, except there are 3 obovate or obcordate hypogynous scales, and sometimes 3 bristles alternating with them. *Stems* leafy. *Spikelets* green, often

hairy and squarrose with the spreading tips of the glumes, usually in dense clusters, forming an irregular terminal narrow panicle.

- |                                |                                    |
|--------------------------------|------------------------------------|
| F. UMBELLATA, Rottb.           | Kamorta (K.). Ceylon. India.       |
| F. <i>pentagona</i> , W. et A. |                                    |
| F. GLOMERATA, Lam.             | S. China. Asia. Africa. Australia. |
| F. <i>Rottboellii</i> , Nees.  |                                    |

#### ISOLEPIS, R. Browne.

Characters of *Scirpus*, except there are no hypogynous scales.

- |  |                                    |
|--|------------------------------------|
| I. BARBATA, Br.  | S. China. Asia. Africa. Australia. |
| <i>Scirpus monander</i> and <i>antarcticus</i> , Roxb. |                                    |
| I. sp.   | Kamorta (K.).                      |
| I. ( <i>Scirpus</i> ) SUPINA, L.                       | S. China. India. Ceylon.           |

#### FIMBRISTYLIS, Vahl.

*Spikelets* several-flowered, the glumes imbricate all round, only 1 or 2 of the lowest empty. *Flowers* hermaphrodite, without hypogynous scales or bristles. *Stamens* 3, or fewer. *Style* 2- or 3-cleft, usually thickened at the base, and articulate on the nut below the bulb. *Leaves* usually radical, or sheathing the stem at its base, sometimes all reduced to sheaths. *Spikelets* solitary on the scape, or more frequently on the rays of a simple or compound umbel, one always sessile, or rarely clustered in a single head, or on the rays of the umbel.

- |   |                                 |
|---|---------------------------------|
| F. ACUMINATA.   | Nipal. S. China. Java.          |
| F. <i>setacea</i> , Benth.  |                                 |
| F. PODOCARPA, Nees.   | India. S. China.                |
| F. FERRUGINEA, Vahl.  | S. China. India.                |
| F. <i>arvensis</i> , Vahl.  |                                 |
| F. SQUARROSA, Vahl.   | S. China. India.                |
| F. FESTIVALIS, Vahl.  | Burma (M.). S. China.           |
| F. WIGHTIANA, Nees.   | Bengal. S. China.               |
| F. <i>junciformis</i> , Munr. (not Nees).                         |                                 |
| F. MILLACEA, Vahl.  | Kamorta (K.). Ceylon. India.    |
| F. ( <i>Scirpus</i> ) <i>tetragonus</i> , Roxb.                   |                                 |
| F. COMPLANATA, Link.  | Kamorta (K.). Ceylon. S. China. |
| F. DIPHYLLA, Vahl.  | Kamorta (K.). Ceylon. S. China. |
| F. <i>tomentosa</i> , Vahl.                                       |                                 |
| F. <i>Rageniana</i> , var. $\alpha$ et $\beta$ , Nees.            |                                 |
| F. <i>communis</i> , Kth.   |                                 |
| F. OVALIS, Nees.  | Kamorta (K.). Ceylon.           |
| There are two forms, a glabrous and a densely villous one (Kurz). |                                 |
| F. NUTANS, Vahl.  | Kamorta (K.). Ceylon. Silhet.   |
| F. GLOBULOSA, Wall.   | Kamorta (K.). Ceylon.           |
| F. SCHENOIDES, Vahl.  | India. Ceylon. S. China.        |

#### AXOSPORUM.

- |                      |                |
|----------------------|----------------|
| A. CEPHALOTIS, Vahl. | Nicobars (K.). |
|----------------------|----------------|

#### ABILDGAARDIA, Vahl.

Characters and habit of *Fimbristylis*, only differs in having distichous glumes.

- |   |                                |
|---|--------------------------------|
| A. MONOSTACHYA, Vahl.                       | India. S. China. Ceylon.       |
| A. <i>Rottboelliana</i> , Nees.             |                                |
| A. ERAGROSTIS, Vahl.                        | Khasi Hills. S. China. Ceylon. |
| <i>Fimbristylis quinquangularis</i> , Munr. |                                |
| A. FUSCA, Nees.                             | Nipal. Ceylon. S. China.       |
| A. <i>cinnamomctorum</i> , Thwaites.        |                                |

## CYPERIÆ.

*Spikelets usually many-flowered. Glumes distichous, imbricate, some of the lower often empty. Flowers hermaphrodite. Perianth none, or represented by hispid bristles. Style very rarely swollen at the base, deciduous.*

KYLINGIA, *Linnaeus*.

*Spikelets 1-flowered, or with a second male flower, closely imbricate in globular or oblong heads, or short spikes resembling spikelets; the bracts under each spikelet very small, or altogether wanting on the interior of the spike. Glumes distichous, 1, 2, or 3 empty ones below the flowering one. Flowers hermaphrodite, without hypogynous scales or bristles. Stamens 3 or fewer. Style 2-cleft. Nut flattened. Spikes usually solitary or few together, sessile or shortly pedunculate within 2 or 3 long leafy bracts.*

K. MONOCEPHALA, L.

Great Nicobar (K.). Ceylon. S. China.

K. TRICEPS, Rottb.

Burma (M.). Ceylon.

LIPOCARPHA, *R. Browne*.

*Spikelets 1-flowered, closely imbricate in globular or oblong heads, or short spikes resembling spikelets, the glume-like bracts under each spikelet as long as the spikelets themselves. Glumes 2, very thin and transparent, concave and scarcely keeled, one or both falling off with the nut, when ripe. Flowers hermaphrodite, without hypogynous scales or bristles. Stamens 3 or fewer. Style 2- or 3-cleft. Nut slightly compressed or obtusely 3-angled. Herbs with the habit of *Kylingia*. Spikes usually 3 or 5, rarely solitary, sessile, between leafy bracts.*

L. ARGENTEA, Br.

India. S. China. Ceylon.

*L. levigata*, Nees.REMIREA, *Aubl.*

R. MARITIMA, Aubl.

Kamorta (K.).

CYPERUS, *Linnaeus*.

*Spikelets several-flowered (very rarely 2- or 3-flowered). Glumes distichous, all nearly equal, with 1 flower in each, or 1 or 2 lowest rarely empty. Flowers hermaphrodite, without hypogynous scales or bristles. Stamens 3, or fewer. Style continuous with the ovary, not bulbous at the base. Spikelets in clusters, heads, or spikes, which are usually several together, in a simple or compound irregular umbel.*

C. FRAGROSTIS, Vahl.

Singapore. S. China.

C. POLYSTACHYUS, Roxb.

Kamorta (both varieties) (K.). S. China. Ceylon.

var. *C. strictus*, Roxb.

C. VULGARIS, Kth.

Kamorta (K.). S. China.

C. NASPAN, L.

Kamorta (K.). Ceylon. S. China.

*C. tenuispica*, Steud.

C. IRIA, L.

Kamorta (K.). Ceylon. S. China.

C. MOESTUS, Nees.

Kamorta and Katchall (K.).

C. PILOSTUS, Vhl.

Kamorta (K.). Ceylon. S. China.

*C. obliquus*, Nees.*C. piptolepis*, Steud.

C. MARGINELLUS, Nees.

India. S. China.

Perhaps, thinks Thwaites, a var. of the last.

C. RADIANUS, Nees.

Sikkim. Singapore. S. China.

*C. radicans*, Kunth.

C. UMBELLATUS, Benth.

Tillanchoung (K.). Typical form in S. China. Ceylon.

*Mariscus cyperinus*, Vahl.var. *b. leucostachya*. var.  $\beta$  Katchall (K.).

C. PENNATUS, L.

India. Ceylon. S. China. Nicobars (K.).

*C. canescens*, Vahl.

C. ROTUNDUS, L.	S. China.
<i>C. hexastachyus</i> and <i>tenuiflorus</i> , Rottb.	
<i>C. pertenuis</i> , Roxb.	
<i>C. bulbosus</i> , Vahl.	
C. DISTANS, L.	S. China. Ceylon. India.
C. PYGMEUS, Vahl.	Burma (M.).
C. DILUTUS, Vahl.	Kamorta (K.). Ceylon.

Some species of *Cyperus* yield an esculent root, which is of value in times of scarcity, as *C. esculentus* and *C. bulbosus*, which last species grows near the sea in Southern India, and is pleasant to the taste. *C. hexastachyus* is another species, sufficiently fragrant to be sought for its perfume. Other species may probably produce edible roots, as Mason mentions one, which is occasionally seen in Burma, which tastes something like filberts. *C. inundatus* is found on mud banks in Bengal, which it helps to protect from the wasting action of the water. In other respects the utility to man of reeds and rushes is not great, but some species can be woven into mats, and it was from a species of this family, *Papyrus antiquorum*, an inhabitant of tropical Africa, that the earliest substitute for paper was made by cutting the culm into thin slices, very much as *shola* (*Æschynomene paludosa*) is now used in India for various industrial purposes, or the so-called rice paper of China, the pith of *Fatsia papyrifera*, on which the soft and brilliant water-colour paintings of Chinese subjects are made.

Mason gives the native names of several species of *Cyperaceæ* as follows : Wet-myt-u ; Myit-kyet-thwōn ; Tor-kyet-lē-hli ; and in Sgau, Hsgai-ka-tho ; The-ki-kho ; O-bo, and Ta-pro.

#### RESTIALES.

*Flowers* hermaphrodite or unisexual, regular or not. *Perianth* of 4 or 6 glumaceous, scarious or membranous segments in 1 or 2 series, or reduced to scales or wanting. *Stamens* 1 to 3, free or united into a cup. *Ovary* usually 3-celled. *Ovules* solitary, pendulous, orthotropous. *Fruit* capsular, rigid or membranous. *Embryo* outside the base of the albumen.

#### Order ERIOCAULONEÆ.

*Flowers* monœcious or diœcious. *Perianth* inferior, double, the outer bi- or tri-phyllous, the inner subtubular, trifid or bifid. *Stamens* double the number of the perigonial leadlets, inserted on the inner, the alternate often sterile. *Ovary* superior, of 2 or 3 uni-ovular cells. *Ovules* pendulous, orthotropous. *Capsule* bi- or tri-celled, loculicidal. *Seeds* albuminous.

#### ERIOCAULON, *Linnaeus*.

*Flowers* sessile, in androgynous (rarely diœcious) heads, with imbricated bracts, 1 under each flower, and a few outer ones empty. *Male flowers*, perianth of 6 or 4 segments, the outer free, or united, inner ones basally united into a solid stalk. *Anthers* 2-celled. *Female flowers*, perianth segments all distinct, or the inner shortly united. *Style* single, with 3 or 2 stigmas. *Capsule* 3- or 2-lobed, opening at the angles. Aquatic or marsh plants.

E. LONGIFOLIUM, Nees.	Kamorta (K.).
E. TRUNCATUM, Ham.	Kamorta (K.). Ceylon. Silhet.
E. WALLICHIANUM, Mart.	Tavoy (M.). Ceylon. S. China.
<i>E. Cantonense</i> , Hook.	
<i>E. longifolium</i> , Nees (?).	
E. SETACEUM, L.	Tavoy. Ceylon.
<i>E. intermedium</i> , Kœrnicke.	
E. CRISTATUM, Mart.	Khasi Hills. Ceylon.
<i>E. miserum</i> , Kœrnicke.	

Order FLAGELLARIEÆ.

*Flowers* hermaphrodite. *Perianth* of 6 subequal segments, in two series. *Stamens* 6, hypogynous, free. *Anthers* 2-celled, introrse. *Styles* 3, papillose throughout. *Berry* 1- or 2-seeded. Sedge-like herbs. *Leaves* with long sheaths and parallel nerves.

FLAGELLARIA, *Linnaeus*.

F. INDICA, L.

Great Nicobar (K.).

Myouk-kyeing.

COMMELYNALES.

*Flowers* hermaphrodite, spiked, paniced, solitary, or capitate. *Perianth* regular, or not, of 6 segments in 2 series, 3 outer herbaceous and 3 inner very different, petaloid, coloured. *Style* usually trifid. *Embryos* outside the albumen, or in a distinct cavity in its side.

Order XYRIDEÆ.

*Flowers* in terminal solitary heads of densely imbricating, 1-flowered, rigid scarious bracts. *Capsule* 1-celled, and 3-valved. *Seeds* numerous, angled, or globose. Rush-like, usually erect and rigid plants, growing in swampy places.

XYRIS, *Linnaeus*.

*Perianth* of 2 lateral outer segments, keeled and compressed, a third broader and more petal-like, enveloping the 3 inner petal-like segments or lobes. *Stamens* 3, fertile, opposite the inner segments, and sometimes 3 sterile penicillate filaments between them. *Placentas* parietal. Rush-like herbs.

X. INDICA, L. (M.).

Burma. Ceylon.

X. PAUCIFLORA, Willd. (M.).

Burma. Ceylon. S. China.

Order COMMELYNEÆ.

*Flowers* hermaphrodite. *Perianth* inferior, double. *Sepals* 3. *Petals* 3. *Stamens* 6, hypogynous. *Ovary* superior, with 3 few-ovuled cells. *Ovules* orthotropous. *Capsule* with 3-2 cells, loculicidal. *Seeds* albuminous. *Leaves* alternate. This family is of small use to man, though the tubers of some species are edible when cooked.

CYANOTIS, *Don*.

*Flowers* regular. *Sepals* united at the base. *Petals* united more or less by their claws, in a 3-lobed corolla. *Stamens* 6, filaments bearded towards the top. *Anthers* uniform. *Ovary* with 2 ovules in each cell, attached to its centre. *Capsule* 3-valved. *Seeds* 1 erect, the other pendulous. Creeping or ascending herbs.

C. AXILLARIS, Roem. et Sch. (P.).

Tenasserim. India. Ceylon. S. China.

C. FASCICULATA, Roem. et Sch.

India. Ceylon. S. China.

POLLIA, *Thunberg*.

*Flowers* regular. *Perianth* segments free, one petal rather narrower. *Stamens* 6. *Anthers* all with 2 parallel cells, but 3 usually barren. *Ovary* 3-celled, with numerous ovules in each cell. *Fruit* globular, slightly succulent, indehiscent, shining and brittle when dry. *Seeds* angular. Stem erect. *Leaves* large. *Flowers* in terminal panicles. *Bracts* small.

P. (ANILEMA) BIDYMA, Ham.

Khasi Hills.

P. sp. (P.).

Tenasserim.

FLOSCOPA, *Loureiro*.

*Flowers* nearly regular. *Perianth* segments free, one petal usually narrower. *Stamens* 6, all fertile. *Ovary* contracted at the base or stalked, 2-celled, with 1

ovule in each cell. *Capsule* flattened, didymous, 2-valved. *Seeds* laterally attached by the broad truncate base. Erect or ascending herbs. *Flowers* small, in terminal panicles. *Bracts* small.

*F. PANICULATA*, Hassk.

India. Malayan Peninsula. S. China.

*F. rufa*, Hassk.

*Dithyrocarpus capensis* and *Meyerianus*, Kth.

*D. petiolatus*, *Rothii* and *undulatus*, Wight.

*Ancilema hispidum*, Don.

#### ANEILEMA, *R. Browne.*

*Flowers* nearly regular. *Perianth segments* free. *Stamens* 6 or 4, of which 3 or 2 have differently-shaped barren anthers. *Ovary* 3-celled, with 2 to 5 ovules in each cell. *Capsule* 3-valved. *Flowers* usually small in terminal panicles. *Bracts* small.

*A. ENSIFOLIUM*, Wight.

Swampy rivulet in Kamorta (K.).

*A. UNDIFLORUM*, Br.

Kamorta (K.). India. Ceylon. S. China.

*A. debile*, Wall.

*A. diandrum*, Ham.

*A. compressum*, Dalz.

*A. HERBACEUM*, Wall.

Burma (M.).

#### COMMELYNIA, *Linnaeus.*

*Perianth* irregular, 2 sepals larger than the third, and one petal differently shaped or more sessile than the 2 others. *Stamens* 6, or rarely fewer, of which 3 are fertile, 1 of them larger than the others, 3 barren, with deformed anthers. *Ovary* with 1 1-ovuled and 2 2-ovuled cells. *Capsule* 2-valved. *Flowers* few, on 2 peduncles enclosed in a folded cordate or peltate-turbinate oblique bract, or spathe, which is usually pedunculate from a split leaf-sheath opposite the blade.

*C. COMMUNIS*, L.

Kamorta (K.). India. S. China.

*C. CESPITOSA*, Roxb.

Burma (M.).

Utsat-le-kyoung, or Mā-gywôt.

*C. SALICIFOLIA*, Roxb.

India. Malay Peninsula. S. China.

*C. BENGHALENSIS*, L.

India. S. China.

#### PONTEDERALES.

*Flowers* hermaphrodite, spiked, paniced or capitate. *Perianth* of 2 segments or of 6 biseriate segments, all petaloid or 3 outer, herbaceous or coriaceous. *Style* single. *Stigma* sub-entire. *Embryo* immersed in copious albumen, not external or in a lateral cavity. Marsh plants.

#### Order PONTEDERIACEÆ.

*Perianth* inferior, petaloid, sex-partite, irregular, persistent. *Stamens* inserted on the perianth, 6, or 3 opposite to the inner segments. *Ovary* superior, of 3 many-ovuled cells, or 2 sterile, and 1 fertile, and 1-ovuled cell. *Fruit* or capsule enveloped by the fleshy perianth. *Albumen* mealy. Marsh plants.

#### MONOCHORIA, *Presl.*

##### (*Pontederia.*)

*Perianth* nearly regular, divided to the base into 6 spreading segments. *Stamens* 6, unequal, 1 usually larger, with a small tooth or spur on the filament. *Ovules* numerous in each cell of the ovary. *Capsule* free, 3-valved, many-seeded. *Leaves* radical on long petioles. *Scapes* with 1 petiolate leaf, the short raceme in its axil appearing to proceed from the middle of the petiole. *Flowers* few.

*M. (PONTEDERIA) VAGINALIS*, Roxb. (M.).

Burma. India. S. China.

Lē-pa-douk.

M. (PONTEDERIA) PLANTAGINEA, Roxb. (M.). Burma. India. S. China.

M. (PONTEDERIA) DILATATA, Buch. (M.). Burma.

Padouk-gyi.

M. (PONTEDERIA) SAGGITATA, Roxb. (M.). Burma.

The young shoots of *P. vaginatis* are edible, and the whole plant is used medicinally, in diseases of the digestive organs, asthma, and toothache.

### LILIALES.

*Flowers* hermaphrodite, rarely unisexual, spiked, racemed, panicle or solitary, rarely capitate. *Perianth* of 6 rarely 4 sub-similar pieces, or monopetalous, and 6-lobed and regular (except *Gillisiaea*), usually all coloured and petaloid (coriaceous in *Junceæ*). *Embryo* as in *Pontederaceæ*.

#### Order JUNCEÆ.

*Flowers* usually hermaphrodite. *Perianth* inferior, 6-phyllous, glumaceous, 2-seriate. *Stamens* 6 or rarely 3, inserted at the base of the perianth-segments. *Ovary* superior, 3- or 1-celled, 1- to many-ovuled. *Orules* erect, anatropous. *Capsule* 1- to 3-celled, loculicidal or septifragal. *Seeds* albuminous. *Embryo* basilar, radicle inferior, stem herbaceous. *Leaves* alternate, sheathing.

Annual or perennial herbs, caespitose or with a creeping rhizome. *Stem* cylindrical, spongy, or sometimes chambered by medullary septa.

#### Juncus, Linnaeus.

J. LESCHENAUITH, J. Gray.

India. S. China.

#### Order ROXBURGHIACEÆ.

*Flowers* large, solitary, axillary, foetid. *Perianth* of 4 lanceolate petaloid segments. *Stamens* 4, hypogynous. *Filaments* very short. *Anthers* large, basifixed, 2-celled, longitudinally dehiscent, and produced into a long appendage. *Ovary* 1-celled. *Style* none.

#### ROXBURGHIA, Dryander.

R. sp. (fide Dr. Diedrichsen).

Nicobars.

Sir J. Hooker says the tuberous root is candied and eaten in India.

#### Order ASPARAGEÆ.

*Flowers* usually hermaphrodite, regular, pedicels jointed. *Perianth* inferior, petaloid, sex-partite and biseriate. *Stamens* 6. *Ovary* superior, 3-celled. *Fruit* a berry. *Seeds* with black crustaceous testa. Albumen fleshy.

#### ASPARAGUS, Linnaeus.

A. ACEROSUS, Roxb.

Burma (M.).

Shit-ma-tet.

The Orders *Asparagææ*, *Smilacææ* and *Melanthacææ* are by some botanists (Kurz *et. g.*) reduced to tribal rank among the Liliacææ; but Maout and Decaisne separate them as both a more natural and convenient arrangement. *Asparagææ* are intermediate between *Liliacææ* and *Smilacææ*, being differentiated from the former by their berried fruit, and the latter by characters of the testa. *Asparagus* is a favourite vegetable, remarkable for communicating its peculiar smell to the urine, and its roots were once esteemed as purgatives. The roots of *Cordyline*, on the other hand, are used as medicine in dysentery, and the plant is cultivated in Burma, chiefly about Khyoungs or Monasteries. The genus *Phacæna* yields the true "dragon's blood," but the resin of the Padouk (*Pterocarpus*) is not unfrequently substituted for the real article.

DRACENA, *Vaud.*

*Perianth* tubular, deeply 6-cleft, caducous, valvate in bud. *Stamens* 6, adnate to the perianth-tube, and free from the throat. *Anthers* 2-celled, versatile. *Ovary* free, 3-celled, each cell 1-ovuled. *Style* 3-sulcate, filiform. *Stigma* capitate 3-lobed. *Leaves* petioled, or sessile and half stem-clasping.

† *Flowers in panicles.*

\* *Leaves sessile, with a narrowed stem-clasping base. Perianth-lobes more or less recurved from the middle.*

D. ANGUSTIFOLIA, Roxb. *E.T.*

Tree forests of South Andaman. Great Nicobar. Trice and Traek.

Kwam-lin-nek (Kurz)

Panicle erect, shorter than the leaves, stiff; outer bractlets 1-2 lines long, with scarious border, filaments white. Berry-lobes the size of a small pea.

D. ENSIFOLIA, Wall, *E.S.*

Upper Tenasserim.

Panicle nodding, longer than the leaves, flexuose. Bracts acute, almost wholly scarious; filaments orange. Pedicels  $\frac{1}{2}$  inch long.

D. BRACHYPHYLLA, Kz., *E.S.*

Tree forests of the Andamans.

Panicle much shorter than the  $\frac{1}{4}$  to  $\frac{1}{2}$  inch long leaves, erect, stiff. Bracts linear acuminate, herbaceous, with scarious margin. Pedicels only 2 to 3 lines long.

\*\* *Leaves narrowed in a complicate petiole.*

‡ *Perianth-lobes erect-spreading, conniving in a tube. Small shrubs.*

D. ELLIPTICA, Thbg.

var. *a.* Chittagong and all over Burma and the Andamans.

Flowers sparse. Bractlets 1 line or longer. var. *β.* Tenasserim.

var. *a. elliptica.* Flowers by twos or threes, white.

Kwōn len-lpyu.

var. *β. atropurpurea*, Bak. Flowers solitary, purplish outside.

Kwōn-len-hnet.

D. HELPERIANA, Kz. *E.S.*

Tree forests of Pegu and Tenasserim.

Flowers 1-sided. Bractlets minute, broad and scarious.

‡‡ *Perianth-lobes removed from the middle. Trees.*

D. TERNIFOLIA, Roxb.

Khakyen Hills.

Panicle rather contracted. Corolla twisted. Bracts scarious.

†† *Flowers in simple terminal racemes. Leaves narrowed in a leafy petiole.*

D. SPICATA, Roxb., *E.T.*

Tree forests of Chittagong and South Andaman, Kondul and Kar Nicobar.

Peduncle shorter than the leaves, bracted, scaly. Pedicels short. Corolla twisted, tube long, the lobes short, spreading.

D. PACHYPHYLLA, Kz., *E.T.*

Tree forests of South Andaman. Malacca.

Peduncle short or almost none; the raceme almost as long as the petiole. Pedicels very short; corolla not twisted, the lobes not recurved.<sup>1</sup>

In addition to the above Kurz records

D. LINEARIFOLIA, Miq.

Beach forests of Kamorta and Katchall.

*D. Finlaysoni*, Baker.

D. GRIFFITHII, Reg.

Rare in the tree forests of Kamorta.

<sup>1</sup> Kurz remarks; "A *D. spicata*, specie arboreâ quâ cum el Baker conjunxit, staturâ humili et periantho recto, non torto, jam differt."—J.A.S.B. II. 1873. p. 249.

CORDYLINÆ, *Commerson.*

Characters of *Dracena*, but the ovary cells with several ovules.

\**C. TERMINALIS*, Kth., *E.S.*

Var. *a* cultivated round Monasteries.

Glabrous. Leaves 1 to 3 feet long on a 2 to 4 inch long stem-clasping petiole. Chartaceous green or purplish. Flowers small, solitary, white or purplish.

var. *a. terminalis*. Flowers larger, sessile.

var. *β. ferrea*, Baker. Flowers on pedicels.

## Order SMILACEÆ.

*Flowers* usually hermaphrodite. *Perianth* inferior, petaloid, mostly sex-merous, biseriate, isostemonous. *Stamens* hypogynous or perigynous. *Anthers* introrse. *Ovary* superior, 3-celled, rarely 1, 2 or 4-celled. *Berry* few-seeded. *Seeds* globose. *Testa* membranous. *Albumen* very dense. Herbs or undershrubs, sometimes with tendrils or thorns. *Leaves* all radicle or cauline, alternate or whorled.

This Order is unimportant in Burma. The roots of several American species of *Smilax* constitute the Sarsaparilla of commerce, and a similar article is also procurable from several Asiatic species.

SMILAX, *Linnaeus.*

*Flower* dicocious. *Perianth* of 6 spreading segments, all equal, or the 3 outer larger, or the 3 outer united, and the 3 inner wanting. *Male Flowers*. Stamens 6, inserted at the base of the segments, or rarely 3, free or monadelphous. *Female Flowers*. Stamens rudimentary. *Ovary* 3 celled, with 1 or 2 erect ovules in each cell. *Stigmas* 3, sessile, distinct or shortly united. *Fruit* a globular berry. *Embryo* minute, remote from the hilum. Climbers.

*S. GLABRA*, Roxb.

Khasi Hills. S. China.

*S. LANCEFOLIA*, Roxb.

Khasi Hills. S. China.

*S. FEROX*, Wall.

Khasi Hills. S. China.

*S. OVALIFOLIA*, Roxb.

Burma (M.). Ceylon. India. S. China.

*S. macrophylla* and *prolifera*, Roxb.

*S. POLYACANTHA*, Roxb.

Kamorta (K.).

## Order MELANTHACEÆ.

*Flowers* hermaphrodite. *Perianth* sub-herbaceous or petaloid, sex-merous, biseriate. *Stamens* usually 6, inserted at the base of the perianth. *Anthers* extrorse in bud. *Ovary* superior or rarely semi-inferior; of 3 many-ovuled cells. *Styles* 3. *Seeds* albuminous. *Embryo* small, included.

## METHONICÆÆ.

*Perianth* tubular or 6-partite. *Stamens* inserted at the base of the perianth-segments, or on its tube. *Ovules* anatropous. *Stigmas* 3. *Fruit* capsular. *Seeds* turgid. *Testa* thick or fleshy, white or red. *Embryo* straight.

## \* METHONICA.

*M. SUPERBA*, Lam. (M.).

Hsi-mi-touk.

The Hpungyis collect the roots of this for medicine (K.).

## VERATRICEÆ.

*Stem* or *scape* leafy. *Flowers* axillary or solitary, or in spikes or racemes. *Styles* short, usually distinct. *Perianth* leaves free, sessile, or very shortly clawed, sometimes basally united. *Ovary* free or semi-inferior.

## ANGUILLARIA.

*A. INDICA*, Brown (M.).

Burma.

## SIEMONA.

S. GRIFFITHIANA, Kz.

Ava. Pegu. Tenasserim.

A perennial erect herb, rhizome thick, hypogæous, leaves ovate, 3-5 inches long, on a petiole of equal length. Flowers greenish-purple. Stamens 4. Filaments broad, purple. Anthers yellow. Ovary 1-celled. Ovules 6, linear-oblong, pendulous capsules bivalved, 3-4 seeded. Seeds sulcately keeled, with a short white basal villus.

This order embraces plants of great medicinal efficacy, and yielding the powerful alkaloids *veratrine*, *colchicine*, *sabadilline*. *Colchicum autumnale*, however, is the only one which may be deemed important in medicine, though many species are used both in powder and infusion as vermifuges and insect destroyers.

## Order LILIACEÆ.

*Flowers* hermaphrodite. *Perianth* inferior, petaloid sex-partite, biseriate. *Stamens* 6. *Ovary* superior, with 3 several- or many-ovuled cells. *Style* simple. *Fruit* capsular. *Albumen* fleshy. *Stem* with a bulbous or fibrous-fascicled root.

## HYACINTHINÆÆ.

*Perianth* tubular or 6-partite. *Stamens* inserted on the receptacle or perianth-tube. *Ovules* anatropous or semi-anatropous. *Fruit* capsular. *Seeds* globose or angular. *Testa* crustaceous, black. *Radicle* facing the hilum. *Herbs* with bulbous or fibrous-fascicled roots.

SCILLA, *Linnaeus*.

Perianth-segments 6, nearly equal, free or nearly so, spreading or forming a bell-shaped or tubular flower. Stamens 6, inserted below the middle, or at the base of the segments. Ovary with 1, 2 or several ovules in each cell. Stigma entire or nearly so. Seeds few, black, oblong or globular. Bulbous herbs. Leaves radical, parallel veined. Flowers pink or blue, in a simple raceme on a leafless scape.

S. INDICA, Roxb. (M.).

Burma.

Pa daing-kyet-thwōn.

ALLIUM, *Linnaeus*.

\* A. SATIVUM, L. (M.).

Cultivated.

Kyet-thwōn-hypu. Garlic.

\* A. CEPA, L. (M.).

Cultivated.

Kyet-thwōn-ni. Onion.

\* A. PORRUM, L. (M.).

Cultivated.

Tor-kyet-thwōn. Leek.

\* A. ASCALONICUM, L. (M.).

Cultivated.

The Eschalotte, Shallot, or Onion of Askalon.

## ORNITHOGALUM.

O. REVOLUTUM, Jacq. (M.).

O. CAUDATUM, Ait. (M.).

## ALONINÆÆ.

Perennial herbs, sometimes arborescent, and with fleshy leaves (Aloe), and roots fibrous fascicled, often swollen.

## ALOE

\* A. SOCOTRINA, L. (M.).

Mōk.

This plant, a native of the Cape of Good Hope, is now thoroughly naturalized in India and Burma, and makes a valuable hedge plant, where gardens require protection near roads from stray cattle. The inspissated juice forms bitter aloes, the best coming from Socotra, and the fibres of the fleshy leaves, yield materials for the manufacture of an excellent and beautiful fabric.

## HEMEROCALLIDIÆ.

*Perennial herbs with tuberous or fibrous roots.*

## HEMEROCALLIS.

\* *H. DISTICHA*, D. Don (M.).

\* *H. FULVA*, L. (M.).

To this tribe belongs the valuable fibre plant, *Phormium tenax*, which would probably thrive well in Burma, and is deserving attention for the sake of the excellent fibre or flax which it yields.

## TULIPACIÆ.

This tribe is chiefly remarkable for the beauty of its flowers.

The Order Liliaceæ is an extremely important one to man, as the tribe *Hyacinthinæ* yields some of the most useful culinary herbs we possess, as the onion, garlic, and leek. *Aloinæ* are also valuable to man for their fibre and other purposes, whilst the tribe *Tulipacæ* yields some of the handsomest and most prized denizens of his pleasure grounds, as tulips, lilies, and the Yucca, which in full bloom forms such a glorious object in an Indian garden. The cultivation of the garlic and onion, especially the former, is probably coeval with history, and their value as a condiment to the somewhat insipid diet of the inhabitants of warm countries can hardly be over-estimated. It is worth remembering that the onion and leek were not formerly eaten by certain classes in Egypt, as we learn from Juvenal—

Porrum et cæpe nefas violare et frangere morsu.  
O sanctas gentes quibus hæc nascuntur in hortis  
Numina!—*Sat. XV. 9.*<sup>1</sup>

At the present day onions are not eaten in India by Brahmins, the assigned reason being their red colour causes them to resemble flesh. There can be little doubt however that the true reason is the same occult one, which caused them to be originally avoided by certain classes in Egypt, though the cause has now died out of the knowledge of the men who nevertheless still observe the prohibition. It has been suggested that the free consumption of onions rendered a man liable to compromise the purity of the air, in the temples wherein he might subsequently worship; but I think a more likely reason for the selection of this plant as a sacred one may be discovered in its globular head of seeds, which, in times when a vivid imagery went hand in hand with the worship of the fecund powers of nature, might have seemed a fit emblem of the great Solar Orb—the fruitful source of life on earth—and have been set apart as holy on that account. It requires perhaps an effort now-a-days to realize the light wherein to us trivial ideas may have then presented themselves; but a very little knowledge of the subject is required to prove how universal and deep-seated was the symbolism connected with religion, when all religion was imbued with nature worship of either Phallic or Solar complexion.

## ARALEÆ.

*Flowers* hermaphrodite, or unisexual, arranged in a spadex or spike, with or without a spathe, or sunk in pits of a minute scale-like frond. *Perianth* of distinct

<sup>1</sup> 'Tis mortal sin an onion to devour;  
Each clove of garlic is a heavenly power!  
Oh holy nations and O sacred elods,  
Where every fruitful garden teems with gods!

pieces, white or green, or of minute scales, or wanting. *Fruit* a drupe or berry with one, few, or many minute albuminous seeds. Herbs, often very large, rarely trees. *Leaves* simple or pinnatifid, very rarely pinnately divided.

#### Order LEMNACEÆ.

*Flowers* hermaphrodite. *Perianth* none. *Seeds* most minute. Small, free-floating water plants, comprising the smallest known phanerogams.

##### LEMNA, *Linnaeus*.

L. PAUCICOSTATA, Hegelm.

In a marsh behind Katjui, Katchall (K.).

This order embraces the smallest known phanerogams. *L. minor* is the familiar duck-weed of our English ponds.

#### Order AROIDEÆ.

*Flowers* usually monœcious, more rarely diœcious or hermaphrodite, inserted on a simple spadix, furnished with a spathe, with or without a perianth. *Ovary* 1 to several-celled. *Ovules* basilar or parietal. *Fruit* a berry. *Seed* usually albuminous.

The *Aroideæ* are herbaceous perennial plants, with rhizome or tubers and then stemless, or caulescent with straight, branched, and arborescent stems, marked with petiolar scars, sometimes sarmentose, or climbing by means of adventitious roots, sometimes viviparous (*Romusatia vivipara*), very rarely floating (*Pistia*). The leaves of all known species but one (*Anthurium violaceum*) are glabrous, but in other respects very variable, sometimes recalling *Sparganiæ* (*Acorus*), sometimes *Marantaceæ* (*Aglaonema marantæfolium*), sometimes *Smilacææ* (*Goniurus*), sometimes *Tuccaceæ* (*Dracunculus*, *Amorphophallus*), and sometimes even some Dicotyledonous plants, as *Aquilarinææ* (*Heteropsis salicifolia*), or *Cycadææ* (*Zanioeulcas*).

##### ARACEÆ.

*Flowers* diœcious, achlamydeous, the female on the lower, the male on the upper part of the spadix.

##### Section PISTIACINÆ.

Spadix adnate to the spathe. Female flowers solitary, separate from the male flowers. Aquatic, floating herbs, stoloniferous or terrestrial, with tuberous rhizome.

##### PISTIA, *Linnaeus*.

P. STRATIOTES, L. (M.).

##### AMBROSINIA.

A. ? (M.).

##### Section DRACUNCULINÆ.

Spadix free, or rarely adnate to the base of the spathe. *Monœcious* or very rarely *diœcious*. *Flowers* male and female, sometimes separated by rudimentary organs. Herbs with usually a tuberous or thick rhizome. *Spathe* coloured, usually violet, glabrous or hairy within, and fœtid.

##### ARUM, *Linnaeus*.

*Spathe* convolute or tubular at the base. *Spadic* androgynous, the ovaries at base, the stamens higher up, with barren organs either between the ovaries and stamens, or above the stamens, or both; the rachis ending in a club-shaped or pointed appendix. *Stamens* distinct. *Anthors* 2-celled, sessile or on short filaments. *Ovaries* 1-celled with 1 or more ovules. *Rhizome* usually tuberous. *Leaves* entire, or 3-lobed, on long radical petioles. *Scapes* radical, without bracts under the spathe.

A. DIVARICATUM, L.

India. Ceylon. S. China.

A. RAPIFORME, Roxb. (M.).

A. TRILOBATUM, L. (M.).

*A. orixense*, Roxb.

Thwaites considers *A. orizense* as identical with the Linnean plant. The roots are very acrid, and applied in poultices as a counter-irritant, and also to destroy maggots in the sores of cattle.

AMORPHOPHALLUS, *Blume*.

*Spathe* of *Arum*. *Spadix* continuously androgynous without barren organs, and ending in an appendix, sometimes very large. *Anthers* sessile, 2-celled. *Ovaries* distinct, 2-, 3- or rarely 4-celled, with 1 erect ovule in each cell. *Leaves* divided into 3 segments, which are again once or twice pinnately divided. *Spadix* often livid purple, and very fetid.

\* *A. CAMPANULATUS*, Roxb. (M.). Cultivated.

Weh. Telinga potato.

Cultivated for its roots, which are cooked like yams, and highly esteemed, weighing each from four to eight pounds. In a good soil the yield is as much as 250 mannds (lbs. 20,000) to a Bigah.

Section COLOCASINÆ.

*Spadix* free, terminated by a naked and sterile appendage (*Colocasia*, etc.) or without appendage (*Caladium*, etc.). *Flowers* male and female, numerous, usually separated by rudimentary organs. Herbs with tuberous rhizomes, stemless or caulescent, sometimes climbing. *Spathe* usually sweet-scented.

COLOCASIA, *Ray*.

*Spathe* and *spadix* as in *Arum*. *Stamens* united, several together, in short truncate or peltate masses, with the anthers laterally adnate. *Ovaries* 1-celled or partially 3-celled, with several ovules. *Leaves* usually large and glaucous, cordate and sometimes peltate. *Spadix* usually sweet-scented.

\* *C. ANTIQUORUM*, Schott. Cultivated in Burma and the Nicobars (K.).

Peing.

*C. VIROSA*, Kth.

Kamorta (K.).

*C. INDICA*, Voigt (M.).

Sit-tung.

*C. ODORA*, Voigt (M.).

Peing-mā-haw-ya.

Of this plant Dr. Mason remarks: "This is a most singular plant. It has a stem 1 or 2 feet high and 6 inches in diameter, resembling a low palm, while its leaves are like gigantic cabbage leaves 3 or 4 feet long, by 2 or 3 wide. The flowers are said to be fragrant. The natives do not cultivate it for food, like the other species of *Arum*, but, as they say, for medicine." In addition to the above species of this family, Dr. Mason gives the names of several others, some of which, it may be presumed, are cultivated varieties of *Colocasia*, which in India has several names in the vernacular. They are as follows:—Koung-gen-peing, Pan-nai-nat, Wet-kyouk-peing, Peing-kyan, Peing-mug, Peing-kyoung-khyac, Peing-shan, and Peing-pan-hwōn. The roots of *Colocasia* are much used as food, but are little esteemed by Europeans. The best way of cooking them is to boil them first, and then bake them, when the superior varieties would probably be found (especially where potatoes are unprocurable) more deserving of notice than they are generally thought.

Section ANAPORINÆ.

*Spadix* free (*Aglaonema*) or adnate to the spathe (*Spathicarpa*), rarely ending in a sterile appendage (*Pinellia*). *Flowers* female and male contiguous, the female usually mingled with *staminodes*. Herbs with knotted rhizome, stemless, or caulescent.

AGLAONEMA.

*A. SIMPLEX*, Bl.

Katchall and Kamorta (K.).

## CALLACIÆ.

*Flowers hermaphrodite, or male and female on the same spadix, achlamydeous or not.*

## Section CALLINÆ.

*Spathe coloured. Flowers achlamydeous.*

## CHAMELOCLADON.

*C. OVATUM*, Schott.

Great Nicobar (K.).

## SCINDAPSUS, Schott.

*S. PTEROPODUS*, T. et B.

Great Nicobar (K.).

The family of *Aroidæ* is of no great value to man, though many species yield edible roots, which, however, are chiefly in repute among the poorer classes. Some species are cultivated for the beauty and the variety of colour of their smooth cordate leaves (*Caladium*), whilst others are notorious for their repulsive odour. The *Arum maculatum* of our English hedges is a familiar example of this family, and is known by a variety of popular names, many of the older and now obsolete ones being of a highly indelicate character, and referring to the supposed amatory virtues of the plant, or the shape of the spadix. One of them, however, *Aaron*, is a mere vulgar corruption of the word *Arum*.<sup>1</sup> The most curious point, perhaps, about this family is the great amount of heat the flowering spadix of many *Arums* gives off, varying from 7° to 12° above that of the atmosphere, and even 22° according to some observers.

## Section ORONTINÆ.

*Spathe* persistent, herbaceous or sometimes coloured, rarely wanting, covered with hermaphrodite flowers.

POTNOS, *Linnaeus*.

*Flowers* hermaphrodite, in a globular or cylindric spike, usually stipitate above the convolute or concave spathe. *Perianth* of 6 small concave scales or segments. *Stamens* 6, opposite the perianth scales. *Filaments* flat. *Anthers* 2-celled. *Ovary* 1-celled with 1 to 3 erect ovules. *Stigma* sessile. *Berries* 1- or 2-seeded. *Albumen* none. *Stem* usually creeping or climbing. *Leaves* entire, coriaceous, usually articulate on the more or less dilated petioles. *Peduncles* axillary, often bracteate below the spathe.

*P. SCANDENS*, L.

The Nieobars (K.). India. S. China. Ceylon.

*P. Seemannii*, Schott. *Prod. Aroid.* p. 564, "and probably the whole of the first 19 species enumerated in that work."—Bentham.

*P. PINNATIFIDA* (P.).

*P. GIGANTEA*, Roxb. (M.).

Ngā-ya-gye.

*P. RECURSIVA*, Roxb. (P.).

*P. LASIA*, Roxb. (P.).

*P. HETEROPHYLLA*, Roxb. (P.).

## Section ACORINÆ.

*Spathe* leaf-like, adnate to the peduncle. *Flowers* hermaphrodite, covering the spadix. *Leaves* ensiform, equitant, sheathing in vernation.

HOMALONEMA, *Linnaeus*.

*H. AROMATICUM*, Schott.

Kamorta. Pulu-Milu (K.).

<sup>1</sup> Consult "Popular Names of British Plants," by R. C. A. Prior, under "*Arum maculatum*," "Wake-pintle," and "Lords and Ladies."

ACORUS, *Linnaeus*.

*Flowers* hermaphrodite, in a cylindrical spike, the spathe linear and continuous with the scape. *Perianth* of 6 concave scales or segments. *Stamens* 6, opposite the segments. *Filaments* linear, flat. *Anthers* terminal. *Ovary* 3-celled, with several ovules in each cell. *Stigma* sessile on the obtuse top. *Seeds* albuminous.

A. CALAMIS, L. (M.).

Len-hai.

This is the sweet cane of the Scriptures, and not sugar-cane, as some have supposed (Mason).

The whole plant is aromatic, but the root alone preserves this quality in drying. It occurs in the bazaars in the shape of wrinkled pieces, and is esteemed by the Hindus as a stimulant in cases of ague and flatulency. The *Calamus aromaticus* of the ancients is considered by Royle to be a grass, *Andropogon calamus-aromaticus* one of the species yielding the fragrant 'grass oil.'

HAPALINE, *Schott*.

II. BENTHAMIANA, *Schott*.

*Masonanthus niveus*, Kurz.

Kurz thus describes this plant:—"A small glabrous herb about  $\frac{1}{2}$  a foot high, with a somewhat tuberous root, at base sheathed with a long linear white sheath. *Leaves* 3 inches long, on petioles of equal length, oblong, deeply sinuate-cordate, the basal lobes overlapping each other, and bluntish-prolonged, glabrous, uniformly green, shortly acuminate, the nerves anastomosing. *Flowers* 2 or 3, from the rhizome on long slender 3 to 4 inch long scapes, the spathe snow-white, linear-lanceolate to lanceolate, about  $\frac{1}{2}$  an inch long, complicate at base, net-veined, reflexed, the male *spadic* exserted, straight, linear-subulate, white, nearly as long as the spathe.

"In Eng Forests near Karway (Tsittoung), Martaban. A simple-looking but really attractive plant, growing clandestinely along with other varieties, such as *Hemiochlis Birmanica*, Kurz, and *Ariopsis*, on the sterile laterite ground. I have called it 'Dr. Mason's snow-white flower,' in honour of the Rev. Dr. Mason, at Toung-ngoo. Any one who knows this active and modest gentleman personally, and who knows a little about flower-language, will agree with me, that I could have selected no better plant for dedicating to him than the one before me."

It would seem, however, that the plant in question had already received a name, and the above words of Kurz, describing his *Masonanthus*, will alone remain as an honourable recognition of Dr. Mason's amiable qualities of heart and mind.

Order PANDANÆÆ.

*Flowers* dioecious or polygamous, naked, or simple or branched. *Spadices*, protected by many spathes. Male flowers: *Stamens* naked, simple, or variously connate. *Anthers* erect, 2-celled, the cells dehiscing longitudinally, truncate or the connective produced. Female flowers: *Ovaries* naked or rarely surrounded by sterile stamens, solitary or several united into a bundle, 1-celled, the ovules solitary or numerous, and inserted in 2 series along the bi- to septi-parietal placentas; stigmas often sessile. *Drupe*s fibrous-woody or fleshy, free or variously connate, 1- or many-seeded. *Testa* membranous or rarely crustaceous. *Albumen* fleshy. *Embryo* almost basal, small, with an inferior radicle. Trees branched or simple-stemmed, or shrubs often scandent or supported by strong aerial roots. *Leaves* simple, elongate, sessile, parallel-nerved, often spiny along the margin, distichous, or arranged in a triple or rarely simple spiral. *Drupe*s simple or compound, collected in more or less compact heads (*syncarps*).

PANDANUS, *Linnaeus*.

*Flowers* dioecious. Males: *Spadic* compound fleshy, at the base, and at the branchings furnished with yellow or white spathes. *Stamens* very numerous, single, or more usually united into bundles. *Anthers* erect, 2-celled. Females: *Spadic* often

simple, rarely branched, similarly protected by pale green, rarely whitish leafy spathes. *Drupe*s fibrous, woody, with a fleshy epicarp, arranged into compact heads, free or united into bundles, usually angular pyramidal, 1-seeded, or as many (or fewer) seeds as drupes thus united. *Putamen* bony. *Seeds* large, strophiolate.

\* *Drupe*s simple.

† *Stigmas* simple, spiny-acuminate, continuous with the apex of the drupe. *Stamens* free. *Anthers* acuminate.

*P. FÆTIDUS*, Roxb. *E.S.*

Tidal forests of Arakan and Tenasserim.

Tha-kyet or Tau-tha-kyet (Kurz).

Shrubby, soboliferous. *Drupe*s quite smooth.

†† *Stigmas* spinescent, and often depressed, usually 2-3-forked, horny and deciduous. *Stamens* palmately connate. *Anthers* aristate or spiculate.

*P. FURCATUS*, Roxb., *E.T.* Tree forests of Chittagong, Pegu, and Tenasserim.

A large robust tree. Leaves 2-4 inches broad, spiny armed. *Stigmas* forkedly 2-3 spinous.

*A. GRAMINIFOLIUS*, Kz., *E.T.*

Tenasserim.

A slender screw pine. Leaves only 3-4 lines broad, minutely spinulose. *Stigmas* very short, blunt.

\*\* *Drupe*s united into phalanges (rarely the one or two, simple). *Stigmas* sessile, or nearly so, reniform, or peltate. *Stamens* racemose-united; the anthers aristate.

† Leaves spiny along the margins and midrib.

*P. LERAM*, Jones, *E.T.*

Marshy spots in coast forests of the Andamans and Nicobars.

<sup>1</sup> Leaves dark-green, 4-5 inches broad, 15-18 feet long, phalanges the size of the fist.

*P. ANDAMANENSIS*, Kz. *E.T.*

Tree forests of the Andamans.

As the last, but drupes only 2 inches long. Leaves gradually acuminate.

*P. ODORATISSIMUS*, L. f. *E.T.*

Coasts of Burma. The Andamans, Kamorta and Katchall.

Tsat-tha-pu (Kurz).

Leaves glaucous or whitish, 3-5 feet long.

†† Leaves with smooth margins.

\* *P. LEVIS*, Rumph.

Cultivated about villages.

As the last, but all parts without spines.

Kurz makes the following observations on some peculiarities presented by species of this genus (J.A.S.B. 1876, Part II. p. 152):—"The form which grows along the beaches forms arboreous ascending shrubs, much branched, and sending down quite a labyrinth of straight aerial roots, but the one which grows on the heaths is entirely different, being a small tree from twenty to twenty-five feet in height, with a stout grey simple stem, which sends down short and thick aerial roots, from the lowermost part only, while the crown is small, sparingly and shortly branched, and very dense.

"There are besides, two varieties of these trees on the heaths, the one having the stigmas normal, as in the littoral form, and the drupes connate high up, so as to affect a tessellated appearance, while the other variety has the drupes free for about one fourth of their length from the top, terminating in short erect points, on the inner

<sup>1</sup> There is some discrepancy here I cannot rectify. In the index of species the leaves are described as 15-18 feet long and 4-5 inches broad, whilst in the textual description they are described as 8-15 feet long by 2-3 inches broad (W.T.).

surface of which the linear-lanceolate stigmas are situated. The foliage in the one is darker green, but the male flowers of both varieties are exactly the same. Dr. Hance (in Trim. Jour. Bot. 1875, p. 68) has remarked upon the variability of the stigmas in screw-pines, but overlooked that I had myself pointed out this fact (Jour. Bot. 1867, p. 99) with the qualification, that they vary without therefore giving up their essential value. The stigmas ought to be described from the ovaries, or the young drupes, but it is difficult to collect such. It is usually only after the syncarpus have attained some size that they catch the eye.

"The male organs appear to me to be of much higher value, in grouping the species of *Pandanus*, but the time has not yet arrived, when these organs shall be available for all, or even for most of the species. *Pandanus helicopus* was correctly placed by me in the section *Ryckia*, as I find on re-examination of my material, and I have also since obtained the male spadices of it, which show racemose anthers."

The *Pandanus* is a useful tree. The basal pulpy part of the drupes can be eaten on emergency, as also can the tender white base of the leaves. The male flowers of the *P. odoratissimus* exhale a delightful perfume. The leaves are used for thatching, and when split up into strips, are made up into soft and durable mats, used either for packing purposes or made into bags to hold different sorts of produce, whilst from the tough strong roots, split up, baskets are made.

#### FREYCINETIA, Gaudichaud.

*Flowers* diœcious, or rarely spuriously polygamous, in simple or branched spadices. *Males*: *Stamens* free, naked. *Anthers* 2-celled, opening longitudinally. *Females*: *Ovaries* naked, or surrounded by sterile stamens, united into bundles, 1-celled, with as many parietal placentas, as sessile stigmas. *Ovules* numerous, attached in 2 series to the placentas. *Berries* united in a fleshy syncarp. *Seeds* very numerous, minute.

*F. insignis*, Bl., *E.S.S.*

Tree forests of the Andamans,  
Katchall, and Kamorta (K.).

Leaves 3-stichous,  $1\frac{1}{2}$ -3 feet long, spinulose-serrate in the margins and mid-rib. Stigmas 3-1, horse-shoe shape.

*F. scandens*, Gaud.

Katchall and Kamorta (K.).

Kurz is in doubt if this is Gaudichaud's plant, or the young state of the last.

#### PALMALES.

*Flowers* hermaphrodite, unisexual, or polygamous. *Perianth* double, each of 3 segments in 2 distinct series, imbricate or valvate in bud. *Stamens* 6, or rarely more, or three only. *Anthers* versatile, 2 celled. *Ovary* usually consisting of 3 carpels, free or united, in a 3-celled ovary, with a solitary or rarely 2 erect ovules in each carpel or cell. *Stigmas* 3, usually sessile, undivided. *Fruit* either a 3- or 1-celled drupe or berry, or consisting of 3 distinct drupes or berries, either all developed, or 1 or 2 of them aborted. *Pericarp* smooth, or variously rough, retrorsely scaled. *Seed* erect or laterally attached. *Albumen* first milky, then indurating and horny, or bony-homogeneous, or acuminate, solid, or hollow in the centre, or outside. *Embryo* small, in a cavity near the outside of the albumen. *Simple* or soboliferous trees, erect or decumbent, very rarely branched, or lofty scandent shrubs. Leaves usually very large, usually crowded at the summit of the trunk, or alternate folded in the bud, pinnately or palmately divided, rarely simple, the petioles more or less sheathing. Flowers comparatively small, usually sessile, in simple or panicle spikes, enclosed when young in several, or rarely in single sheathing bracts, called spathes, and usually with 3 small bractlets under each flower.

A large noble group, which yields wine, oil, wax, sago, flour, dragon's-blood, sugar, fibre, utensils, weapons, food, and habitations. The cocoa, date, betel-nut, palmyra, rattan, etc., are well known. Kurz remarks: "The size of the palms is often enough variable and, amongst the many examples, I shall mention only *Phoenix paludosa*, the stem of which varies in height from only 2 to 3 feet up to 15 to 25 feet. Sobolification is a character of little value in my eyes. I look upon it rather as an idiosyncrasy, and, therefore, not even as a sufficient character on which to establish a variety. No doubt in very many species this character has become general and constant, but atavisms are not unfrequent. We know, for example, cases in which the common betel-nut palm has made as many as 7 shoots, and similar examples are not wanting (especially in *Phoenix*, *Cocos*, *Arenga*, *Euterpe*). *Areca triandra* has simple and soboliferous trunks with all intermediate states, and I have, therefore, unhesitatingly connected with it *A. lara*, a species that differs in no structural points. *Caryota sobolifera* is another example wherein simple-stemmed and soboliferous plants may occasionally be found in the Burmese jungles not a dozen yards from one another. Species based upon such distinctions, if not also accompanied by structural differences, are in my opinion untenable, and grouping palm-species after such a character is simply misleading.

"Again, the armature in *Calamus* would appear to me to be also subject to variation within certain limits. It certainly is often very different, according to the age of the rattan itself, or accordingly as the sheaths come from the lower or upper parts of the plant. On the other hand, the *Calami* (including *Dæmonorops*) offer so many valuable characters in their spathes and spathules, nature of seeds, loræ, and flagellæ, and, finally, in the scales and stamens, that we may confidently look forward to a sound and natural classification of the rattans so soon as the numerous book-species, often based upon incomplete pieces only, shall have been got rid of. The difference in the scales of the fruits of *Calamus* in different stages of growth is so far as possible illustrated in the present paper. The indument of the inflorescences and their spathes seems to afford valuable characters, especially to herbarium-botanists. The colour, however, of the same varies greatly in the same species, as for example in *A. gracilis*, in which some individuals have yellowish-white and bright scarlet *spadices*, while others have them greenish-purple.

"Burmese palms are still very incompletely known, especially the rattans. While the distributional area of the *leincarpous* palms is greater than one might have expected, that of the rattans is singularly restricted and limited. Thus I have been unable, in spite of all the pains I have taken, to identify several of my Burmese rattans with any of the 100 species or thereabouts already published. Only the more light-loving species, such as *C. Guruba*, *fasciculatus*, etc., have a wider distribution."

#### Sub-family CALAMEÆ.

\* Fruit covered with retrorsely imbricate scales or bristles. Seeds often arillate. Usually armed climbers, rarely erect or unarmed.

† Flowers spirally arranged, forming a dense cylindrical spike.

#### ZALACCA, Rumphius.

Erect palms, stemless or nearly so. Albumen homogeneous. Male flowers solitary or paired, bracteate within the small spathaceous-connate spathules, and enclosed by 2 boat shaped connate bracts. Female flowers solitary within the small spathule and enclosed within 2 ovular bractlets. Calyx in both sexes trifid. Drupe almost 1-celled, through thinning of the cell-walls, 1 to 3-seeded. Seeds with a dense fleshy arillus.

Z. WALLICHIANA, Mart.

Tree forests all over Pegu and Tenasserim.

Z. *edulis*, Reinw. (apud Mason).

Yen-gan-khyo, or Khyen.

The fruit is eaten by natives according to Dr. Mason, who further remarks: "The Selungs of the Mergui Archipelago shoot over their waters with remarkably light

boats, and they owe their buoyancy to the materials that form their sides, which are the stems of the edible *Zalacca*. These stems are as light and of the consistency of cork, for which they are often substituted, and the Selungs are skilful in uniting them together to serve instead of planks, so as to make an unequalled sea-boat, that floats on the waves like a swan."

*KORTHALSIA, Blume.*

Scandent palms. *Albumen* ruminatè. *Flowers* dioecious, solitary, within a scale-like bract, and embraced by 2 bractlets, united in a cup forming a terete catkin or spike. *Corolla* tripartite. *Drupe* 1-seeded, densely covered with rigid, imbricate retrorse scales.

*K. SCAPHIGERA*, Mart. *E.S.P.*

All over the Andamans.

Spines on the petioles almost straight, 3-4 lines long. *Drupe* obovoid,  $\frac{1}{2}$  inch long.

*K. LACINIOSA*, Mart. *E.S.P.*

Tenasserim.

Spines on the petioles short, reflexed. *Drupe* turbinate, the size of a small pea.

†† *Flowers* distichous (very rarely spuriously unilateral). *Scandent*, often lofty palms, very rarely erect.

*PLECTOCOMIA, Blume.*

*Flowers* in small naked racemes or spikes, hidden by the distichously imbricate spathes, and arranged in long tail-shaped panicle catkins; Dioecious. *Male* flowers in pairs. *Stamens* 6. *Females* solitary. *Calyx* and *corolla* 3-parted. *Drupe* densely covered with reflexed imbricate shining scales, 1-seeded. *Leaves* pinnate, the rachis terminating in a whip-like tendril armed with recurved thorns.

*P. MACROSTACHYA*, Kz. *E.C.*

Tenasserim. Bithoko Range at 3000 feet.

All parts glabrous, the petiole and rachis spiny. Spines straight, up to  $\frac{1}{2}$  inch long. A lofty climber, distinguished from *P. elongata*, Bl., by its larger flowers and more densely imbricate spathules.

*CALAMUS, Linnaeus.*

*Flowers* solitary in the spathules, forming panicles, polygamously dioecious. *Calyx* and *corolla* tripartite. *Stamens* 6. *Drupe* covered with retrorsely imbricate scales, 1-seeded. *Arillus* watery, white or rosy, often edible. Evergreens, known as 'rattans.'

\* *Flowers* usually sessile, *spathes* persistent, all tubular or flattened, not from a tubular base. *Albumen* usually homogeneous.

† *Drupe* sessile, i.e. the perianth more or less spreading and adhering to the base of the fruit. *Spathules* of the spikes much imbricated, the exerted part cymbiform, shorter than broad, truncate.

‡ *Scales* of fruit without a conspicuous appendage.

Δ *Pinnæ* equidistant, no leaf tendrils.

*C. ARBORESCENS*, Griff.

Tree forests in marshy spots, Pegu.

Dun-oung (Kurz).

A stoloniferous, gregarious, erect, tufted cane. *Pinnæ* white beneath. *Leaves* 6-8 feet long, non-flagellate.

*C. ERECTUS*, Roxb.

Tree forests of Chittagong and Pegu.

Theing (Kurz).

Low tufted, *Zalacca*-like palm, all parts glabrous. *Leaves* uniformly green, and 8-12 feet long.

Δ Δ *Pinnæ* fascicled or interruptedly approximate.

*C. FASCICULATUS*, Roxb.

All over Burma and the Andamans.

Kycing-kha (Kurz).

Young stem whitish, powdery. *Leaves* without tendrils. *Pinnæ* interruptedly fascicled. *Drupe*s globular, straw-coloured.

C. LATIFOLIUS, Roxb.

Tree forests all over Burma and the Andamans.

Yan-ma-hitā.

Glabrous. *Leaves* tendril-bearing. *Pinnæ* broad, alternately approximate. *Drupe*s oblong, brown.

† † *Scales of fruits produced into a fringed appendage as long or longer than the crustaceous scale itself.*

C. ANDAMANICUS, Kz.

The Andamans and Tree forests of Kamorta and Car Nicobar.

*Leaves* tendril-bearing. Inflorescence without tendrils. *Drupe*s  $\frac{1}{2}$  inch long, straw-coloured.

C. TIGRINUS, Kz.

Tree Forests of Pegu. Tenasserim and the Andamans.

Lemay.

*Leaves* without tendrils. Inflorescence with tendrils. *Drupe*s an inch long or more, variegated dark and pale brown.

† † *Drupe*s seated on the erect, indurated, thick, pedicel-like perianth. *Spathules* usually long-exserted and tubular, rarely cymbiform and imbricate, rarely truncate.

*Spathules imbricate, broader than long, truncate.*

C. TENUIS, Roxb.

Chittagong and Pegu.

*Leaves* without tendrils. *Pinnæ* equidistant. *Drupe*s globular,  $\frac{1}{3}$  inch thick, straw-coloured.

*Spathules exserted and rather elongate.*

° *Spathes with a short acute limb only.*

C. GRACILIS, Roxb.

Chittagong.

*Leaves* without tendrils. *Pinnæ* interruptedly approximate. *Drupe*s ellipsoid, straw-coloured, nearly an inch long.

C. HELFERIANUS, Kz.

Tenasserim (or the Andamans).

*Leaves* without tendrils. *Pinnæ* equidistant, narrow. *Spathes* green, very thin, compressed-tubular, almost unarmed.

C. PARADOXUS, Kz. Tree forests of Palawa-zeik (Toukyakat) East of Toung-ngoo.

*Leaves* tendril-bearing. *Pinnæ* distinct, alternately approximate. *Male flowers* in recurved small spikelets, or fascicles exserted from the *spathules*.

° ° *Lower spathes expanded in a flat elongate limb, only at the short base tubular.*

C. GURUBA, Mart.

All over Burma.

Kyeing-ni (Kurz).

*Leaves* without tendrils. *Pinnæ* narrow, equidistant. *Drupe*s globular, the size of a pea, the scales straw-coloured with dark borders.

\*\* *Flowers usually pedicelled. Spathes deciduous, the outer one boat-shaped and large. Albumen usually ruminant.*

#### DEMONOROPS, Blume.

*Spathes* cleft to the base. *Spathules* incomplete, reduced to bracteoles. *Spadix* erect, stiff, never tendril-bearing. Scandent rattan Palms.

† *Spathes unarmed, or nearly so.*

D. HYPOLEUCUS, Kz.

Tenasserim. The Thoungyeen Valley.

*Leaves* without tendrils. *Pinnæ* interruptedly approximate, white beneath.

† † *Spathes, or at least the outer ones, much armed.*

D. GRANDIS, Griff.

Tree forests of the Andamans.

*Leaves* uniformly green. *Sheaths* and *spathes* outside fearfully armed with flat, glossy, black spines. *Drupe*s globular, the size of a cherry. 'Dragon's-blood' is sparingly produced by this tree (Kurz).

Dr. Mason records the following species, which are, most of them, no doubt, included in the above list of species of *Calamus* by Kurz: *C. platyspathus*, Griff.; *C. palustris*, Griff.; *C. melanacanthus*, Griff.; *C. concinnus*, Griff.; *C. nitidus*, Griff.; *C. laciniatus*, Griff.; *C. longisetus*, Griff., and the following vernacular names of various *Calami*: Kyeing-ta-boung, Kyeing-khā, Kyeing-na-tha, Kyeing-tan, Kyeing-bōk, Hpwe-to-mā, Ta-nen-tha-ri-kyeing,<sup>1</sup> Kyeing-lipyu, Thwōn-kyeing.

## Sub-family PALMÆ GENUINÆ.

Fruits not imbricate-sealy, but smooth or variously rough or tubercled. Seeds without arillus. Usually erect, very rarely armed palms.

## FLABELLATÆ.

*Leaves* fan-shaped. *Perianth* complete in both sexes. *Erect* valves.

§ *Coraphinæ*. *Ovary* apocarpous, consisting of 3 free, or apically united carpels, or only the styles united, usually only one of the carpels coming to perfection.

CORYPHA, *Linnaeus*.

*Flowers* hermaphrodite; clustered. *Stamens* hypogynous. *Drupe* corticate. *Pinnæ* united into a blade. Erect palms, dying off after flowering.

*Drupe*s the size of a wood-apple or orange.

C. UMBRACULIFERA, L.

Cultivated in Tenasserim.

Pe-pen.

All parts glabrous. Trunk lofty, annulated (not spirally grooved). *Drupe*s  $\frac{1}{2}$  inch long, solitary or by 2-3, dirty blue. *Albumen* homogeneous, horny.

A noble Palm, which however dies off after flowering. The pith of the trunk yields a sort of sago, and the leaves are made into huge fans.

*Drupe*s the size of a cherry.

C. GEBANGA, Bl.

Occasionally cultivated.

*C. elata*, Roxb.

*Trunk* spirally grooved, as if twisted, 60-70 feet long. *Petioles* 6-12 feet long. The pith yields a sort of sago.

C. MACROPODA, Kz.

Bamboo Jungles on Termoklee and Western side of South Andaman.

Dondar (of the Andamanese).

*Trunk* 8-12 feet long. *Petioles* 18-25 feet long.

‡ ‡ *Inflorescences* axillary, corolla 3-parted. *Drupe* sappy.

LIVISTONA, *R. Brown*.

*Flowers* hermaphrodite, clustered. *Stamens* perigynous. *Albumen* with a cavity filled with the intruding integuments. *Pinnæ* connate in a blade.

L. SPECIOSA, Kz.

Tree forests of the Eastern slopes of the Pegu Range

Htan-myook-lu, Tor-ltan (Kurz). and Upper Tenasserim.

*Leaves* palmately flabellate, 6-7 feet across, plaited, the petiole at the base, up to an inch broad, and armed with strong sharp falcately-curved flattish, black spines.

CHAMEROPS, *Linnaeus*.

*Flowers* polygamous, several together. *Stamens* hypogynous. *Albumen* with a longitudinal furrow. *Pinnæ* united into a blade. Erect palms.

<sup>1</sup> Corrupted by the English into 'Tenasserim'!

C. KHASYANA, Griff. Khakyen Hills and Martaban at 4000 and 6500 feet.

*Leaves* palmately flabellate, 4-5 feet across. Fruit-bearing spadix decompoundly branched, panicle-like, nodding, glabrous.

LICUALA, *Rumphius*.

*Flowers* hermaphrodite, solitary, or by twos or threes. *Stamens* perigynous, the filaments inserted at the throat, and united into a ring. *Pinnæ* free or united with flabellate segments by threes or more.

\* *Flowers large. Leaves peltately flabellate.*

L. FELTATA, Roxb.

Tree forests all over Burma and the Andamans.

Sa-lu (Kurz).

*Calyx*  $\frac{1}{4}$  to  $\frac{1}{3}$  of an inch long.

\*\* *Flowers small. Calyx not above 2 lines long. Leaves palmately-flabellate.*

L. PALUDOSA, Griff.

Tidal forests and swamps in the Andamans.

*Trunk* 4-8 feet long. *Petioles* aculeate, bordered along their whole length. *Calyx* about a line long.

L. LONGIPES, Griff.

Forest south of Mergui.

Shā-zoung. Pinang lawyer.

Almost stemless. *Petioles* unarmed for the upper third of their length. *Calyx*  $1\frac{1}{2}$  line long.

*Carpels syncarpous. The ovary 2-4-celled, with as many ovules. Drupes 2-4-celled, with as many seeds.*

§ § *Borassinae. Ovary syncarpous, 2-4-celled, with as many ovules. Drupes 2-4-celled, with as many seeds.*

BORASSUS, *Linnaeus*.

*Spathes* incomplete, several. *Corolla* imbricate in bud. *Drupe* large, fleshy, fibrous. *Seeds* soapy, with an apical pore. *Pinnæ* united into a blade. Erect palms.

\* B. FLABELLIFORMIS, L.

Cultivated in Ava and Prome.

Htan.

The common fan palm.

This is a tree of considerable value. In the Prome district it is largely cultivated for its 'toddy,' which is not only fermented and vended for its exhilarating properties, but is boiled down and a large quantity of coarse sugar thence obtained. The seeds are eaten, their gelatinous flesh being very refreshing, and the young shoots (the seeds being planted in beds to germinate) are eaten as a vegetable, though apt to be stringy to a European palate. The leaves serve a variety of purposes, and the trunk, when split up, yields ratters, pipes or conduits, as may be required. The external fibres are of iron-hardness, and the wood cut transversely has a pretty look, and might be used effectively for inlaid work. It also makes pretty sticks, though not so good as some canes. According to Dr. Balfour (*Forest Trees*), it is one of the strongest woods in tensile strength experimented on by Dr. Wight and Mr. G. Rohde; but its small scantling (the external hard portion being alone used) will always tell against its employment, save in petty or ephemeral combinations. One piece of information embodied by Dr. Balfour is worth preserving as a curiosity. "The timber of the female tree is the hardest and best, and that of the male tree is never used, unless the tree be very old. It is too heavy to make ships of." The *ships* the writer had in his mind's eye, when penning the above passage, must surely have been 'dug-outs'!

#### PINNATE.

*Leaves pinnate or bi-pinnate, or pinnatisect; rarely almost entire. Perianth complete in both sexes.*

§§ *Caryotea*. *Spathes* serrate, tubular or sheathing, persistent. *Pinnæ* of the leaves often fasciated, jagged or crose-toothed. *Ovary* syncarpous, 3-celled, with as many ovules.

† *Spathes* serrate, tubular or sheathing, persistent. *Pinnæ* of leaves often fasciated, jagged, or crose-toothed. *Erect Palms*.

*Leaves bipinnate.*

CARYOTA, *Linnaus*.

*Flowers* monœcious, on the same spadix. *Stamens* indefinite. *Petals* in females imbricate in bud. *Drupe* sappy. *Albumen* horny, ruminant. *Berries* globular or nearly so.

C. TRENS, L.

Ava and Pegu.

Min-bō (Kurz).

Simple-stemmed. *Male petals* about  $\frac{1}{2}$  inch long by 3-4 lines broad. *Anthers* acuminate.

The pith yields sago, and both species fibre from the leaves.

C. SOBOLIFERA, Wall.

Arakan. Tenasserim and the Andamans, but not yet noticed in the Pegu range.

Soboliferous. *Male petals* about 4 lines long by  $1\frac{1}{2}$  line broad. *Anthers* mucronulate to emarginate.

*Leaves* simply pinnate. *Petals* in females valvate.

WALLICHA, *Roxburgh*.

*Flowers* monœcious on different spadices, rarely diœcious. *Ovary* 2-celled. *Stamens* often definite. *Drupe* sappy. *Albumen* homogeneous.

*Male spikes* almost filiform.

W. CARYOTOIDES, Roxb.

Tree forests of Chittagong. Ava and Tenasserim.

Zanoung (Kurz). Generic.

Stemless, tufted. *Male flowers* yellowish, the calyx tubular, about a line long. *Drupe*s the size of a nutmeg.

*Male spikes* thick and rigid. *Spadix* of both sexes very ample. *Male flowers* purplish or green.

*Leaves* placed in a  $\frac{1}{3}$  spiral.

W. DENSIFLORA, Mart.

Chittagong.

W. oblongifolia, Griff.

*Calyx* tubular, nearly a line long. A stemless, tufted palm.

W. YOMIE, Kz.

Eastern slopes of the Pegu Range and Kombalu-toung.

W. disticha, Kz.

*Calyx* minute, cup-shaped, only  $\frac{1}{4}$  of a line deep. *Trunk* 3-4 feet high, robust.

ARENGA, *Labill*.

*Flowers* monœcious on different spadices. *Stamens* indefinite. *Ovary* 3-celled. *Drupe* depressed, triangular, rather dry. *Albumen* homogeneous.

A. SACCHARIFERA, Lab.

Eastern slopes of the Pegu Range and Tenasserim.

Young-ong.

*Trunk* 20-40 feet, covered (especially above) with the petioles and netted by the strong black fibrous remnants of the sheaths. *Drupe*s  $1\frac{1}{2}$ -2 inches long, yellowish, smooth, pericarp coriaceous, the mesocarp jelly-like and full of raphides. *Pyrone*s 3, dull black, convex on the outer, bifacial on the inner side.

The trunk is easily hollowed, and then forms a good water pipe. The black stringy fibres form a rope peculiarly resistant of decay when wet; the pith of the trunk yields sago; the leaves fibre; and the tree when flowering furnishes toddy

like other palms. Kurz remarks: "Besides its well-known value for toddy, sugar, and fibre, this palm is especially adapted for the support of orchids, ferns, and other epiphytical plants, for which purpose it is highly recommendable to horticulturists in tropical climates."

§§ *Phaniceæ*. *Spathes* 1-2, boat-shaped, persistent. *Ovary* apocarpous, consisting of 3 distinct carpels. *Pinnæ* often fascicled. *Erect palms*.

PHŒNIX, *Linnaeus*.

Diœcious trees. *Spathes* 1 or 2, boat-shaped. *Corolla* in males valvate, in females imbricate. *Drupe*s sappy, single. *Albumen* homogeneous. *Lower pinnae* spiny, reduced.

†† *Spathes* glabrous; flowers supported by a small subulate bract.

P. ACAULIS, Roxb.

'Eng' forests of Pegu and Martaban.

Thin-loung (Kurz).

Stemless. *Petioles* rather long and slender. Spiny-armed.

††† *Spathes* covered with a brown scurf. Flowers without a bract.

\* P. SYLVESTRIS, Roxb.

Cultivated about Chittagong.

Simple stemmed, robust. *Petioles* very short and dilated, spiny-armed. *Drupe*s about an inch long.

P. PALUOSA, Roxb.

Tidal forests of Burma and the Andamans.

Then-boung.

Soboliferous, slender. *Petioles* long and slender, spiny-armed. *Drupe*s about  $\frac{1}{2}$  an inch long.

A considerable quantity of date sugar is made from the juice collected from the tree when about to flower. Most trees found near villages bear the scars caused by this process, and many trees are rendered deformed and unsightly thereby.

Mason gives also *P. dactylifera*, which he names Swön pa-lwön, but this species is not included by Kurz.

§§§ *Arecinæ*. *Spathes* 1-2, boat-shaped, caducous. *Putamen* not perforated. *Albumen* solid, homogeneous or ruminant. *Pinnæ* neither fascicled nor coarse-toothed. *Erect palms*.

PINANGA, *Blume*.

Flowers monœcious, immersed in the cavities of the rachis. *Stamens* indefinite. *Stigma* 1. *Albumen* ruminant. *Pinnæ* irregularly united into segments, rarely all united into a bifid blade.

*Flowers distichous*.

P. COSTATA, Bl.

Tree forests of South Andaman.

Soboliferous, tufted. *Spadix* branched. *Sheaths* slightly scurfy.

*Flowers tristichous*.

P. (ARECA) GRACILIS, Roxb.

Tree forests all over Burma, especially in marshy spots.

Tan-kwam-thi (Kurz).

Simple-stemmed. *Spadix* slender, ramified or simple. *Sheaths* scurfy.

*Flowers 5-6-stichous*.

P. (ARECA) HEXASTICHA, Kz.

Marshy spots in Southern Pegu, as near Kyan-zu and Kya-eng.

Simple-stemmed. *Spadix* simple, fleshy, as thick as the finger. *Sheaths* scurfy.

ARECA, *Linnaeus*.

Very like the last, but *stamens* 6 to 3. *Stigmas* 3. *Female flowers* lateral, between the ramifications, rarely axillary.

*Stamens 6. Female flowers without a bract.*

\*A. CATECHU, L. Cultivated, especially in Tenasserim, wild on  
Kwam-thi-pen. Betel-nut palm. Kamorta and Katchall.  
Glabrous, simple-stemmed. *Drupe*s as large as a hen's egg, orange or scarlet.

*Stamens 3. Female flowers without a bract.*

A. TRIANDRA, Roxb. Tree forests of Chittagong and the Andamans.  
Tan-kwam-thi.  
Glabrous, simple stemmed or stoloniferous.

#### ORANIA.

O. NICOBARICA, Kurz. Kamorta.  
*Spathes* spindle-shaped or clavate. *Putamen* at the base 3-porous, *albumen* hollow.

*Cocos, Linnæus.*

*Flowers* monoecious, on the same spadix. *Petals* in females imbricate-convolute.  
*Ovary* 3-celled, only one of the cells ovule-bearing. *Drupe*s large, woody.

\*C. NUCIFERA, L. Cultivated all over Burma, but only thriving near the sea.  
Ong. Wild on the Cocos and Nicobars and the North-western  
Coast of North Andaman.

The cocoa-nut Palm is one of the most valuable of this order, and thrives best in sandy soils within reach of the sea air, and even sea spray.

#### NIPINÆ.

*Perianth* of females reduced to a few scales. *Carpels* 3, apocarpous. *Male flowers* in separate *spadices*, surrounding the central solitary female head. *Leaves* pinnate.

NIPA, Rumphius.

*Spathes* many, sheathing, persistent. *Male perianth* sex-partite, valvate in bud.  
*Stamens* united by threes. *Drupe*s woody, angular-turbinate, in a large dense head.  
*Albumen* homogeneous, hollow.

N. FRUTICANS, Wurm. Tidal forests of Burma, the Andamans and Nicobars.  
Da-ni.

The thatching or 'Dunny' palm.

This palm is often cultivated along river banks and tideways for its leaves, which are used for thatching. Kurz remarks that its seeds would supply vegetable ivory, but I do not know if they are now so used.

Sub-division b. OVARY APOCARPOUS.

(reduced to one carpel in some *Naiadææ*).

#### POTAMALES.

*Flowers* hermaphrodite or unisexual. *Perianth* of 3, 4, or 6 segments, or more.  
*Carpels* 1-ovuled. *Style* basal or lateral. *Seed* minute, with very dense *albumen* and obscure embryo. Minute leafless slender herbs.

#### Order NAIADÆÆ.

Marine or freshwater, annual, or perennial herbs.

#### NAJAS.

N. sp. In water-holes behind Katjui, Kamorta (K.).

CYMODOCEA, *Kœnig*.

C. sp.

Kurz describes a species of this genus as forming submarine meadows about the coral reefs round Kamorta, at a depth of from 2 to 4 fathoms (J.A.S.B. 1876, Part II p. 153).

*Zostera* is also included by Diedrichsen in his list of Nicobar plants.

## HALOPHILA.

H. OVALIS, H. f.

Submarine banks off Katchall (K.).

EUPALUS ACOROIDES, Steud.

Nicobars (K.).

Kurz (*l.c.*) describes this species as not attaining to more than 6 inches in length, on the reefs off Katchall, whereas in the debouchures of rivers it grows to 4 feet in length, owing, it may be presumed, to the presence of a mixture of freshwater.

## Order POTAMEÆ.

Annual or perennial plants growing in salt, brackish or freshwater. An order of little importance.

POTAMOGETON, *Linnaeus*.

P. INDICUS, Roxb. (M.).

SPATHIUM, *Loureiro*.

S. CHINENSE, Lour. (M.).

Pegu.

The roots are said by Voigt to be nearly as good as potatoes.

## Order ALISMACEÆ.

Aquatic or marsh herbs, perennial, and sometimes producing subterranean tuber-like buds. An order of little importance.

ALISMA, *Jussieu*.

A. sp. (M.).

## Division B. OVARY INFERIOR.

(Superior in some *Bromeliaceæ* and *Hamodoraceæ*).

*Perianth* usually distinct, bi-seriate and coloured.

*Albumen* fleshy or horny. *Embryo* distinct.

## DIOSCORALES.

Flowers diœcious, regular. *Perianth* herbaceous. Stamens 6, inserted at the base of the perianth segments. Ovary 3-celled. Fruit a berry or capsule. Seeds with copious fleshy dense albumen, and a distinct included embryo. Leaves net-veined. Climbing herbs or under-shrubs.

## Order DIOSCOREÆ.

*Flowers* diœcious. *Perianth* superior, sex-merous, bi-seriate. *Stamens* 6. *Ovary* inferior with 3, 2, or 1-ovuled cells. *Ovules* pendulous, superimposed, anatropous. *Fruit* a capsule or berry.

DIOSCOREA, *Linnaeus*.

*Flowers* diœcious. *Capsule* 3-angled or 3-lobed, opening loculicidally at the angles, often leaving the nerve-like edge free. *Seeds* winged. Stems twining.

*D. OPPOSITIFOLIA*, L.

Silhet. Ceylon. S. China.

*D. GLABRA*, Roxb.

Kamorta and Great Nicobar (K.). Silhet.

*D. batatas* of China may be a cultivated form of this species (Bentham).

\* *D. FASCICULATA*, Roxb. (M.).

Ka-dwai-u. Karen Potato, or Tavoy Potato.

This is a small species, not larger than a kidney potato, and excellent in flavour, but procurable only during a few months in the year. In Bengal it yields an arrowroot.

\* *D. GLOBOSA*, Roxb.

Cultivated (M.).

Myouk-hpyu. Large white yam.

This is one of the best yams, and its flowers are highly fragrant.

*D. ALATA*, Willd. (M.).

\* *D. ATROPURPUREA*, Roxb.

Cultivated (M.).

Myouk-ni.

The root is of a dark purple colour and of a good quality, its large and irregular tubers growing so near the surface as to cause it to crack over them. *D. purpurea* is also highly esteemed, and its tubers are said to attain to 3 feet in length.

*D. CRISPATA*, Roxb. (M.).

Myouk-kyu.

*D. RUBELLA*, MacClell. (M.).

*D. ANGUINA*, MacClell. (M.).

*D. VERSICOLOR*, Buch. (M.).

*D. DILMONTUM*, Roxb.

Kywai. Wild Yam.

This is a species with ternate leaves, nearly a foot long and 6 inches wide, and is very acrid and poisonous, but eaten, according to Dr. Mason, by the Karens in times of scarcity. Other wild species, as *D. bulbifera* and *D. pentaphylla*, are very acrid and poisonous, but capable of being rendered edible, by slicing and steeping in a solution of wood ashes, before cooking. Indeed, old Rumphius goes so far as to see a beneficent design in the poisonous juices of this plant, and remarks, "Creator sapienter hanc impregnavit radicem hoc succo, ut ab apris intacta hominibus cibo inserviret!" A still more illustrious authority has suggested if the appearance on the globe of such luscious fishes as the salmon, was not, providentially, deferred to the epoch wherein we know them to have appeared, for the gastronomic delectation of men (and Ablermen), and in order that their succulent flesh and fine flavour should not be wasted on the inappreciative appetites of Palæozoic Ganoids. We are bound to treat the teleological argument with respect, but nevertheless it sounds but queerly!

In this connexion one is irresistibly impressed with the cogency of the argument of Pope—

"Has God, thou fool! worked solely for thy good,  
Thy joy, thy pastime, thy attire, thy food?  
Who for the table feeds the wanton fawn  
For him as kindly spreads the flowery lawn.  
Is it for thee the lark ascends and sings?  
Joy tunes his voice, joy elevates his wings.  
Is it for thee the linnet pours his throat?  
Loves of his own and raptures swell the note.  
The bounding steed you pompously bestride,  
Shares with his lord the pleasure and the pride.  
Is thine alone, the seed that strews the plain?  
The birds of heaven shall vindicate their grain.  
Thine the full harvest of the golden year?  
Part pays and justly, the deserving steer.  
The hog that ploughs not, nor obeys thy call,  
Lives on the labours of this lord of all."—*Essay on Man*, III. 27.

The genus *Dioscorea* yields a valuable esculent in its tuberous roots, which are largely cultivated, and form a very passable substitute for the potato of colder regions.

Dr. Mason, in addition to the above, gives the vernacular names as well of several *Dioscoreas*, distinguishing one as the Elephant-foot-yam, from resembling an elephant's foot in size and shape. Myouk-then, Myouk-pwai-tôk, Twen-souk-myouk, Hsen-lung-gywôt, Kywai-kyouk-tha, Ka-dat, and in *Pwô karen*, Nai-ka-hsang-khang-long, and in *Sgau karen*, Kwai-taplu and Nwai-so.

#### NARCISSALES.

*Flowers* hermaphrodite, regular or irregular. *Perianth* usually petaloid. *Stamens* 3 or 6, inserted on the perianth tube. *Ovary* 3-celled. *Seeds* with copious fleshy or horny albumen, and a distinct embryo. *Leaves* parallel-veined.

#### AMARYLLIDEÆ.

*Flowers* hermaphrodite. *Perianth* superior, petaloid, sexfid, biseriate, sometimes with a crown simulating a supplementary perianth. *Stamens* 6, very rarely 12 to 18, inserted in the perianth. *Ovary* inferior, 3 to 1-celled. *Style* simple. *Fruit* a 3-valved capsule.

#### CURCULIGO, Gærtner.

*Perianth* regular, the tube long, often filiform, the limb of 6 equal deciduous segments. *Ovules* several in each cell of the ovary. *Stigmas* 3. *Fruit* oblong, succulent, crowned by the persistent perianth tube. *Seeds* enveloped in a fleshy pulp, with a lateral beak-shaped hilum. *Flowers* sessile in sheathing bracts, in a sessile or pedunculate head.

*C. ORCHIOIDES*, Roxb.

Kamorta (a single plant) (K.).

*C. ensifolia*, R. Br.

*Hypoxis minor*, Seem. (non Don.).

#### CRinum, Linnæus.

*Perianth* with a long tube and a regular 6-cleft limb, the segments spreading or recurved. *Stamens* inserted at the summit of the tube. *Filaments* free, filiform. *Anthers* linear, versatile. *Ovules* usually 4 in each cell. *Style* filiform. *Stigma* entire or 3-lobed. *Capsule* globular, depressed, bursting irregularly. *Seeds* few, nearly globular, often converted into fleshy bulbs. Large bulbous, glabrous herbs. *Flowers* usually large, white or purplish, in an umbel or head proceeding from a 2- or 3-leaved spathe.

*C. ASIATICUM*, L.

Kamorta. Katchall. Car Nicobar (K.).

Pa-daing.

*C. PROCERUM*, Carey.

Burma (M.).

*C. RIGIDUM*, Herb. (M.).

*C. MACROCARPUM*, Carey (M.).

*C. ENSIFOLIUM*, Roxb. (M.).

*C. ALENUM*, Roxb. (M.).

*C. PRATENSE*, Herb. (M.).

*C. LORIFOLIUM*, Roxb. (M.).

*C. ELEGANS*, Carey (M.).

*C. ERYTHROPHYLLUM*, Carey (M.).

*C. ORNATUM*, Herb. (M.).

*C. ZEYLANICUM*, L. (M.).

*C. HERBERTIANUM*, Wall. (M.).

#### PARDANTHUS.

\* *P. CHINENSIS*, Ker. (M.).

Thit-sā.

EURYCLES, *Salisbury*.

\* E. AMBOINENSIS, Sal. (M.).

La-man. Nac-men.

MOLINERIA.

M. (LEUCOGUM) CAPITULATA, Lour.

Nankowry (K.).

The tuberous rhizomes of this family contain a large amount of starch, and many of them consequently can be used as food. The powdered bulb of *Iris florentina* is known as Orris root. The seeds of *Iris pseudo-acorus* can be substituted for coffee, and *Crocus sativus* is cultivated for its stigmas, which constitute the saffron (true) of commerce, once used extensively as a tonic condiment, and still given as a stimulating medicine to cage birds. Fake saffron, however, contains no saffron, but is a paste manufactured from the florets of *Carthamus tinctorius*. The use of saffron as a medicine, condiment or dye, dates from the remotest antiquity, as we incidentally gather from Homer, who speaks of the Dawn,<sup>1</sup> with 'saffron robe.'

AGAVEÆ.

AGAVE, *Linnaeus*.

\* A. AMERICANA.

This plant, though introduced, flourishes well in Burma. It is of great value as a hedge plant, forming, when well and closely planted, an impenetrable barrier to that nuisance of our stations, stray cattle. The fibre of the leaves is strong, and, when dressed and made up, yields an elegant fabric. The fleshy leaves dried and cut up can be used as a substitute for cork. Bitter aloes is the inspissated juice of various species of *Agave*, the best being reported to come from *Soeotra*.

\*\* *Albumen none or cellular. Embryo very obscure. Seeds very minute, except in Taccaceæ.*

TACCALES.

*Flowers* hermaphrodite, regular. *Perianth* sex-lobate. *Stamens* 3 or 6, inserted on the perianth tube. *Anthers* peculiar. *Fruit* capsular or berried. *Seeds* minute, exalbuminous or larger and albuminous.

Order TACCACEÆ.

*Flowers* hermaphrodite. *Perianth* superior, petaloid, sex-merous, biseriate. *Stamens* 6. *Filaments* concave. *Anthers* adnate to their concave face. *Ovary* inferior, 1-celled, with 3 parietal placentas. *Ovules* numerous. *Fruit*, a berry. *Seeds* numerous. *Leaves* broad, with a midrib and diverging veins.

TACCA, *Forster*.

\* T. PINNATIFIDA, Forst. (M.).

Touk-tā.

This species is cultivated for its tuberous roots, which are rich in starch, and from which in Tahiti an arrowroot is prepared.

T. LEVIS, Roxb. (P.).

Order BURMANNIACEÆ.

*Flowers* hermaphrodite. *Perianth* superior, sex-partite, biseriate. *Ovary* inferior, 1 to 3-celled. *Stigmas* 3. *Seeds* with cellular testa, exalbuminous. *Embryo* undivided. *Leaves* narrow, with parallel venation, or broader and net-veined.

BURMANNIA, *Linnaeus*.

B. TRIFLORA, Wight (P.).

B. JUNCÆA, Brown (P.).

<sup>1</sup> Ἡὸς μὲν κροκόπεπλος ἐκιδνατο πᾶσαν ἐπ' αἶαν.—*Iliad*, Θ. l. 1.

GONYANTHES, *Miers.*

*Perianth* tubular, 3-angled or winged, the 3 inner lobes minute. *Anthers* 3, nearly sessile below the inner lobes. *Ovary* 3-celled. Capsule opening by transverse fissures opposite the cells. *Flowers* terminal, solitary or cymose. Delicate leafless herbs.

G. WALLICHII, *Miers.*

Tavoy. S. China.

## Order ORCHIDÆ.

INTRODUCTION.<sup>1</sup>

"The Burman books tell us (says Dr. Mason) that the trees round King Wathandria's hermitage were covered with Orchids, and that after being plucked they would retain their fragrance for seven days." King Wathandria (whoever that worthy potentate may have been) must either have been in great favour with the Nâts, supposing, as is highly probable, that they placed the Orchids there for his special delectation; or, if he were his own collector, he certainly displayed very good taste, and an early appreciation of 'the beautiful' in Nature; for, assuredly, out of all Flora's choice and bounteous store, nothing could have been drawn more worthy of royal regard. It is with Orchids still that the wealthy and the great love to surround themselves in countries where these lovely plants are strange and exotic; and this at a cost which would probably have astonished good King Wathandria, and which, in the aggregate, is worth a king's ransom.

The varied and fantastic beauty of this order of plants has attracted so much attention, especially of late, and is so fully appreciated, that it would be superfluous to dilate on this part of the subject; I shall confine myself, therefore, to remarks on their habit of growth and the structure of their flowers for the better information of those to whom they are favourites, and who, knowing but little about them, may desire to know more. For it is to these, and not to the scientific (whom I do not pretend to instruct), that my observations here and my familiar descriptions hereafter are mainly addressed.

"Orchids" are found all over the world, except where the rigour of winter is Arctic, or the aridity of summer heat excessive: but "*Air-plants*" (as they are often called) are not. These last are confined to the warmer or tropical regions of the earth. The strange plants, a peculiarity in the root of which first gave them their name, were originally discovered and studied in Europe, where they are all terrestrial, and have fibrous or tuberous roots, growing like most ordinary plants. Afterwards, as Botanical research was extended to tropical countries, plants of a similar habit of growth and structure, also terrestrial, were discovered; but, besides them, others (and these by far the most beautiful) of a different habit—*epiphytal*—though having the same general peculiarities of floral structure. And, inasmuch as Natural Orders are framed more on similarity of such floral structure than on vegetative growth, the name *Orchidæ* was extended to all those new plants, whether terrestrial or epiphytal, although not strictly appropriate to the latter. But, while *Orchidæ* is the scientific name for both groups, the name of "*Air-plants*" has been used for the latter by the non-scientific. Hence a vulgar error that the words "*Orchids*" and "*Air-plants*" are synonymous expressions and co-extensive. But this is not the case. As not all Orchids are Air-plants, so neither are all Air-plants Orchids. Some of the former (as already remarked) are terrestrial, and many other plants besides Orchids are Air-plants, or (better) Epiphytes; as, for example, many *Vaccinia*, *Aschmannia*, and some *Rhododendra*.

And now for a word or two on the term "*epiphyte*." An "*epiphyte*" (I shall presume upon sufficient learning in my readers to tell them the meaning of the word) is a plant which only asks for a lodgment on another and larger plant (a *rock* often answers its purpose), growing on it simply as a support, and deriving no nourishment

<sup>1</sup> This interesting and lucid introduction to the order *Orchidæ* has been most kindly furnished by the Rev. C. Parish.

from it, but from the surrounding air, or, more correctly, from the moisture that is in the air. The expression "Air-plant," therefore, is not so appropriate as is supposed, for though it be true that our Epiphytal Orchids will live a long time when merely suspended in the air, the main condition for their so doing, and for their growth, when so suspended, is that the air be charged with moisture. Their true nourishment is water, not air, as is evident from the fact that they are denizens of damp tropical forests and abound most where the rainfall is the heaviest, or, from whatever circumstances, the atmosphere continues to be heavily laden with moisture; becoming rarer in drier climates, until, in the absolutely dry, they refuse to grow altogether. Their remarkable power of enduring a sustained drought is simply due to the store of moisture which they lay up for themselves during the rainy season in their fleshy stems or pseudo-bulbs. These are always expanded and plump at the close of the rains and become more or less shrunken and angular by the end of the dry season, in consequence of their store of moisture being gradually exhausted in supporting life and in the production of the flowers. The case is the same with other epiphytes. They nearly all have either thick and fleshy drooping stems, corresponding to the lengthened pseudo-bulbs of most *Dendrobia*, or large swollen rhizomes or root-stocks, corresponding to those of *Bulbophylla*, in which moisture is garnered in the rainy season and used in the flowering or dry season. Some *Vaccinia*, for example, have huge swellings, occasionally as large as a child's head, which are the stock from which the short thin branches rise; and the beautiful large white Rhododendron, which is found on the high branches of trees in the mountains east of Maulmain, has lengthened root-stocks of considerable thickness, which enable it to live when the exterior moisture fails, though this may not be for long at the great elevation at which it grows. There are, indeed, exceptions to this fleshy habit in some epiphytes, as in the case of an elegant small scarlet-flowered *Eschynanthus*, which I found on the Shan border, the stems of which were long and slender; but then it grew in the densest and dampest jungles, into which the sun's rays hardly penetrated, and all attempts to make it grow in the drier atmosphere of Maulmain failed. Very different to this is the growth of "parasites," which fasten on and become incorporated with the substance of the tree on which they grow, and drain their life-sap. A common example of such a parasite is furnished by a *Loranthus*,<sup>1</sup> the appearance of which should be familiar to all who have observed the "*Amherstias*" in Rangoon and Maulmain, where hardly a tree attains any size before it is preyed upon by this injurious plant.<sup>2</sup>

<sup>1</sup> Under the head of "Vanda," further on, it will be found stated that that name is a Sanscrit one, simply adopted by us. But the same name was given also to "*Loranthus*"; therefore, as Sir Wm. Jones suggests, it was probably the Sanscrit for all plants, whether epiphytal or parasitic, which fastened themselves on others. This want of discrimination between two very different kinds of growth, though excusable in pre-scientific and "ignorant" days, is hardly so now. And while on the subject of native names, it will be found, I believe, that they are for the most part names of a class suggested by some superficial similarity, and not the result of any nice distinctions; they are generic, in fact, and not specific, and very broadly so. Specific distinctions are entirely the production of modern science.

<sup>2</sup> Apropos of epiphytes and parasites, the following fact of vegetable life may be interesting. There grew, when I first went to Maulmain, in 1852, just inside "Tiger's gap" (as the entrance to the Cantonments on the Nyabustee side was then called) in the centre of the three-cross way, "trivia juncta viæ," a fine *Vitex arborea*, some 40 feet high. There stood in the same place, when I left in 1876, a "*Peepul*" or "*Ficus*" tree of even larger size, the *Vitex* having entirely disappeared. Yet no one removed the one or planted the other: it was a simple natural operation, the silent work of some twenty years.

A ripe fig-seed obtained a lodgment in some crevice of the unhappy *Vitex*, germinated, and became a small and apparently innocent epiphyte. Being there comfortably entertained, it turned parasite (though not in the strict botanical sense), and took an unhandsome advantage of its position, to stretch its roots downwards till they touched the earth, and its branches laterally over those of its supporter.

"In the meek garb of modest worth disguised,  
The eye averted, and the smile chastised,  
With sly approach it spread its dangerous charms,  
And round its victim wound its wiry arms."—*Darwin*.

For some years it did no very evident harm, but in course of time, slowly and insidiously, the roots and

I pass on now to the peculiar structure which distinguishes Orchids from all other plants. "The order owes its chief peculiarities to the following circumstances: 1st, to the consolidation of all the sexual organs (*i.e.* stamens, pistils, etc.) into one common mass, called the column; 2ndly, to the suppression of all the anthers, except *one* in the mass of the order, and *two* in Cypripedeæ; 3rdly, to the peculiar condition of its pollen and the anther which contains it; and 4thly, to the very general development of one of the inner leaves of the perianth in an excessive degree, or in an unusual form."—*Lindley*. Such, shortly and technically stated, is the peculiarity of an Orchid flower; in order, however, to make all the parts of the flower clear to an inexperienced person, perhaps the simplest way will be to suppose that we have such a flower in our hand, and proceed to examine it in detail. Fortunately one of the largest and most suitable for our purpose is also one of the commonest and most easily procurable in Burma: this is the lovely *Dendrobium formosum*. We will take, then, a specimen of this well-known flower in our hand, and examine it part by part. First, we notice that it is seated at right angles on a short round white curved *pedicel*, or stalk, which is thickened slightly upwards, *i.e.* near the flower. This upper or thickened portion is really the germ, or yet unfertilized seed-vessel, which, if duly impregnated, will ultimately be developed into a large oval or pear-shaped pod. Some Orchid flowers have little or no other foot-stalk than this germ. If we next look at and count the segments of the flower, we shall find that they are six, including the lip as one. *Sic*, be it remembered, is the normal number of such parts in all Orchids: there are occasional apparent exceptions, but this is the rule. These six segments go by the general name of *perianth*, which means the flower-envelope ("the flower" of a plant, technically, being its sexual parts, and not the generally coloured parts commonly so called and forming its chief attraction). Of this perianth (a word I have avoided the use of in my specific descriptions) the three outer segments will be seen to be oblong, pointed, and tolerably uniform in shape: these are the *sepals*. Alternating with these are the three much larger and broader inner segments, which are the *petals*. This name, however, in Orchids is mostly confined to the two upper, while the lower one is called "the *lip*"—and is that part of the perianth, which being "generally developed in an excessive degree, or in an unusual form," constitutes one of the main characters of the order. We next observe, in the centre or axis of the flower, a short thick fleshy body—this is "the *column*";—and at its extremity, seated in a sort of cleft, a little cap or lid, which is the *anther*; and if we gently lift this lid (it is fastened by a hinge to the back of the column) there will probably fall out (for they are perfectly free) four small, yellow, hard, waxy bodies, either altogether or in two pairs; these are the *pollen-masses*, on the number and position and attachment of which the "diagnosis" of Orchids is made so largely to depend. Farther, if we look just below the anther in front, a small cavity with a viscid surface will be seen: this is the *stigmatic* surface, and the fertilization and development of the germ into a fully ripened capsule or pod depends entirely on

the branches united into a solid mass, till all that could be seen of the miserable victim was an arm here and there, as it were imploringly stretched out and struggling towards the light, vainly trying to escape from the treacherous embrace of its tormentor. At last my poor friend the *Fitez* totally disappeared, enveloped in a winding sheet of inextricable folds, and strangled to death in the embrace of its inexorable foe—a vegetable "Laocoon."

"Round sire and sons the scaly monsters rolled,  
Ring above ring, in many a tangled fold,  
Close and more close their writhing limbs surround,  
And fix with foamy teeth the envenomed wound."

*Darwin, Loves of the Plants, Canto iii. 331.*

Few who now pass by and see the placid *Ficus* (for I doubt not it stands there yet) would suppose that such a foul deed had been done by it, and that it still holds the murdered body of its victim hidden within that smiling exterior! Many a giant *Ficus* in the forests betrays its former life by its perfectly hollow trunk, from which the very bones of a too confiding friend, similarly treated, have, by the process of inevitable decay, fallen out.

the pollinia, or pollen-masses, coming in contact with it. And it is, doubtless, owing to the fact that the pollinia in *Dendrobium* are wholly free, and so easily fall out and away from the flower, that ripened pods are so rare in this genus as compared with some others, such as *Aerides* and *Saccolabium*, whose pollinia are not free.

But we must not throw away our flower yet, for we have not quite finished its examination. It was said that the outer three segments of the perianth or sepals were tolerably uniform; this, however, has reference to their upper part only, for it will be seen that the two lateral sepals are drawn out backwards (as is also the base of the lip), and have there become *connate*, *i.e.* have grown one with the back part of the column, which is lengthened behind into a *horn* or *spur*. We have now noticed all the principal parts of an Orchid flower, and these are all to be looked for and found in nearly every Orchid, though it is not to be supposed that they will be always discovered as readily as in our typical flower. For Orchids are given to much concealment and to many disguises, in short, to masquerading in the most wanton and bizarre costumes, and they will sometimes hide their features if they can; though it is this very fairy-like wantonness that gives them their chief charm; and, like similar behaviour elsewhere, is doubtless meant rather to attract than to repel. Sometimes you will look in vain for six segments, and must be content with five, as in *Cypripedium*, where the two lower sepals are connate and form but one, and these two together often smaller than the upper one, which stands nobly up, like the standard in a Papilionaceous flower, and is generally the most striking feature. Sometimes you may search in vain for the petals—for they may be so minute as hardly to be seen, as in *Monomeria*—or wholly transformed into something else, as into a fringe in *Epicranthes*. If, again, you should be fortunate enough to obtain that singular little gem, *Drymoda picta*, you will wonder what in the world has become of the two lateral sepals, till, upon more careful inspection, you find them close to the lip, far away at the end of a long and unusual projection. This projection is the “*mentum*.” The column, which in our *Dendrobium* was produced backwards into a spur or horn, is, in *Bulbophyllum* and other Orchids, projected forwards, in a greater or less degree, and then it is called a *mentum*. This forward projection is extraordinary (*i.e.* for the size of the flower, which is altogether very small) in *Drymoda*. The column again, which is very short in some Orchids, is very long and prominent in others, as in *Calogyne*. Lastly, the lip is variously attached to the column, sometimes being connate with its base, sometimes articulated or jointed with it, and this in a greater or less degree; so slightly, for instance, in *Bulbophyllum* as to shake tremulously with every movement of the flower. It is the lip also which assumes that endless variety of fantastic form and colouring which is familiar to those who have studied or cultivated this most singular and charming order of plants.

But while all this variety and prodigality of beauty has been the admiration of the cultivator, it has been the difficulty of the botanist who would systematize and arrange. One may easily form an idea of the immense difficulties which so Protean an order, yet, withal, so natural a one, must present. Of this systematic arrangement it is now time to speak. The main divisions of the order were made by Lindley—the acknowledged master of it while he lived—to depend on differences in the pollen-masses. These differences will soon be perceived to be considerable by any one who will take the trouble to examine them. Some, as those of *Dendrobium* and *Bulbophyllum*, are rounded, firm and waxy. Others, as those of most terrestrial genera, are loose in structure and granular. Of the former, besides that they vary in number, some are quite free, without any appendage, or attachment to each other, or to the stigma; others have such appendage or attachment though varying in form and character. Of the latter, the form and position of their anther furnishes distinctive marks. Those who would know more must consult works which treat on the subject. Suffice it to say, here, that Lindley’s arrangement, as set forth in his “*Genera and Species of Orchidaceous Plants*” (the only recognized text-book available by me, and my mainstay during all my residence in Burma) is as follows:—

## I. Anther one only.

## A. Pollen-masses waxy.

- (a) No caudicula or separable stigmatic gland.

Tribe I. *MALAXEÆ* or *MALAXIDÆÆ*.

- (b) A distinct caudicula, but no separate stigmatic gland.

Tribe II. *EPIDENDREÆ*.

- (c) A distinct caudicula, united to a deciduous stigmatic gland.

Tribe III. *VANDEÆ*.

## B. Pollen powdery, granular or sectile.

- (a) Anther terminal, erect.

Tribe IV. *OPHREÆ* or *OPHRYDÆÆ*.

- (b) Anther terminal, opercular (lid-like).

Tribe V. *ARETHUSEÆ*.

- (c) Anther dorsal.

Tribe VI. *NEOTTEÆ*.

## II. Anthers two.

Tribe VII. *CYPRIPEDÆÆ*.

The above arrangement is that followed here.

Quite recently, however, Bentham has propounded a greatly modified arrangement in his "Notes on Orchideæ," read before the Linnean Society, January 20, 1881: and these are available now by all students of the order. If my arrangement had not been already made before I was favoured with a copy of the "Notes," or time had been sufficient, I should have been disposed to adopt their arrangement; but, as things are, the old arrangement must stand. I have, indeed, made one change, but it is only of a word or "term." I have adopted Bentham's term "*stipes*" for the appendage of the pollinia of *Vandææ*; retaining Lindley's term "*caudicle*" for that of *Epidendrææ*, as the former botanist has pointed out the need of a distinctive term for an organ which is so essentially different "both in origin and substance." I say I have adopted the term here because it comes recommended on such high authority, though I cannot consider the choice of the word a very happy one for so delicate and transparent an organ as is, nearly always, the appendage of Vandæous pollinia. The word "*stipes*" conveys the idea of a *stocky* or *stumpy* support, as opposed to a slender and fragile one. "*Stipitibus duris agitur, sudibusque præstis*," says Virgil, when he would describe a "certamen agreste"—

"One with a brand yet burning from the flame,

Armed with a *knotty club* another came."—*Dryden*.

*Stipitis hic gravidæ "nodis."*—As applied to a fern-stock it is suitable, for even if that be slender, it is, at least, the stoutest part of the frond; but hardly, I submit, to so delicate an organ as that in question. This is the reason I venture to object to "*stipes*" in this application. It may indeed be difficult to find an appropriate term that has not been already applied elsewhere, but I cannot see why there should be any objection to "*ligula*," though it be used of the prolongation of a grass-sheath, for it is tolerably descriptive of the characters of the little Vandæous tongue or strap. Or, if that word be objected to, I would submit that a simple word like "*ligamentum*" might be considered free from objection.

As these introductory remarks, however, have already reached a length not originally contemplated, it is time to conclude them. This I will do with a few words about books.

Although any one who should take up the study of Orchids in Burma now will find more help to his hand than was accessible twenty years ago, there is, at the same time, no one single work published which describes all known Burmese Orchids. The notices of them are scattered here and there in different publications, as, for instance, in the Botanical Magazine, and in The Gardeners' Chronicle.

Some few of the older plants will be found described in Lindley's "Genera and Species of Orchidaceous Plants;" some few more in his "Contributions to the Orchidology of India," vols. i. ii. and iii. of the *Journal of the Proceedings of the Linnean Society: Botany*. More are to be found in Professor H. G. Reichenbach's "Enumeration of Orchids collected (by me) in the Neighbourhood of Maulmain," *Linn. Soc. Transactions*, vol. xxx.: and yet a few more in the same author's "Orchideæ Parishiæ Burmenses," *Otia Botannica, Fasc. I.* Hamburgh, 1878. Having these, I fear the student must wait until full and complete descriptions of all Indian Orchids appear in the "Flora Indica," now in the course of publication; though it will probably be some time yet before the order "Orchideæ" comes to be handled.

I take this opportunity of acknowledging how much I owe to Prof. Reichenbach for kindly naming my numerous Orchids, and for his collation and recension of them. To quote Mr. Bentham's words: He is "the great Orchidologist of the present day, who took up the pen and pencil as they fell from the hands of Lindley, and who, having since devoted himself almost exclusively to the study of the order, is now the only authority for determination of species."

For my humble part, I have given as complete a Catalogue, as the materials at hand have enabled me to give, of all the Orchids known to grow in Burma, with references. This I trust will prove useful. And from this Catalogue I have selected some of those species which appeared to me to be most remarkable for beauty, or for some peculiarity of structure, and have described or remarked upon them. The descriptions I have tried to make as simple as possible, avoiding scientific terms generally, though, for brevity's sake, I have been drawn into using a few; these, however, I have nearly always explained. I hope that in this a fairly middle course has been struck between language which, by an affected accuracy, might have proved unintelligible to the beginner, and that which, from its laxity, would have been wholly useless from a scientific point of view.

The total number of Orchids here catalogued is considerably over 350. This is a large number for so small an area as that over which the collection has been made. For all but a very few come from the Tenasserim provinces, Upper Burma having been but hastily gleaned. When, therefore, we consider further how little ground has been really covered in the search for Orchids, and how local and limited in their area many plants are, we may be sure that a large number remain to be discovered, and moderately safe in predicting that Burma is yet capable of showing a list of 500 species.

It should be understood that the number of species given as that of each genus means, not that of *all known Orchids*, but of known Burmese Orchids.—C.P.

#### ORCHIDALES.

*Flowers* hermaphrodite and very irregular. *Perianth* of 6, rarely 3, segments. *Stamens* 1, 2, or 3, confluent with the style. *Fruit* capsular. *Embryo* very minute.

##### MICROSTYLIS, Nutt.

Small terrestrial Orchids with plicate wavy leaves, the sheathing bases of which combine to form a kind of false stem. Roots fibrous, attaching themselves to half-decayed leaves and other loose vegetable matter. Flowers small and inconspicuous, seated on a terminal erect stalk or rachis, commonly resupinate (*i.e.* inverted in position). About half a dozen species. Pollen-masses 4, collateral (side by side).

##### LIPARIS, L. C. Rich.

Also inconspicuous plants, in general appearance resembling those of the preceding genus, but differing in the structure of the flowers. About a dozen species. Pollen-masses 4, collateral.

##### MALAXIS, Sw.

Sub-genus OBERONIA, Lindl.

All the plants known to me as belonging to this genus come under the head of *Oberonia*, which Lindley constituted a distinct genus; but Reichenbach (whom I generally follow) unites *Oberonia* with *Malaxis*. The following short description is only applicable to *Oberonia*.

Small stemless Epiphytes, pendulous from trees, to which they are attached by fibrous roots. They are readily distinguished by their generally flat (somewhat rounded in *O. myosurus*), fleshy, distichous (two-ranked) equitant leaves (set edge-wise), which are broad and self-clasping at their base, and taper to a point. The flowers are minute and are seated on a rachis, which proceeds from the axis of the leaves, and somewhat resembles a rat's tail. Size, from 3 to 6 inches, or even a foot. About 10 species. Pollen-masses 4, incumbent (back to back).

#### BULBOPHYLLUM, *Thouar.*

A considerable genus of very uncertain limits, that is to say, it is made by some authorities to include several small groups of plants, which, in the opinion of others, should be separated from it; and, indeed, have been so separated and received distinct generic names. These distinctions cannot here be given. It must suffice to say that *Bulbophyllum*, as here defined, includes *Trias* and *Cirrhopetalum* of Lindley. These all agree in the following characters. They have a creeping rhizome or root-stock emitting rootlets from the under surface, on which rhizome are seated, at longer or shorter intervals, pseudo-bulbs (really leaf-bearing stems), with a solitary leaf at their summit. Occasionally, however, no apparent pseudo-bulb is developed at the base of the leaf, which then sits with a short foot-stalk closely on to the rhizome. In some cases, again, the pseudo-bulbs are so crowded as completely to conceal the rhizome. The inflorescence is various, but always, whether consisting of solitary flowers, or dense or umbellate heads or racemes, supported on a longer or shorter scape or leafless stalk, which arises from the base of the pseudo-bulb and derives its nourishment from it. The flowers have their small labellum or lip versatile, that is, easily moved, in consequence of its very light attachment to the prolonged base of the column, which column has two horns or arms projecting from the top, one on each side of the anther. The flowers of this genus, though for the most part small, are often very beautiful and highly curious, from the varied forms which their different parts assume. The pollen-masses are 4, in pairs, sometimes adhering but separable, sometimes connate, in which case one of each pair is very much smaller than the other. Species about 40.

##### B. AURICOMUM (Fragrant Bulbophyllum).

This is the ta-zeen-ban of the Burmese, "much prized by the youths and maidens, Burmese and Karen, who are extremely fond of wearing it in their hair."—F.M. Pseudo-bulbs ovate, 1 inch long. Flowers in a long pendulous raceme, small, white or golden yellow, fragrant. When in flower, the plant is leafless.

##### B. CAREYANUM (Carey's Bulbophyllum).

"This is a common Orchid in the vicinity of Maulmain."—F.M. Pseudo-bulbs rather large, ovate; leaf, long, strap-shaped. Flowers in a dense cylindrical spike, small, greenish purple. A worthless plant.

##### B. (TRIAS) OBLONGUM.

Dr. Mason remarks that this is the smallest Orchid known to him. There are several smaller, notably, *B. moniliforme*, the pseudo-bulbs of which are only  $\frac{1}{8}$ th of an inch in diameter. Of this plant, as being the smallest Orchid known to me (though many others have smaller flowers), I give a short description.

##### B. MONILIFORME (Necklace Bulbophyllum).

Pseudo-bulbs very small,  $\frac{1}{8}$  inch, round, depressed, closely seated on a slender-branched rhizome, which they completely conceal. Leaf one to each bulb, lance-shaped, barely  $\frac{1}{4}$  inch long, falling off before the flowers appear. Flowers solitary, at the end of a slender scape which is  $\frac{1}{2}$  inch high, themselves about  $\frac{1}{8}$  inch in diameter. Sepals yellowish, striped with orange. Petals much smaller, blunt. Lip

red, in shape difficult to describe, as with most *Bulbophylla*, arched behind, bluntly pointed forwards, and fleshy like a tongue. Column surmounted by two awl-shaped projections.

On betel-nut trees, island of Madremacam, Mergui, forming small irregular patches. Flowering in January.

#### EPICRANTHES, *Bl.*

One species only known. In habit a *Bulbophyllum*, differing, however, in having a fringed membrane in the place of petals, and only two pollen-masses. For further description see *Otia Botanica*, Reich. fil. Fasc. I. p. 48, No. 25, Hamburgh, 1878, *E. Javanica*.

#### DRYMODA, *Lindl.*

One species only known, *D. picta*. A very curious little plant, figured and described in *Bot. Mag.* tab. 5904, to which reference can be made.

On trees. Dauna-toung, about 4-5000 ft. Flowers in Nov., Dec.

#### DENDROBIUM, *Sw.*

A very large genus, which, as at present constituted, includes plants of widely different habit and general appearance. Their point of agreement lies in their flowers. Some (sub-genus *Aporum*) have flat stems with fleshy equitant leaves and small and unattractive flowers. Some have pseudo-bulbs approximating them in appearance to *Bulbophylla*, as *D. amplum*. Others have terete (or quill-shaped) stems and leaves. Others, again (and these are the true and typical *Dendrobia*), have more or less elongated cylindrical leafy pseudo-bulbs or stems (as they may be fairly called here), the leaves being generally bifarious (in two ranks) alternate and flat, *i.e.* in the same plane. They differ, as in habit, so in size, some being less than an inch high, others 5 or 6 feet long. The flowers are lateral, and either solitary, in fascicles, or in racemes. The sepals and petals, in other words, all the segments of the flower except the lip, are nearly uniform in shape and colouring,<sup>1</sup> the general difference being that of the three outer segments or sepals the two lateral ones are somewhat larger than the other and adhere commonly to the side of the column, which is semiterete (or half-round) and is usually prolonged into a sort of blunt spur. The lip is always sessile, and articulated with the base of the column or adnate to it, generally large, undivided or three-lobed. It is of the same thin texture generally as the rest of the flower, whereas, in *Bulbophyllum* the lip is thick and fleshy. Pollen-masses 4, in pairs, side by side, nearly uniform and quite free, in a two-celled anther. Species 70 or 80.

This genus includes a predominating proportion of the beauty of the Orchid Tribe, at least of that part of it which is found in the Eastern Hemisphere. It stretches from India through the Eastern Archipelago to N. Australia, and Burma may fairly lay claim to be its Head-centre. Out of so much that is beautiful, it is difficult to make a selection, which must necessarily be limited.

#### D. CRUMENATUM.

Pseudo-bulbs tufted, swollen at the base, and there deeply grooved and sometimes constricted at intervals; swollen portion, 3 or 4 inches long and varying in diameter from  $\frac{1}{2}$  to  $1\frac{1}{2}$  inch; suddenly tapering off into a very long slender stem, 1 foot or more, marked with the scars of the fallen leaves. Leaves fleshy, linear oblong, often opposite on lateral offshoots 2 or 3 inches by  $\frac{1}{2}$  an inch, blunt and emarginate. Flowers single or in pairs, in a raceme at the end of the long stem; large—2 inches—pure white, with a yellow quadrate spot on the lip; sweet-scented.

I select this species for special mention, not because of its beauty (though it is pretty enough), but on account of a peculiarity which I have noticed in it, and think

<sup>1</sup> This is the case with the typical *Dendrobia*, but in others, such as *Aporum* of Lindley, now included in *Dendrobium*, the petals are very small and narrow.

worth recording. The flowers last but one day, and it flowers (as far as I have observed) but once a year. I had several (3 or 4) plants on trees in different parts of my garden in Maulmain, and I noticed for one or two years that they all came into flower on the very same day! On one such day, when they happened to be in flower, Colonel Benson, who was then residing in Maulmain, came into my garden, and I mentioned this curious circumstance to him, pointing in proof of my statement to the several plants all at that moment in flower. He was naturally surprised and not a little incredulous. He said, however, that he had one plant nailed to a tree in the compound which he then temporarily lived in. We walked up, accordingly, to his house, and there, sure enough, his one plant was in flower! All the flowers, his and mine, were withered before the next day. This singular circumstance is worth further verification. The plant is rather frequent about Tavoy, with its very nearly (a smaller plant of the same character), *D. angulatum*.

#### D. FORMOSUM.

This is the "Silver-flower" of the Burmese. It grows profusely in the neighbourhood of Maulmain, and may be found in blossom almost at any season of the year. It is brought into the town in basket-loads during the rains, as it is a great favourite with the Burmese, and is commonly seen in their houses and among their offerings at the Pagodas. It is so well known as hardly to require description. The flowers are very large—the largest of the genus,—being 5 inches in diameter, of the purest white, save for a blotch of yellow in the centre of the lip; and of a delicate fragrance. The stems vary much in size—from 6 inches to 18.

#### D. INFUNDIBULUM.

A nearly allied species to the preceding—very similar in form and general appearance, but with smaller flowers and more slender stems. It is abundant on the mountains near Toung-ngoo, on Dauna-toung, near Maulmain, and elsewhere, at an elevation of 4–5000 feet. Although so near to *D. formosum*, as to appear to be only a mountain variety, I could never succeed in making it grow in the plains. These two species, together with *D. Jamesianum*, *D. eburneum*, *D. xanthophlebium*, and one or two more, all white-flowered, form a group distinguished by Lindley as "nigro-hirsute," as they are all marked by the presence of black hairs on the stems when in a young state.

#### D. PIERARDII.

Stems long (3–4 feet), pendulous, slender. Flowers in alternate pairs along nearly their whole length, diaphanous, pale lilac, lip of a somewhat dingy yellow, with purplish veins, the lower part rolled into a tube round the column. Common about Maulmain and probably elsewhere. Very pretty when full of flower, but wanting in colour.

#### D. TRANSPARENS.

As Lindley says, "Very like *D. Pierardii*," but generally brighter in colour, with stems very much shorter and stiffer, about 1 foot. I have only met with it once or twice on the mountains near Toung-ngoo.

#### D. CHRYSOLOXON.

A fine yellow-flowered species. Pseudo-bulbs clustered, thick, club-shaped from a slender base, ribbed and jointed, with 3 or 4 oblong leathery leaves at the end. Flower-stalks just below the leaves, bearing a drooping raceme of golden yellow flowers, with a beautifully fringed lip. Abundant in the Tenasserim Provinces. This is surely *D. clavatum* of Roxburgh.

#### D. AGGREGATUM.

Also a yellow-flowered species, but readily distinguished by the more crowded pseudo-bulbs, which are ribbed or grooved, but not jointed, and have a habit of lying almost flat, appressed against the branch on which they grow, also by the single leaves and the much thinner and more delicate texture of the flowers. Abundant, and widely distributed.

*D. DALHOUSIANUM.*

A noble species. Stems often 5-6 feet long when found in damp shady forests which it affects, drooping. Flowers in loose racemes, near the end of the stems, of 6-7 flowers, 4 inches across, cream-coloured; lip large, saccate, but hardly slipper-shaped, with two large deep blood-red blotches on the inside, the middle and front part projecting forwards and covered with a soft velvety pile. Abundant in the Tenasserim forests. The stems, however long, are but of one rainy season's growth, at the close of which they flower for the first time, while the leaves remain on, but the same stems will flower also the second and third year, after the leaves have fallen off, new racemes proceeding from the leaf-axes next below those of the preceding year. As there has been some confusion in respect of this and two nearly allied species, I subjoin below characters which, I hope, may suffice to distinguish them. They have all three been under my eye in a growing state at the same time.

*D. DALHOUSIANUM.*

Stems terete, 5-6 feet, pendulous, *marked with red-purple lines*. Leaves lanceolate, obtuse. Racemes lateral, but towards the end of the stem, 6-8 flowered. Sepals oblong-obtuse. Petals oblong-ovate obtuse, broader than the sepals. Lip bagged, or boat-shaped, villous, with the *central margin turned outwards*. The flowers are very large, 4 inches across; cream-yellow, but delicately tinged with rose; the lip is of the same general colour, with two deep, rich, blood-red blotches on the inside. Column and anther dark purple.

*D. CALCEOLARIA.*

Stems terete, 4-5 feet, pendulous, *not marked with purple lines, but stippled towards the base with green and purple dots*. Racemes 5-8 flowered. Sepals oblong-obtuse, very widespreading. Petals oblongo-ovate obtuse, much broader. Lip slipper-shaped, not at all pointed, but with the *central margin turned in*, very villous, or soft with pile. The flowers are of the same general colour as those of *D. Dalhousianum*, though more deeply tinged with rose, and smaller, about 3 inches across. Lip yellowish, with two deep red-purple blotches, and crested or fimbriated veins. Column and anther dark purple.

*D. MOSCHATUM.*

Stems terete, pendulous, 4-5 feet, stippled. Leaves lanceolate obtuse. Racemes 5-8 feet. Sepals lanceolate acute. Petals rhomboido-ovate obtuse, broader. Lip slipper-shaped, very obtuse, villous *outside*. Flowers orange-yellow, 2½-3 inches across. Lip of the same colour, with two deep crimson blotches on the inside, and five crested fimbriated veins. Column and anther greenish-yellow.

*D. FIMBRIATUM.*

In general character like the three foregoing species, but the flowers, which are golden yellow, are much smaller—2 inches across. The lip is not slipper-shaped, and the edge all round is beautifully fringed. The stems have no special markings.

Of the four species here described, *D. Dalhousianum* and *D. calceolaria* have *creamy white flowers* tinged with rose. *D. moschatum* and *D. fimbriatum* have *yellow flowers*. *D. Dalhousianum* may always be *infallibly* distinguished by the purple lines on the first season's stems, whereas those of *D. calceolaria* are stippled and not striped. As the stems of *D. moschatum*, however, are also stippled, I know no mark whereby to distinguish this species from *D. calceolaria* *when out of flower*. When in flower, the colour alone (yellow) is sufficient mark. *D. fimbriatum* may at all times be distinguished from the other three, both by the absence of all special marking, and by the circumstance that its stems (according to my experience) invariably *taper* at both ends, being stoutest in the middle. All four are beautiful Orchids—but *D. Dalhousianum* bears the palm. I may add, that *D. moschatum* and *D. calceolaria* smell strongly of rhubarb and magnesia, the other two do not. They are all abundant in the Tenasserim Provinces, except *D. calceolaria*, which I never found but once.—

N.B. *D. calceolaria* (our plant) of Hooker is *not D. calceolus* of Roxburgh—which latter I believe to be *D. moschatum*. Hence, it is probable, much of the confusion.<sup>1</sup>

*D. FARMERI.*

Pseudo-bulbs 4-sided, club-shaped, tapering finely downwards, but again expanding into a small swollen base. Leaves 2 to 4, near the top. Flowers in a loose raceme. Sepals ovate obtuse, petals broader. Lip rounded, with a sinus near the base on either side. General colour pale rose; lip yellow, deepening towards the centre. A most lovely Orchid. Frequent throughout the Tenasserim Provinces. The true *D. Farmeri* lasts in bloom a full month. There is an inferior variety with weaker stems and smaller flowers, which fade in 3 or 4 days.<sup>2</sup> The figure in Bot. Mag. 4659 resembles (as far as the flowers are concerned) this inferior variety.

*D. FARMERI*, var. *AUREO-FLAVUM*.

This may be shortly described as the preceding, with golden yellow flowers. It appears to be rare. I have only found it once, on Dauna-toung, having in vain sought for it after its first discovery.

*D. TORTILE.*

To enable this species to be recognized, it may suffice to say that it has also swollen pseudo bulbs tapering downwards; but instead of being square, they are rather flattened. The flowers also are borne on the plant differently—not in a single raceme, but in twos or threes on distinct foot-stalks. General colour lilac. Sepals and petals much contorted. Frequent. Also a lovely Orchid.

*D. ALBOSANGUINEUM.*

Stems elongated, terete, about 1 foot long. Leaves 5 or 6 near the top. Flower stalk from between the topmost leaves, erect, 6–7 flowered. Flowers 2½ inches across, creamy white. Lip same, but with some deep blood-red streaks near the base. When out of flower, this species may be readily distinguished by the black margins of the leaf-sheaths. Abundant in some places, but local.

*D. SENILE.*

A small species—about 6 inches high—with erect rigid stems, which are covered with white hairs. Flowers yellow. Apparently rather rare. Shway-gyeen district.

*D. BOXALLII.*

Stems drooping, 1 foot or more, nodes moderately swollen at the top, tapering downwards, dark brown when old, but pale while still clothed in their young leaf-

<sup>1</sup> It is often a difficult task to unravel a tangled web which a moment's carelessness has caused. Such a tangle has gathered round *Dendrobium pumilum*.

I. Roxburgh, Vol. III. p. 479, under the head of this plant, gives a correct description of it in the first two paragraphs, or for some four lines, but thereupon follows to the end a long description of another and totally different plant.

II. Some years ago I found two small *Dendrobia*, one of which had short swollen (turbinate?) pseudo-bulbs (my No. 98), and agreed otherwise with Roxburgh's description. This accordingly was considered to be *D. pumilum*. The other (my No. 120), though almost exactly alike in the inflorescence, had elongated quadrangular bulbs, and being clearly a distinct plant, I named it *D. quadrangulare*, a name already appropriated, which I was not aware of at the time! These (with drawings) were sent home to Kew, where my second plant (*D. quadrangulare*) was designated *D. pumilum*. Happening to be at Kew not long ago, I was shown an authentic specimen of *D. pumilum*, and surely enough, it was identical with my *D. quadrangulare*, and not with the other or *turbinate* species.

III. In a recent description of some of my Orchids by Prof. Reichenbach published by the Linnean Society (to which some figures are appended) the artist has actually combined in *one* my *two* drawings. The bulbs will be seen, on careful inspection, to be of two forms, which are those of two distinct plants! To this moment I do not know which of the two is really Roxburgh's plant, but I incline to think it is that with swollen or "turbinate" bulbs, and not the quadrangular plant, though this last is called *D. pumilum* in the Kew Herbarium. Occasionally (it is probable) among the numbers of bundles of dried plants sent to Kew from all parts of the world, a specimen or a label may become displaced.

<sup>2</sup> This is *D. palpebræ*, Lindley.

sheaths. Flowers in alternate pairs all down the stem, large, 3 inches across. Petals and sepals lanceolate, pink-lilac. Lip full, round, but slightly pointed, golden yellow, with a white margin and lilac tip. A very handsome plant. Bhamo and the North generally.

*D. NODATUM.*

Stems branched, with swollen joints, which are more apparent in the older stems, rooting at the joints. Leaves at the end of the young shoots, oblong lanceolate. Flowers single. Sepals lanceolate. Petals ovate, broader. Lips obscurely 3-lobed, lateral lobes turned inwards, middle lobe rhomboid, with a blunt point. General colour creamy yellow, that of the lip yellow, deepening to orange in the centre, with two very dark purple streaks at the base. Column green and purple. Anther purple. A very free-growing plant.

*D. FINDLAYANUM.*

Another Orchid with jointed stems, joints larger upwards and tapering rather suddenly downwards, pear-shaped, with a large brown sheath at each internode. Leaves oblong-lanceolate, acute, unequally toothed at the point. Peduncles 2-flowered. Sepals linear lanceolate, acute, revolute. Petals ovate, broad. Lip nearly round and undivided, slightly crenate at the margin. Sepals and petals lilac, deepening towards the tips. Lip pale lilac at the edge, yellow in the centre, with a deep purple stain at the claw. Column striped with the same. Anther white. An elegant plant, first found by Mr. James Findlay on the route to Zimmay, and given by him to me; hence named after him.

*D. CRASSINODE.*

Stems swollen at the joints to an exaggerated degree, so as to look like a number of flattened spheres with short intervening constrictions. About 1 foot long. A strikingly beautiful Orchid, first discovered by me in the year 1859, on the Shan border, S.E. of Maulmain, in February, when it was in full flower. The whole of a very fine collection, made on that occasion, not of Orchids only, but of other plants, was lost in the *Persia*, which foundered in the Calcutta River. One plant, which I reserved and attached to a tree in my garden, lingered for 2 or 3 years and then died. It was fortunately rediscovered later by Col. Benson, in the hills between Thayet-myo and Arakan. It will be seen, by looking at the figure in *Bot. Mag.* 5766, that the flowers are there represented as having red-lilac tips to the sepals, petals and lip, while the centre and base of the latter are yellow. A rough drawing of my plant made at the time of discovery shows *these colours exactly reversed*—tips yellow and lip red-lilac! It may be observed here that several Orchids which are found in the jungles S. and E. of Maulmain, reappear in the N. and W., while they seem to be wanting in the intervening districts, notably the plant now under discussion, with *D. Parishii*, *D. eburneus*, and others. Colour, again, varies oftener than is generally supposed, so as to make it doubtful wisdom to give a distinct name to an Orchid because of such difference merely. While on the subject of variation, I may take the opportunity of saying that a long acquaintance with this Order has satisfied me, that even the labellum or lip, which is generally esteemed a sure characteristic mark of a species, is liable to considerable difference of form. I will specify two Orchids in which this is the case, *D. erumenatum* and *D. bambusifolium*. I possess drawings, most carefully made, of the labellum of these two plants, and, being made at different times from different individuals, they display most marked differences both in form and colour. My opportunities of observation were almost unrivalled. Fixed at one station for upwards of 20 years, and having some 150 species growing in my garden, fresh supplies being continually brought in, it was my daily delight to watch their growth; and hardly a day passed on which I did not either draw or examine microscopically some one Orchid or another, and often the same species at widely different times, and brought from widely distant localities. I trust, therefore, that my remarks, here and elsewhere, may be made without presumption, even though they should chance to differ from the opinion of acknowledged masters in Orchidology.

## D. BENSONIÆ.

This is one of the very few Orchids I have never gathered. I must therefore borrow my description from the *Bot. Magazine*. Stems terete, 1 to 3 ft. long, nodes not swollen, internodes concealed by the membranous sheaths (this is the case with many other Orchids when the stems are in a young state). Flowers 2 or 3 on a foot-stalk, 2 inches across, pure white, except the lip, which is golden yellow in the centre, and has two dark purple spots near the base. Lip nearly round, convolute into a sort of neck at the base, a feature common to other *Dendrobia*. A handsome species. Arakan hills.

## D. PARISHII.

A very handsome plant when large and covered with blossom. Stems pendulous, generally more or less curved (a pretty constant habit) a foot or more long. Flowers wholly red-purple, with a deeper-coloured lip. It smells offensively of rhubarb and magnesia. It is, I believe, too well known to require further description.

## D. FITCHIANUM.

This is described in *Bot. Mag.* as *D. barbatulum* by Mr. Bateman, from which, however, I always considered it markedly distinct. My name has been since accepted, and its distinct character admitted. Stems erect, terete, slender, of the size of a goose quill, and 1 foot long. Flowers in a terminal raceme, 1 inch to 1½ across. Sepals narrow, lanceolate. Petals very broadly ovate, pointed. Lip distinctly 3-lobed—middle lobe broadly obovate, with a small mucro or point in the slightly sunken centre—lateral lobes small, erect, between which and at the base of the middle lobe is a tuft of purple hairs. Colour of the flower pure white, except the purple eye. A very elegant little *Dendrobium*, which first attracted my attention as ornamenting the hair of the Burmese girls in Maulmain. It was some time before I could find it. At last, when ascending the Salween River in company with the then Col. Fyche, he spied an Orchid on the overhanging branch of a tree. It proved to be the desired plant. The name records the circumstance.

Space will not admit of further notice of this genus, profuse as it is in number of species and in beautiful forms. The object here proposed is not a scientific description of all Burmese Orchids (this would require a work of some considerable length), but only just sufficient brief notice of some of the most striking species as may enable an amateur collector to distinguish them, and incite him to their study. I pass on, therefore, to other genera.

## CRYPTOCHILUS.

A small genus of obscure plants, of which Burma has but one representative, as far as is at present known, *C. meirax*. It is a dwarf species, stemless, consisting wholly of a flattened pseudo-bulb ½ an inch in diameter, attached to the tree on which it grows by minute fibrous roots. Each bulb produces 1 sessile flower, large for the size of the bulb. Its peculiar feature is that the exterior segments of the flower cohere at their edges, and thus form a sort of tube concealing the lip. It has a 2-celled anther with 4 pollen-masses in each.

## ERIA (including ANIA).

A genus which includes plants of widely different size and appearance—some being small stemless plants with flattened pseudo-bulbs, not more than ¼ inch high, bearing a pair of small leaves and 1 or 2 obscure flowers in their axis; others being a foot or more high, with short or lengthened pseudo-bulbs, and leaves leathery and smooth, or thin and plicate, and variously disposed. The inflorescence also is various, being either in lateral or axillary racemes, or in dense heads, or consisting of solitary flowers on a thin peduncle. It is distinguished from *Dendrobium* by having 8 pollen-masses instead of 4, which are round or pear-shaped, and united in 1 or 2 bundles at their base by an elastic cobwebby material, not free as they are in that genus. The lip, articulated with the much prolonged and projecting base of the column, is commonly 3-lobed, and has crested or raised lines on its disk. Species about 35.

## E. OBESA.

Pseudo-bulbs short, ovate, plump, about 2 to 3 inches high, 3 or 4 together, their rather flattened sides touching each other. Leaves 4 or 5, beginning from near the base, and terminating (each) a broad sheath, which clasps the bulb all round. These sheaths slope alternately to right and left, and are striated, or marked with lines, as are also the bulbs, which are somewhat constricted at the internodes. Flowers small,  $\frac{1}{2}$  inch, almost colourless, forming a raceme of 3 or 4, with large ovate reflexed bracts at the junction of the stalks.

## E. EXSTINCTORIA.

Pseudo-bulbs round, flattened and even depressed on the top, growing in small crowded patches, about  $\frac{1}{4}$  inch across and the same in height, bearing, when fully matured in the rainy season, one small ovate pointed leaf in the centre. Before the dry season has well set in, and the plant flowers (the only time when it is likely to attract attention), these have fallen off and, in its place, exactly in the axis of the bulb, stands a slender erect peduncle or flower-stalk about 2 inches high, which, gradually swelling into the germ, terminates in a solitary flower, about  $\frac{1}{2}$  inch long. Upper sepal ovate, acute, lateral sepals of the same general shape, but produced downwards and adnate to the prolonged column which ends in a blunt, rounded, or slightly notched spur. Petals smaller, lanceolate. Lip 3-lobed, middle lobe large, and itself 2-lobed, the segments rounded, lateral lobes smaller, rounded and crenate. The lip tapers into a claw, which is attached to the foot of the column, and has 3 raised lines or ridges along its length. Colour white, tinged with pink; the 3 papillose ridges of the lip and the intermediate space are orange-yellow, with just a tinge of pink. Base of the column inside, yellow. Spur greenish. Anther blotched with deep red on each side. I have here given the colour, as seen and carefully drawn by myself. I consider the figure in Bot. Mag. much too highly coloured, and the pollen-masses to be incorrectly drawn by the artist. I find them 8, but in 2 bundles of 4 nearly round united by their suddenly tapering caudicles in the normal manner of the genus, by an elastic cobwebby substance. On the subject of leafless Orchids I have a word or two to offer. Several small species have been described as leafless which are not really so. This plant, with *Drymoda picta*, *Bulbophyllum moniliforme*, and others, has leaves. But they must be looked for at the right season, viz. in the rains. In the dry or flowering season, when they are generally sought for and gathered, no trace of leaf is to be seen. Wight (Icones, No. 1741) figures and describes *Cheilochista usneoides* as a leafless epiphyte. Whether this plant be really so or not I cannot say, as I am not acquainted with it; but we have a small Orchid (*Thriaspium luniferum*), which, for the greater part of the year, consists simply of a bundle of roots, growing from a common centre, which centre hardly presents a trace of stem. In this state it resembles Wight's plant. In the dry season a long raceme of small flowers grows forth from this axis, and in this state it is generally found; but if it be watched throughout the rains, two small leaves (about 1 inch long), lanceolate and pointed, will be seen to be produced at the same axis. I think it very probable that if *Cheilochista* were watched with equal care, leaves would be found. The only really leafless Orchid with which I am acquainted is *Galeola*, which will be described in its proper place.

## E. VESTILA, sp. aff.

A very different-looking plant from either of the preceding ones. Stems tufted, a foot or more long, pendulous, about the diameter of a lead-pencil, very dry and hard near their base, where they are generally leafless, being leafy only for about  $\frac{2}{3}$  of their length; leaves lanceolate, acute, 3-4 inches long and 1, or a little more, broad, fleshy, profusely covered with soft rufous hairs on both sides, making them velvety to the touch. Racemes axillary, very short, consisting of 3 or 4 flowers only. The short hairy flower-stalk is rather zigzag and bears 5 or 6 ovate pointed bracts, the 2 or 3 lower of which are without flowers. Flowers sessile in the superior ones,  $\frac{3}{4}$  inch long. Dorsal sepal linear, lateral sepals broad, connate below and forming a blunt spur. Petals narrow, linear, about the same length as the sepals, showing

their recurved tips between them. Lip attached to the base of the curved spur, and curved conformably to it, undivided, wedge-shaped, rounded at the point, about the length of the sepals. Column cylindrical, contained in the same line as the short ovary. Anther deep purple. Petals white, lip pale yellow. Sepals, bracts, flower-stem, and margin of lip red with hairs. Tavoy. I have been minute in my description of this plant in the hope that it may be sent home and satisfactorily determined. My dried specimens appear to have been lost, and, by a strange omission, the pollen-masses are wanting from my drawing of the flowers. In the absence of flowers, the plant exactly resembles *Eria vestita* of the *Bot. Magazine*, No. 5807. In consequence of the dry and wiry character of the roots I could never succeed in making it attach itself to a tree, and it always refused to grow with me.

#### DENDROCHILUM.

A small genus consisting of a few obscure plants. Pollen-masses 4, incumbent. For further information reference must be had to books. Limited space allows only brief notice here. Species 1.

##### D. PALLIDE-FLAVENS.

A small plant, in general aspect like a *Bulbophyllum*, bearing a slender raceme about 3 inches long, of minute straw-coloured flowers from the base of the pseudo-bulbs.

#### PHOLIDOTA.

The plants of this genus have either pseudo-bulbs, or jointed swollen stems, with plicate leaves, and terminal, two-ranked, drooping racemes. Pollen-masses (in the only two species known to me) 4, ovate, joined in pairs to a slender caudicle. Species 2.

##### P. IMBRICATA.

Pseudo-bulbs ovate, oblong, terminated by a large lanceolate leaf, from the central axis of which hangs a long flexible spike of closely imbricated greenish-yellow flowers, each almost concealed by a concave bract. Common.

##### P. ARTICULATA.

Stem articulated; joints fleshy, cylindrical, 3-4 inches long, terminated by a pair of ovate leaves, from the axis of which droops a lax raceme of some dozen greenish-yellow flowers. It forms loose, irregular masses, rooting freely at the joints.

#### OTOCHILUS.

In general appearance like *P. imbricata*, but the flowers are slenderer, and have a long, arched, half-rounded column resembling that of *Calogyne*. Pollen-masses 4, incumbent, concavo-convex, united in pairs by an elastic cobwebby material. Species two, forming large tangled masses on the branches of trees in mountainous districts. Flowers colourless and inconspicuous.

#### PLEIONE.

A small group of very distinct form and habit, by some united with *Calogyne*, and indeed in the general structure of their flowers having no essential difference; passing, moreover, by easy gradations, through *C. Schilleriana* and *C. uniflora* into that genus. The few plants belonging to this group are dwarf epiphytes growing in dense patches on rocks and trees on the higher mountains, among moss. They consist of rounded, more or less depressed, pseudo-bulbs,  $\frac{3}{4}$  or 1 inch in diameter and height, from the base of which spring 1 or 2 strikingly beautiful flowers of extraordinary size for that of the bulb. Leafless when in flower. Although apparently lateral, the flowers here (as in *Calogyne*) are really terminal. They grow at the end of a new and as yet undeveloped pseudo-bulb, which, in its early stage, forms the foot-stalk of the flower. This, after the flower has perished, swells and eventually becomes the recognized pseudo-bulb, often bearing at its end the now matured fruit. Thus the leaves are formed later than the flowers, the reverse of what is ordinarily the case in Orchids.

The discovered species are two, *P. præcox*, which I have gathered abundantly on the mountains near Toun-g-ngoo, at an elevation of 7 or 8000 feet; and *P. Reichenbachiana*, on the mountains E. of Maulmain at a somewhat lower elevation. The latter plant shared the fate of my *Dendrobium crassinode* and many other fine things, all sunk in the "*Persia*," and thus Col. Benson became the fortunate first introducer of the plant into England. Both species are figured in the *Bot. Magazine*.

## CELOGYNE.

The Orchids of this genus have for the most part handsome flowers, though not of the first order of beauty. They are to be distinguished by the following characters. The flowers are terminal (as explained under *Pleione*) on a pseudo-bulb formed or unformed. Pseudo-bulbs crowded so as to form tufts, or distant on a creeping root-stock, generally short, but sometimes much elongated. Leaves 2, at the end of the pseudo-bulb. Sepals separate and distinct, generally, but not always, wide spread. Petals similar, but narrower. Lip large, articulated with the base of the column, and parallel with it, usually 3-lobed, the side-lobes very large and erect, with longitudinal raised lines or crests on the disk. One of the most marked characters is the column, which is long, curved and winged, often hooded and toothed at the top. Pollen-masses 4, incumbent (back to back), united in pairs by a granular substance. This is the rule, but there are exceptions. Species 25.

*C. SCHILLERIANA.*

This may be fairly called a small *Pleione*. Pseudo-bulbs small ( $\frac{2}{3}$  inch). Leaves 2, at the end of the undeveloped pseudo-bulb, which, at this stage, looks like a narrow flower-stalk only, with imbricated bracts at the base. Flowers solitary from between the leaves, about  $1\frac{1}{2}$  inch across. Sepals and petals tawny-yellow, the latter very narrow. Lip 3-lobed, lateral lobes oblong, rounded, parallel with the column; middle lobe very broad, wavy, crisped and notched at the point, colour yellow, with dark reddish-brown blotches. The old bulbs are leafless at the flowering season. Maulmain and elsewhere.

*C. CNIFLORA.*

Pseudo-bulbs about 1 inch long, flask-shaped, seated closely on a creeping root-stock, terminated by 2 long linear leaves. Flower 1 (sometimes 2) from the base of the *fully-matured* bulbs, and not from the axils of the leaves, as in *C. Schilleriana* (herein apparently forming an exception to the rule of the genus already mentioned), about 1 inch long, orange-yellow. Lip 3-lobed; side-lobes small, acute; middle-lobe boat-shaped, with 3 orange-coloured streaks at the base, and three similar spots in the middle.

*C. RIGIDA.*

Pseudo-bulbs distant, 3 inches or so, on a coarse, hard, branched root-stock, which is  $\frac{1}{2}$  inch in diameter, ring-marked where the scales have fallen off, and sending out wiry roots from its under surface. The bulbs from 3 to 5 inches long, smooth when young, but much grooved when old and shrunk. Leaves two, ovate-lanceolate, pointed. Flowers 8 or 10 in a pendulous raceme from between the leaves. Raceme 8 inches long, flowers  $\frac{3}{4}$  inch, rufous. Sepals oblong. Petals very narrow and standing back from between the sepals. Lip 3-lobed, middle lobe broad and itself 2-lobed, with two dark brown wavy crests. The unexpanded flowers have each a large ovate, pointed bract, embracing and nearly concealing them. These bracts are of a rich brown colour towards the point. The flowers occupy about half the length of the peduncle, and at the base of the lowest flower are a number of imbricated scales, extending back for about two inches. The old bulbs are generally surmounted by the hardened rigid remnant of the peduncle, which is almost hard enough to run into the hand. Hence the name.

*C. FUSCESCENS*, var. *BRUNNEA*.

A plant of much the same character as the preceding, but generally smaller and less robust. The flowers are 5 or 6, in a drooping raceme at the end of the young

undeveloped pseudo-bulb, each about 2 inches long, of a general tawny-yellow colour. The lip dark chocolate brown. A handsome Orchid.

#### C. PARISII.

Pseudo-bulbs on a creeping root-stock, 5-7 inches long, cylindrical, smooth, surmounted by two oblong-lanceolate plicate leaves. Peduncle of about 5 flowers in their axil, 6-7 inches high. Flowers large, green, lip crested and marked with black streaks and spots. More curious than beautiful. In this species the flowers terminate the fully-matured pseudo-bulbs.

#### SUNIPIA, Buch.

A genus of two species only (as far as is at present known), one of which is found in Burma, *Sunipia scariosa*. Its description may suffice here for that of the genus. A plant in habit like a *Bulbophyllum*, with a creeping rhizome of the thickness of a goose quill, bearing upon it, at regular distances of 2 or 3 inches, ovoid pseudo-bulbs about 1 inch long, tapering upwards, each terminating in a single linear leaf, 6 inches by  $\frac{3}{4}$ , leathery. Inflorescence a spike on a long slender peduncle, erect for about 10 inches, with stem-clasping scales at intervals, thence drooping for another 6 or 7 inches. Flowers very small, sessile, alternating on a zigzag rachis, each concealed by a glumaceous bract. Sepals ovate obtuse, the two lower uniting to form a keel. Petals much smaller and nearly round. Lip articulated with the column, 3-lobed, side lobes rounded, middle lobe elongated, blunt, solid, hollowed out at the base. Pollen-masses 4, collateral, nearly round, attached by pairs to two short blunt fleshy caudicles. The colour of the flower is white, tinged with rose at the base. Lip pale yellow. Lindley places it among *Vandeæ*, and speaks of a gland, but I can find no trace of one. 4-5000 feet among the mountains.

#### AGROSTOPHYLLUM, Bl.

Like the last, this is a small genus consisting of 2 or 3 species. Our Burmese representative is *A. planicaule*, a plant with fleshy flattened stem about 5 inches long,  $\frac{3}{4}$  inch broad by  $\frac{1}{2}$ , bearing a leaf (possibly 2 leaves) at the top. Leaf oblong, 6 inches by 1. Flowers in a small dense head at the base of the leaf, interspersed with brown bracts. The pollen-masses are 8—those of an *Evia*, though Lindley places the plant among *Vandeæ*. The plant grows in a tufted manner—several stems near together. This is the meanest Orchid and the most weedy-looking that I know. Species 1.

#### SPATHOGLOTTIS, Bl.

“Terrestrial plants with subterranean corms” (rhizomes underground, Bentham in *Flora of Hong-Kong*, p. 355), “and sword-shaped plicate leaves. Sepals spreading, free, equal. Petals rather broader. Lip articulate at the base of the column, not spurred but concave or saccate, 3-lobed, middle lobe contracted into a claw, and crested or tuberculated. Column winged or petal-like. Pollen-masses 8, waxy. Scapes radical, leafless.” Species 3.

The foregoing generic description is simply copied from Lindley and Bentham. This is done because the first of the three species mentioned below (placed in this genus by Reicheubach) will be found to differ in some respects from it.

#### S. HARDINGIANA.

Pseudo-bulbs about the size and shape of a cob-nut, terminated by two lanceolate pointed leaves much attenuated below, 6-7 inches long by  $\frac{3}{4}$  broad. The flowers are borne in a loose raceme of some 8 or 10, on one, or occasionally two, slender peduncles 9-10 inches high, with 2 or 3 sheathing scales nearly an inch long at regular distances upon them, springing from the base of the pseudo-bulb. The stem (peduncle) is covered with soft hairs and is red. Each flower, which is nearly an inch across when fully expanded, has a slender stalk 1 inch long and a pointed bract at its base. Sepals ovato-lanceolate pointed. Petals of the same length and appearance, but much narrower, all thrown backwards when in full flower. Lip long and narrow, awl-shaped, very acute, from a broad rounded base with a central

longitudinal line. About the middle of the lip are two prominent lumps or callosities (one on each side of the line), of considerable size for that of the lip. The column is long, slender, arched (almost hooked at the end) and winged on the upper half. Anther 2-celled. Pollen-masses 8, long and tapering into caudicles, and cohering in two bundles of 4 by their glutinous extremities. The colour of the unopened buds is greenish, that of the expanded flower clear white with just a blush of rose at the tips; column rose; anthers deep red purple, and the callosities marked with red and yellow. An extremely elegant little Orchid sent me by Mr. Harding of Rangoon in 1873. I named it accordingly after him. I believe he received it from Blamo. I grew it for 2 years with the greatest ease at Maulmain in a pot, where my one plant increased to two or three. I should have liked to send it to England in a growing state, but fearing that, if it were lost or died, there would remain no proof of its existence beyond a verbal record and a drawing, I sacrificed it in its full beauty, forwarding one dried specimen to Kew and reserving one for myself. The fortunate possession of this perfect specimen has enabled me, now as I write, to re-examine the pollen-masses. In my original drawing, made in 1874 I represented them as attached to a sort of gland, but I appended a note to the effect that I was not sure I was right, that the apparent gland was torn, and I could not clearly make it out. This observation Prof. Reichenbach quotes in his description of the plant (*Otia Botanica*, Hamburg, Fasc. 1. p. 46), and suggests that the apparent gland had some irregular source. I now find that the pollen-masses are without any gland, as is to be expected in *Epidendrea*, but I perceive that the rostellum at the end of the column is very thin and membranous, and I think it likely that in removing the pollen-masses from the anther, an irregular fragment of this membrane may have been carried away with them, in consequence of the very glutinous nature of the caudicles.

The differences observable between this species and the description of the genus are, that, though terrestrial, the pseudo-bulbs are above ground, the petals are smaller than the sepals, and the lip is undivided.

S. PUBESCENS.

S. LOBBII.

These two plants must be passed by with a brief notice. They both have underground bulbs of an irregular shape, two long linear-lanceolate leaves and long slender flower-stalks, which bear from 3 to 5 yellow flowers, about 1½ inch across. Sepals and petals broad, nearly the same size. The lip is 3-lobed or tripartite, and in both is of a remarkable shape. They are about a foot high, resemble each other very much, differing in points of small detail. The first I find on Zing-gyik, near Martaban, the last on the hills East of Amherst. It was also sent to me by the late Capt. Gower, from Akyab. They are both easy of cultivation, and deserving of it.

*Spathoglottis* is nearly allied to *Bletia*, from which (says Lindley) it is distinguished by the middle segment of the 3-parted lip being unguiculate with two tubercles or lamellæ at its base, and by its two-celled anther." There is a handsome purple *Bletia* grown now frequently in Rangoon gardens which I take to be an introduction.

#### CALANTHE, *R. Br.*

Terrestrial or epiphytal plants, consisting of pseudo-bulbs which are nourished by fibrous roots from their base. Flowers numerous in racemes on erect stems, which spring from the base of the pseudo-bulb. Sepals and petals spreading, nearly equal, free. Lip connate with the column, entire or lobed, variously spurred. Pollen-masses 8, in pairs, tapering into caudicles, which adhere to each other by a cobwebby substance, and are occasionally united by a spurious gland. Leaves terminal on the pseudo-bulbs, broad, plicate. Species 3.

C. VESTITA.

Pseudo-bulbs large, 4-5 inches, ovate, somewhat squared, partly clothed with membranous scales, of an ashy-grey colour. Leaves 2 or more from the end, a foot or more long, 4 inches or more broad, lanceolate, ribbed, tapering downwards into

a foot-stalk, and upwards into a point, falling off before the flowers appear. Flower-stem, or scape, springing from the base of the matured pseudo-bulb, 1 foot or more, erect, bearing at intervals sheathing scales, clothed with hairs which stand out at right angles with the stem. Flowers large, several, 7-8, in a loose drooping raceme. Sepals and petals widely spreading, broad, lanceolate, pointed, nearly of the same size. Lip widely spreading, the base of it attached to the sides of the column along its whole length, laterally compressed; the remaining or projecting portion rounded in outline, deeply 3 lobed; the middle lobe again subdivided, but not so deeply. Spur long, slender, curved forward under the lip. Anther sunk in the column, 2-celled. Pollen-masses 8, tapering into caudicles, adhering to each other, but without any gland. The colour of the flowers is pure white, with the exception of a yellow or Roman-red stain in the eye of the lip. An extremely beautiful plant, widely distributed; always found on trees.

The pollen-masses of *C. veratrifolia*, a Straits plant, are united to a distinct gland, but one of a different character from the gland of *Vandea*. *C. obtusata* has a distinct gland, very Vandeous-like.

#### LIMATODES, Bl.

Terrestrial plants, bearing pseudo-bulbs nourished by fibrous roots which penetrate the vegetable soil. In character very near to *Calanthe*. Sepals and petals spreading, nearly equal. Lip free, undivided, spurred. Column very short. Pollen-masses 8, as in *Calanthe*, without a gland. Leaves terminal, broad, plicate. Flowers in a raceme on a stalk which springs from the base of the pseudo-bulbs. Species 1.

##### L. ROSEA.

Pseudo-bulbs elongated, jointed or constricted, angular, tapering upwards, 5-6 inches long. Stems villous, erect, with scales at intervals, many-flowered. Flowers rose-coloured. Lip oblong, undivided, rolled into a tube at the base, and enveloping the column; pale yellow in the eye, which is surrounded by a deep crimson ring. Spur long, stouter than in *Calanthe*, and bent backwards. Stem and flowers hairy. A lovely plant, profusely abundant in the crevices and on the ledges of the limestone rocks about Maulmain, growing in loose rich vegetable mould.

The Messrs. Veitch have produced a hybrid plant by crossing *Limatodes rosea* and *Calanthe vestita*. The conclusion to be drawn from this is, not that plants of distinct genera can be intercrossed, but that the so-called genera are not really distinct. It points to the extremely close relationship of the plants, and to the purely artificial nature of the distinction which has been made.

It may be remarked here that *Calanthe* and *Limatodes* have been placed by Lindley and other botanists among *Vandea*, on account of the occasional appearance of a gland to the pollen-masses. The character of this gland, however, as well as that of the pollen-masses themselves, is very different from that which prevails among *Vandea*.<sup>1</sup> These two genera, accordingly, with some others, are now referred to the Epidendrous division of Orchids, as showing more general affinity with it.

#### ARUNDINA, Bl.

Terrestrial plants with tall erect leafy stems and 2-ranked leaves, and no pseudo-bulbs. Sepals lanceolate, equal, petals broader. Lip 3-lobed or entire, rolled round the column, without a spur. Column half-rounded, clavate (club-shaped) at the end. Pollen-masses 8, in fours. Flowers large, handsome. Species 1, *Arundina bambusifolia*, for description of which see Roxburgh's Flora Indica, vol. iii. p. 460, under *Cymbidium*. Damp shady places among moist rocks. Akyab.

#### PHAIUS, Lour.

Terrestrial or epiphytal plants, generally tall and caulescent, though sometimes stemless and pseudo-bulbous. Scapes radical. Flowers showy. Sepals and petals free, spreading, nearly equal. Lip rolled at its base round the column, 3-lobed or

<sup>1</sup> *C. obtusata* perhaps excepted.

entire, spurred. The middle lobe with ridges or raised crests. Column continuous with the ovary, half round. Pollen-masses 8, nearly equal.

P. BLUMEL.

I regret being unable to speak positively of this plant, and to say if it have pseudo-bulbs or not, as, unfortunately, I have kept no record of the fact, nor any drawing, and my dried specimens consist of flower-stems and flowers only. Nor does the drawing of *Limodorum Tankervillei*, *Bot. Mag.*, tab. 1921 (now *Phaius*), which, being closely related to it, probably grows in the same way, afford any material for deciding; nor does the meagre description of the plant there given. As far as my recollection serves me, the leaves, which are broad lanceolate, pointed and plicate, arise from a mass of underground fibrous roots, and form a sort of false stem made by their combined bases, which is slightly swollen at the point where it touches the ground. The scape, or flower-stalk, springs from the side of the leaves at their base, is longer than the leaves, being about 10 inches or 2 feet long. It has several sheathing scales along its length at regular distances of 2 inches, and bears towards the end a loose raceme of several (6-8) large handsome flowers, full 4 inches across. The form of the flowers is as described above in the genus. The lip has a short curled spur at its base. Sepals and petals white outside, brownish inside. Lip whitish, streaked with crimson. From Bhamo.

THUNIA, *Rehb. fl.*

Epiphytal plants, with leafy fascicled stems, slightly swollen at the base, clothed with alternate leafy sheaths from the bottom, enlarging upwards with normal leaves. Flowers few, 2-6, terminal, each with a spathaceous bract at the base. Sepals and petals lax, thin, wide-spreading, lanceolate, pointed, nearly equal. Lip parallel with the column, 3-lobed, bluntly spurred, the lateral lobes enveloping the column; middle lobe broad, wavy, crested on the disc. Column winged, somewhat hooded at the top, 3-lobed, middle lobe rounded, side lobes toothed. The stigmatic aperture is covered by a membrane which falls over and conceals it, very much as in *Vanilla*. Pollen-masses 4, or, by division, 8, united by a thick fleshy stipes. Anther 2-celled, each cell subdivided again into two. Species 2 or 3.

T. ALBA.

The generic description given above may serve also generally for the specific description. The stems of this species are 6 or 10 inches long tapering to a point. The leaves are alternate and two-ranked, glaucous, long-lanceolate, pointed, and the flowers are white.

T. BENSONLE.

Same as above, except that the flowers are larger, 3 inches long, and purple. The lip is of a much deeper colour than the rest of the flower, and has its disc ornamented with yellow raised and crested lines. Certainly a handsome plant, but disappointing, owing to the flaccid texture and drooping habit of the flowers, which hardly show their beauty unless raised and opened by the hand. Both this species and the foregoing are epiphytal on the perpendicular surface of trees and rocks at an elevation of 4-5000 feet. Although known to me for some time previously, Colonel Benson was fortunate in being the first to send it to England.

T. XANTHOPHLEBIA (PULCHRA).<sup>1</sup>

<sup>1</sup> THUNIA PULCHRA, *Rehb. f.*, "Gard. Chron." 1881.—"A glorious specimen of this is at hand from Mr. W. Bull. It has a rather nodding, rich inflorescence of 10 fine flowers, and these make one think of *Celogyne cristata* in their pure whiteness. The lip has yellow and brown crests, but very little of those is to be seen as long as you do not expand the flowers artificially. The genus *Thunia* was established by the writer of these lines, in Dr. Lindley's lifetime, in Von Schlechtendal and Von Mohl's *Botanische Zeitung*, 1852, p. 764, having been regarded as *Phaius* till then; it has been universally admitted. Let us now imagine somebody had refused its acceptance, and declared it once more a *Phaius* and not a *Sobralioid Arctiuseae*, then it should have waxy and not amylaceous pollen. What is a waxy pollinium? The one that, by being covered with a layer of exina, is fit to resist the entrance of water a good while, and is hard and stringy, usually bright yellow, seldom green, hyacinth-red, or

In general character like the two preceding species, but a very much larger plant. Whereas in *Thunia alba* and *Bensonia*, only two stems, one old and one new, go to form the plant, the species under consideration has several stems growing in a fascicled manner, and these are 18 inches or 2 feet long, as thick as the little finger, and leafy throughout. The flowers also are more numerous, 6 to 8 in a raceme. They are white, hardly so large as those of *Thunia Bensonia*, and the lip is marked with ochraceous lines in the disk and yellow veins, whence the specific name. On trees in the plains, about Maulmain.

*Thunia pulchra* is the same as *Thunia xanthophlebia*. Both are Prof. R.'s names. Why he changed the latter name first given into *T. pulchra*, I do not know. *T. xanthophlebia* is descriptive; *T. pulchra* is not. I had it growing for 20 years in my garden, and considered it an indifferent thing.—C.P.

Before leaving this genus, I would draw attention to the pollen-masses. These are described by Sir J. Hooker in *Bot. Mag.* under tab. 5694 as 4, clavate (club-shaped) furrowed, and finely granular. It was always my custom, whenever time permitted it, and the opportunity offered itself, to examine the pollen-masses of all Orchids with the greatest care, and to draw them with scrupulous fidelity. In the great majority of cases this was done at leisure, the plants examined being fresh-gathered in my garden. This was the case with *Thunia Bensonia* and *xanthophlebia*, and the drawings as made some 15 years ago are now before me as I write these lines. Now the pollen-masses of the two plants are very different. They differ in number and in shape. In *T. xanthophlebia* I find 4, and in *T. Bensonia* I find 8. The difference in shape is not easy to describe; a drawing is required to make it plain. However, in *T. xanthophlebia*, they are distinctly 4 only, all 4 equal, elongated, lying in pairs, one pair in each cell of the anther, concavo-convex, and accumbent, i.e. appressed side by side, their concave surfaces one against the other; all four united by two constricted necks (which gives them a somewhat club-shaped appearance) to a common thick granular base, or stipes.<sup>1</sup> In *T. Bensonia* they are 8, 2 pairs in each anther-cell, and these pairs are incumbent, i.e. one pair behind another. The pairs in each cell, moreover, are unequal, a larger pair and a smaller pair, the smaller pair being raised by a slenderer stipes of their own on to the broader stipes of the larger pair, and all united by a grumous (or thick clotted) mass, forming a spurious gland. It may, indeed, be allowable still to say they are 4 only, but these 4 are distinctly cloven to their base, so as to form 8 plano-convex masses, very much as, in *T. xanthophlebia*, the two greater may be said to be partible into four smaller masses. I have no record of the pollen-masses of *T. alba*, but they are probably like those of *T. Bensonia*, from which it is doubtfully distinct as a species. Indeed, under its old name of *Phaius albus*, it comes under that genus in Lindley's "Genera and Species of Orchidaceous Plants," and one of the distinctive characters of *Phaius* is that it has 8 pollen-masses.

#### MONOMERIA, Lindl.

Founded by Lindley on one species discovered by Wallich in Nipal, to which Lindley gave the name of *M. barbata*. The following is his description of the genus.

whitish. This one has no cover of exina, though I admit that the pollinia are not quite as soft as in *Bletilla hyacinthina*, called *Sobralia bletroides* by excellent botanists of Paris for its mealy pollinaria, yet they are nearly as in some *Galeola*, which I had the pleasure of seeing fresh. Blume, indeed, has, in 1856 (*Museum*, p. 181), quoted *Phaius albus*, Lindl., as *Phaius*, yet in his last Orchid book he omitted the plant, no doubt having been informed of its separation—at least I cannot find it in his last book. After all Blume did not know the marks of distinction between *Phaius* and *Bletia*. Morphologically our plant teaches us once more not to rely too much on the presence of the spurs. Our plant has no spur, and *T. alba* enjoys a spur. *Thunias* have a terminal inflorescence on the leafy shoots, when *Phaiuses* have their inflorescences and their fascicles of leaves apart. *Thunias* have fleshy membranaceous leaves, *Phaiuses* have plaited ones; *Thunias* have persistent, *Phaiuses* deciduous bracts; *Thunias* have 4, *Phaiuses* 8 pollen-masses; *Phaius* flowers get blue when dried, *Thunias* keep white, or get brownish flowers in this state. If you look to the propagation, you can make cuttings of *Thunias* as of a *Dracena*. Try it with *Phaiuses*! A representation of *Thunia pulchra* will be given in *Xenia*, and it is intended to add for mere comparison a representation of *Phaius*!—H. G. Rehb. j.

<sup>1</sup> I use the word stipes here, as, from its meaning, it is more appropriate than caudicle, though it is not of a Vandaceous character.

"Sepals ringent (gaping wide), unequal, the lateral ones far removed from the top one (the interval being toothed), united to each other and to the base of the column, bearded. Petals none. Lip jointed with the foot of the column, incumbent, 3-lobed, with 4 parallel lamellar (thin plates) on the disk, the lateral lobes falcate forwards and bidentate at the apex. Column much lengthened out below, half round, with 2 small horns at the point. Anther crested, 1-celled. Pollen-masses 4, cohering in one." A plant with a creeping rhizome (root-stock), which bears pseudo-bulbs. Leaves single, leathery, without veins. Raceme from the root, many-flowered. Note (by Lindley): "This is the only known genus of Orchids in which the petals are abortive. Nothing is found in their room, but there is a wide toothletted interval between the upper and lower sepals." Here follows his further description of the species.

"Pseudo-bulbs ovate. Leaves with very long petioles (stalks) 1 foot long, erect. Raceme shorter than the leaves. Scape (flower-stalk) light-coloured, bearing a few scales, spotted. Flowers light-coloured, spotted with purple. Lip yellowish. The foot of the column thickly dotted with purple."

As a special interest is attached to this plant, I have been careful to give here everything that Lindley says of it. There appear to be only 2 or 3 specimens remaining of this singular plant in European Herbaria, and these, as it may well be supposed, owing to their age, not in a very good state for examination. Lindley himself could only have seen and examined a dried specimen; hence, possibly, he may have been mistaken in some particulars.

It was my good fortune in February, 1871, to find on *Ta-ok*, at about 3000 feet of elevation, a solitary plant, looking exceedingly like a *Bulbophyllum*. Knowing, by experience, how deceptive these *Bulbophyllum*-like Orchids are, I brought it down to Maulmain, where it flowered, and proved to be a *Monomeria*. I thought I had Lindley's *M. barbata*, so very similar did it prove to his description and to his figure of that plant in his *Sertum Orchidaceum*. Eventually, however (to be short), Prof. Reichenbach pronounced it to be a distinct species, and gave it the name of *Monomeria crabro*, from a fancied resemblance of the flower to a hornet.

Into the distinctions between the two species (which are, after all, very slight) I will not enter, but proceed to give a familiar description of my plant, in the hope that it may be found again some day, and sent home once more. As I have remarked above, the plant might be passed over as a very ordinary looking *Bulbophyllum*. The rhizome, which is about as thick as a cedar-pencil, and covered with scales, creeps extensively, emitting tough wiry roots from its under part. It has pseudo-bulbs seated upon it, several inches apart. These are pear-shaped, about 2 inches long, and terminated by a solitary, leathery, strap-shaped leaf, which is some 10 inches by  $1\frac{1}{2}$ . The flowers are about 20, individually 1 inch long, forming a sparse raceme extending over about 9 inches of a curved drooping scape, which in total length is 15 or 16 inches. This scape springs from the base of the pseudo-bulb, and has several scales on its lower portion. The flowers, of a remarkable shape, terminate a germ of 1 inch in length, which, in fact, forms their peduncle, and at the base of the germ is a lanceolate bract. Of the 3 sepals the upper one is ovate triangular, sharp-pointed, and stands erect, arched over the column which it in part conceals. The two lateral, or in this case more markedly, *lower* sepals are oblong, oblique, pointed, parallel to each other, and cohering along their whole length so as, apparently, to form but one oblong-pointed segment. Petals minute, triangular, fringed. Lip elevated on the up-turned end of the column, much shorter than the lower sepals, 3 lobed; lateral lobes small, triangular, acute; middle lobe, oblong with a mucro, or point, at the end. The colour of the upper sepal is yellow, that of the lip dark purple, and the two lower sepals are blotched with the same colour on a dark yellow ground. It remains to speak of the most important part of the flower, the pollen masses. Lindley describes those of his *M. barbata*, as simply 4, "cohering in one mass." This is very much as was to be expected, judging from the general character of the plant, which is that of a *Bulbophyllum*, and it is what I was prepared to find also in my plant. To my great surprise, however, on dissection, I found indeed the 4 pollen-masses, cohering in one round mass, exactly as described by Lindley, but also,

proceeding from between them, a rigid curved stipes (I thankfully avail myself of this word, suggested as more appropriate by Bentham than caudicle), and at the end of it a gland, not a membranous gland as in *Vandea*, but a firm gummy mass; the whole as figured (from my drawing) in the Linnean Transactions. Reichenbach (though whether confirmed by actual observation or not I cannot say) has accepted my representation. But Mr. Bentham, in his recent "*Notes on Orchidæ*," Linn. Soc. Trans. vol. xviii. p. 301 (a copy of which he kindly presented to me), makes the following observation in reference to this plant: "I cannot help thinking that the pollen figured by Parish had become accidentally attached to some extraneous body mistaken for the stipes, a conjecture somewhat confirmed by the very exceptional manner in which the pollen appears attached to the supposed stipes, which, moreover, does not correspond in shape with that of the rostellum, from which it would have been detached." Now, all I can say to this is, that I do not think it possible for me to have made so serious a mistake; I must, therefore, with such modest assurance as I fairly may, state my firm conviction, that it is as I have drawn it, and that there was attached to the pollen-masses a veritable stipes and gland. My original drawing now lies before me (and on none have I bestowed greater pains), and, in corroboration of my statement, I perceive that, in a highly magnified representation of a front view of the column, with all the parts still "*in situ*," as yet untouched, the gland is distinctly drawn as projecting forwards in front, from under the anther. I admit the improbability of such a structure being found, and I feel the full weight of the authority against me, but I must adhere to the correctness of my representation, until, by the fortunate rediscovery of the plant, I shall be proved to be wrong. It is a mountain plant, and the special locality where I found it is Ta-ok in the Dauna-range, east of Maulmain, at an elevation of 3-4000 feet, as nearly as I can guess.

#### EULOPHIA, *R. Br.*

Terrestrial plants, pseudo-bulbous. Roots fibrous, from their base. Flowering stems sometimes terminal on the yet undeveloped leafy bulbs, which grow out from the base of the old leafless bulbs, sometimes also several from various parts of the old bulb, simple or branched. Leaves long, membranous, plicate or smooth. Sepals and petals spreading, nearly equal, free, or adhering more or less to the column, which is lengthened into a blunt spur. Lip 3-lobed, middle lobe wrinkled, much veined or crested with hairs. Anther 2-celled. Pollen-masses (Vandeous) 2, each with a mark as of a second and smaller lobe behind, attached by a short stipes (caudicle of Lindley) to a rather large gland. Flowers in racemes, numerous, single, of no great beauty, about 1 inch in diameter, generally greenish, with more or less of purple on the lip. Species 4.

#### CYRTOPERA, *Lindl.*

Terrestrial pseudo-bulbous plants, so near in their several characters to the preceding, as by some to be united with that genus. Lindley distinguishes the genus by the absence of a spur, whereas it is present in *Eulophia*, but in the two only species known to me, pronounced to be *Cyrtopera* by Prof. Reichenbach, there is a distinct spur, and it is simply in deference to his acknowledged authority that I have separated them from *Eulophia*.

The flowers of *C. squalida* grow in a loose sparse raceme, are  $1\frac{1}{2}$  or 2 inches in diameter. Sepals creamy-white, striped with purple, petals pink; lip undivided, oblong, faint pink, with a broad yellow line down the middle. The anther has two horn-like appendages. The flowers of *C. macrobulbus* grow in a dense raceme of many individuals, of a uniform dull brown or burnt sienna colour. They (as do also the *Eulophias*) affect damp, shady jungles, in places where vegetable mould abounds. Species 2.

#### GEODORUM, *Jacks.*

Terrestrial, pseudo-bulbous. Petals and sepals free, nearly equal. Lip ventricose, obscurely 3-lobed or entire, slightly spurred or pouched at the base, parallel with the column. Column short, very broad, not produced below. Anther 2-celled, but the partition not prominent, with two little lappets inside, which serve to keep the

pollen-masses in their place. These are two, with deep indentations, attached by a broad stipes to a transverse somewhat triangular gland. Old bulbs leafless, new undeveloped bulbs leafy. Leaves broad, plicate, sheathing at the base. Scape from the base of the young leafy bulb, shorter than the leaves. Flowers in curved, drooping, rather dense racemes. Species 3 or 4.

CYMBIDIUM, *Sw.*

(*Eu-Cymbidium*, of Lindley).

Epiphytes with or without bulbous bases. Stems tufted. Roots few, fleshy. Leaves long, narrow, expanded at the base, and these alternately and closely overlapping one another, so as to form a sort of false stem. Flower-stalk of varying length, proceeding from the axils of the lower leaves, few- or many-flowered. Sepals and petals nearly equal, spreading. Lip 3-lobed or undivided, free, articulated with the column, concave, without a spur. Column prominent, erect, half-round. Anther 2-celled. Pollen-masses 2, bilobed behind, sessile on a large triangular gland. Flowers generally handsome, in short few-flowered erect, or in many-flowered pendulous racemes. Species 4.

C. ALBIFOLIUM.

A common plant, at least in the Tenasserim Provinces, with long, narrow, hard, rigid, fleshy or leathery leaves, and a long drooping raceme of dull-coloured flowers. It forms large masses on trees.

C. TIGRINUM.

A small mountain species, about 8 inches high, tufted. Leaves 3 or 4, from the top of the young pseudo-bulbs, which are enveloped in their sheathing bases. Scape radical, scaly below, bearing from 3-6, rather large flowers, two inches across. Sepals and petals oblong, of a uniform yellowish-green colour, stippled with red at their base, wide-spreading. The upper sepal and the petals nearly erect; the lateral sepals distant, spreading. Lip 3-lobed, broad but tapering below. Side lobes rounded, streaked with red on the inside; middle lobe oblong, pointed, creamy-white, with transverse bars and blotches of red. There are two raised ridges at the back of the lip. Column curved forwards, green. Pollen-masses 2, lengthened transversely, 2-lobed, sessile on a triangular gland.

An interesting peculiarity of this species is the dimorphism of its flowers, observed by me on a large number of plants, on the top of Moollee-it, where it is abundant at about 6000 feet. There are two kinds of flower on the same stem. Out of about 6 flowers, the terminal ones are normal, as described, and perfect in structure. But the lower flowers are different. They are of a rich red colour throughout, and rather blotched than striped, and their structure is imperfect. The column is quite abnormal, being unusually thickened, and less curved. There is no anther at all, and there are no pollen-masses; but the edges of the column at the top are turned inwards so as to form a sort of hood, and underneath these edges is a small quantity of a yellow waxy substance (pollen) in an amorphous state. And, occasionally, the intermediate flowers are intermediate also in condition, having no anther, but perfect pollen-masses, though without any triangular gland.

C. LOWIANUM.

A very handsome species. Stems tufted, pseudo-bulbs; or rather the swollen bases, covered with the sheathing leaves, which are very long and narrow, 2-3 feet, and only about an inch broad. Scape 2-3 feet long, drooping. Flowers 12 or more, 3-4 inches across. Sepals and petals green, striped with red. Lip 3-lobed; lateral lobes large, green; middle lobe with 2 ridges at the back, white in the centre, with a lovely maroon-coloured tip. Column green, with red markings. Presumably collected in Upper Burma, by Boxall, and sent to Mr. Low. I had a plant from the same quarter, which I at first took for *C. giganteum* till I saw the flowers.

C. PARISHII.

Stems tufted, not bulbous. Leaves 2-ranked, long, linear, 18 inches by 1,

striated, overlapping alternately at the base. Scape short, erect, about 3-flowered. Flowers large, handsome, ivory white. Sepals and petals ovate, pointed, nearly equal. Lip 3-lobed, very broad; side lobes erect, rather square; middle lobe broad, square retuse, wavy at the edge; all three beautifully streaked with Roman-red, bright golden in the centre. Deliciously fragrant. A lovely plant, but too near to *C. eburneum*. Shan border, 1859. On trees.

*THECOSTELE, Rehb. fil.*

Sepals and petals spreading, free, the former ovate, the latter narrow linear. Lip continuous with the base of the column, 3-lobed. Column long, terete, incurved two-horned at the top. Anther 2-celled. Pollen-masses 2, deeply notched behind, attached by 2 thin elastic stipites to a broad rounded gland. Pseudo-bulbous. Leaf single, terminating the bulb. Scape many-flowered, radical. Species 1.

*T. ALATA.*

This is *Cymbidium alatum* of Roxburgh. Bulbs aggregate, ovate, somewhat flattened, ribbed, each one terminated by a broadly ovate solitary leaf, which is 5 inches by 2. The bulbs are yellowish, the leaves dark green. Scape drooping, 6-7 inches long, scaly towards the base. Flowers numerous,  $\frac{3}{4}$  inch across, spotted with red on a yellowish ground. Lip with 2 small rounded lateral lobes, and an elongated obovate middle lobe, which is hairy in the middle and retuse, *i.e.* it has the centre of a rounded end depressed, colour red, with pale yellow margin. The column is of a remarkable shape, retreating at the base, then arched forwards like a swan's neck, and has 2 horn-like appendages at the end. On trees in the neighbourhood of Maulmain. Flowering in the rainy season.

*BROMHEADIA, Lindl.*

I have no description of this genus, founded, it would seem, originally on one single species, *B. palustris*, a Straits plant, which I only know from Wight's figure. I must, therefore, confine myself to a short description of the second species which it was my good fortune to discover.

*B. APOROIDES.*

A small plant, 2-3 inches high, with distichous (2-ranked), rigid, hard, sharp-pointed, scimitar-shaped leaves, having very much the appearance of an *Aporum*, for which, in the absence of flowers, it might be taken. Flower, in my plant, terminal on a short scaly stalk, large for the size of the plant, 1 inch long. Sepals and petals linear-lanceolate, nearly equal, connivent. Lip parallel with the column, which is that of a *Calogyne*, long, curved, winged and projected beyond the anther. Pollen-masses two, like those of *Cymbidium*, sessile, on a large triangular gland. The colour of the flower is white, the lip excepted, which is 3-lobed; side lobes streaked with pink, pointed, almost as long as the small triangular middle lobe, which has a yellow crest. Flowering time April. No two plants can be more unlike in *vegetative* character than this and *B. palustris*.

*LUSIA, Gaudich.*

Plants with elongated woody stems, long aerial roots, terete (rounded, quill-shaped) leaves, and small and, mostly, inconspicuous flowers. Pollen-masses 2, notched behind, united by a broad stipes to a triangular gland. Species 5.

*COTTONIA, R. W.*

Caulescent. Leaves distichous. Flowers in axillary or leaf-opposed racemes. Pollen-masses 2. Vandeous.

*C. CHAMPIONI.*

A small plant, with fleshy, ovate, pointed leaves, and a few flowers, 5 or 6, on a rigid leaf-opposed stalk, 4 or 5 inches long. Sepals and petals ovate, broad, nearly equal, spreading. Column short. Lip 3-lobed, connate with the base of the column, lateral lobes quadrate, rounded, middle lobe projecting at right angles with them and

tapering to a finely forked extremity. At the back of the lip, between the lateral lobes, is a large cushion-like oval callus, and there is also a *hump* on the middle lobe. A strikingly different plant from *C. macrostachya*, for which see Wight's *Icones*, tab. 1755. The only other known habitat for this plant is Hong-Kong. The flowers are  $\frac{3}{4}$  of an inch across, dingy yellow, with a white and purple lip.

TRICHOGLOTTIS, *Bl.*

A small genus of Vanda-like habit. Leaves long, distichous. Flower-stalks axillary or leaf opposed, few-flowered. Pollen masses 2, stipes narrow, gland broad, peltate. Species 1.

PHALENOPSIS, *Bl.*

Sepals and petals spreading, free; petals much the largest. Lip connate with the slightly produced base of the column, free, 3-lobed, with variously-shaped callosities at the base. Column half round. Pollen-masses 2, bi-lobed, attached by a strap-shaped stipes to a heart-shaped gland. Stemless epiphytes, generally with 2 or 3, sometimes 4 leaves, which are large, broad and fleshy. Flower-stem from the short axis of the plant, 1 or more. Flowers large and showy. Species 4.

P. LOWII.

Stemless. Leaves 2, 3 or 4, very variable in size, from 3 inches  $\times$  1 to 6-7 inches  $\times$  2, ovate-lanceolate, fleshy, pointed. Roots fleshy, flat, extending to a great length. Scape long, 8 to 12 inches, slender, 1 or more, 4 or 8 flowered. Flowers distant, large,  $1\frac{1}{2} \times 2\frac{1}{2}$  inches across, white, suffused with rose. The upper sepal is larger than the two lateral ones. The petals are very broad and rounded, tapering inwards into a wedge-shaped claw. The lip, which is violet, is 3-lobed, and equals the lateral sepals in length. The side lobes are erect, somewhat square, with a reflexed point; middle lobe oblong, pointed and ridged lengthwise. The rostellum or beak (the prolonged point of the column) is very much lengthened, and when the anther, which is also lengthened, lies in its place upon it, the whole has the appearance of an elephant's trunk, as one often sees it nearly touching the ground with the end up. A very lovely plant, discovered by me on limestone rocks near Maulmain about 1860. It grows on the rocks and on the small bushes that clothe the rocks. It varies exceedingly in size, and in the number of flowers which one plant will bear. Ordinarily, a plant has 1 flower-stem with 4 or 5 flowers on it, but I once found a plant which had 3 flower-stems and 8 flowers on each, 24 in all, and the individual flowers were  $2\frac{1}{2}$  inches across. The roots spread for a long distance, 2 or 3 feet, and adhere so firmly along their whole length to the shrub or rock on which the plant grows, that it is quite impossible to detach without lacerating them. The consequence is that removal irretrievably damages the plants. They live, indeed, if attached to a tree again, but they take years to recover their original size and beauty, as they are of exceedingly slow growth.

*P. Parishii* is a much smaller plant, but very pretty, and has a highly curious lip; indeed, the appendages of the labellum of the genus *Phalenopsis* are so various and strangely elaborate in form as to baffle description. *Phalenopsis cornu-cervi* (called *Polychilos* in *Bot. Mag.*) has flowers barred with red. *P. Wightii* is smaller again than *P. Parishii*. Perhaps yet other species of this beautiful genus may reward a diligent search.

VANDA,<sup>1</sup> *R. Br.*

This genus contains some of the most magnificent Orchids of which the Eastern Hemisphere can boast. Not a few are of very large size. They are all epiphytal, and have distichous leaves, which are often thick and leathery, and more or less strap-shaped. The flowers are borne in lateral, erect or pendulous, racemes. The sepals and petals are wide-spreading and resemble each other. The lip is saccate or spurred, and fleshy, entire or 3-lobed, continuous with the base of the column. Column

<sup>1</sup> "Vanda," according to Sir Wm. Jones, is the Hindoo name for *V. Roxburghii*, the original species.

short and thick. Pollen-masses 2, bi-lobed, attached by a more or less wedge-shaped stipes to a large roundish or sub-triangular gland. Species about 12.

#### V. GIGANTEA.

A very large species, with broad, fleshy, strap-shaped leaves, 18 inches or more long by 3 or 4 broad, blunt and emarginate at the end. Raceme drooping, 1 foot or more long, consisting of large yellow flowers 3 inches across, marked irregularly with round spots of a reddish-brown colour. This is undoubtedly a very handsome Orchid, but the flowers, though really large, are dwarfed and rendered comparatively inconspicuous by the still larger and abundant foliage. It sometimes forms masses of extraordinary size. In my early days of botanizing in Burma, and while yet but indifferently acquainted with its Orchids, by good fortune I fell in with this plant on the Shan border. The yellow flowers caught my eye from amidst a considerable mass of foliage, high up on the branch of a forest tree. A Burman was sent up, who after some little difficulty, by the free use of his *dha*, succeeded in detaching the mass, which struck me with astonishment as it came crashing down. As it lay upon the ground, it was as much as one man could drag along by his greatest effort. All I could do was to cut off some comparatively small portions (each in itself a goodly plant) to carry away with me, and leave the bulk behind, as the whole was a great deal more than I could have packed on an elephant, of which we had several in the party. It is, apparently, a very local plant, but abundant in some places, viz. in the shady jungles about Tavoy, and in the Yunzalin district.<sup>1</sup>

#### V. PARISHII.

A coarse-looking plant with a rather flattened stem and broad leathery but flabby leaves, about 8 × 3 inches. The flowers are borne in an erect raceme of 6 to 8 flowers, which are nearly as large as those of *V. gigantea*, and resemble them much in their markings. They are uniformly dotted with round spots of a red-brown colour on an orange ground. The column and base of the lip are white, and the somewhat triangular middle lobe is purplish-lilac. It has a delicious fragrance, resembling honey. It is, I think, the freest and most rapid grower known to me, and very easy of cultivation.

I come now to a very puzzling group of Orchids. I have lying on the table before me as I write, figures and drawings of *Vanda Roxburghii* (true), of *V. Roxburghii*, var. *unicolor*, *V. Bensoni*, *V. Denisoniana*, and of a *Vanda* of my own finding, which I have marked doubtfully as *V. Bensoni*. Size and colour apart, I look in vain for anything among all these which, in any other order of plants, would be reckoned sufficient for a specific distinction. One description will serve fairly well for all. Accordingly I give that of

#### V. BENSONI.

As it is in *Bot. Mag.* No. 5611:—"Leaves distichous, obliquely and unequally-toothed at the end. Flower-spikes erect, many-flowered, longer than the leaves. Flowers distant, about 2 inches across. Sepals and petals unguiculate (clawed) obovate, obtuse. Lip about the same length as the sepals, with two small, triangular, rather blunt side-lobes or auricles at its base, from in front of which it is ovate, convex, traversed by 3 lamellæ, and terminated by a kidney-shaped, broad, bifid apex."

I repeat, this description (for I have omitted observations on the colour) will serve for all the so-called species above mentioned. There may be trifling differences in outline, as, for instance, in the posterior lobes of the lip, which, according to my drawing of *V. Denisoniana*, are rather rounded than triangular, but they are of no consequence as serving to distinguish species. The general aspect of all the plants is much the same, and the form of the flowers, including the crucial part, the lip, with

<sup>1</sup> Since writing what is above, my eye has chanced to light on the following paragraph in the *Gardener's Chronicle*, of July 16, 1881:—"Sir J. Hooker says in the *Botanical Magazine* that he has been credibly informed of a single plant of *Vanda teres* in Burma being a sufficient load for an elephant." There is, I fancy, some mistake here. I have indeed said this of *V. gigantea*; but the growth of *V. teres* is of so light a character that it could not possibly be true of it.

its saecate base, blunt posterior lobes, which are more or less rounded, its lamellæ and its remarkable terminal lobe, exactly like a Blackcock's tail, is the same. Leaving, however, the form and coming to the colour, the extremes are indeed widely different, but there are intermediate varieties. The flowers of *V. Roxburghii*, the first discovered species, are "tessellated, having longitudinal as well as short transverse markings of yellow and dusky ferruginous purple" (Roxb.), the lip being violet at the lobed apex, while the back of the flower is white. The flowers of *V. Denisoniana* are wholly white, except a little yellow in the very centre. *V. Bensoni* is dotted inside with reddish-brown on a yellowish-green ground, the apex of the lip being also violet, and the outside white.

*V. Roxburghii*, var. *unicolor*, is of a uniform dull greenish-brown colour on the inside, lip included, without any markings, and white on the outside. Finally, my fifth plant, which I too hastily took for *V. Bensoni* (not having at the time seen the figure of this plant in the *Bot. Magazine*), is coloured as follows. The inside of the flower (lip excepted) is marked with longitudinal lines of reddish-brown, darkest towards the end of the segments, with short intermediate lines of the same colour running transversely, leaving square interspaces (*areolæ*) of a light colour, so that the marking may be *correctly* called "tessellated," a word inapplicable to the markings in Wight's *Icon*, No. 925, though he describes them as such. The usual bi-lobed lip is of the deepest ruby-red, with lines of the same on the lamina, the spur being colourless. The back of the flower is white, but the coloured markings on the inside show faintly through. The pedicels (being in fact the germs) are also white, as in *V. Bensoni*. This I consider the handsomest of all the varieties (as I cannot but call them) of this *polychromous* plant, for *polymorphous* it cannot be called. The slight differences in the length of the flower-stems, or in the indentations or crosions at the end of the leaves, or in the forms of the posterior lobes of the lip, or in the number of ridges, are not sufficiently constant (even if important enough in themselves) to found specific distinctions upon. I hope I may not be thought presumptuous if I remark that descriptions of new species are not seldom made at home from a single individual plant, which some Orchid-grower has been fortunate enough to flower and bring into notice first, and that small points of structure or form are consequently sometimes relied on as distinguishing marks, which those who have seen many individuals in their native habitats know to be variable. When it happens that colour is the main point of difference, then any other little variation is eagerly looked for and made the most of. This appears to hold good in the case of Orchids only, in which order colour has a value accorded to it which is not accorded to it in any other as far as I know. To revert shortly to our nearly-related group: I may say that *V. Roxburghii* (true) is a Bengal plant, found also in Malabar, and elsewhere in the Madras Presidency, but not yet found, as far as I know, in Burma. *V. Roxburghii*, var. *unicolor*, I have found. *V. Denisoniana* I found on Ta-ok, but I do not know where Col. Benson found it. The highly-coloured variety, described above, I cannot fix a locality for, and *V. Bensoni* is one of the very few Orchids described as Burmese, which I have never myself gathered.

I cannot conclude my remarks on the Vandas without pointing to another small group which affords difficulties of a similar kind to those just discussed, in consequence of the great resemblance in the forms of the flowers of its species, and the wide difference in their size and colour. I allude to *Vanda parviflora*, *V. carulescens* and *V. caerulea*. It should be first stated that *V. parviflora*, *Aerides testaceum* and *Aerides Wightianum* are all one and the same plant. Having stated this, I go on to say that I find, about Mayawaddee, East of Maulmain, a plant of which the following will serve as a general description. Stem 1-2 feet long, as thick as the little finger, woody, with long stout flexuous roots just below the leaves. Leaves numerous, straight, rigidly distichous, with an obliquely-toothed apex, 6 to 8 inches long by  $\frac{3}{4}$  broad, strongly keeled. Raceme erect, many-flowered, from the axis of the lower leaves. Pedicels and germ about 1½ inch long, with a small lanceolate bract at its base. Flowers about 1 inch across. Sepals and petals nearly equal, but the latter the smallest, obovate, obtuse. Lip shorter than the sepals, with two thick longitudinal ridges on the middle lobe, which has a dilated extremity with a bilobed convexity.

This is an accurate description of my plant, which was pronounced many years ago to be *Aerides Wightianum*. It answers also admirably for that of *Vanda carulescens* var. *Borallii*, *Bot. Mag.* 6328, from which, indeed, it is almost wholly taken. The differences, such as they are, are the following:—The leaves of the latter plant are shorter, but to this I attach no importance whatever; (my drawing happened to be that of an individual with longer leaves, that is all,) and the ridges of the labellum, described as “smooth” in *V. carulescens*, are in my plant *pimply*. Beyond this trifling discrepancy, what remains is entirely a difference of colour and size. My flowers are rather smaller and, the lip excepted, pure white. The ridges of the lip are rose-pink, and there is a faint tinge of yellow at the base of the column inside, whereas the flowers of *V. carulescens* (*Bot. Mag.* 6328) are faintly tinged with violet, and the lip is a deep blue. The general habit of the two plants, a matter more for the eye and the pencil than the pen, is identical. Indeed, my plant more nearly resembles *V. carulescens*, var. *Borallii*, than it does *Aerides Wightianum*, *Bot. Mag.* 5138, the leaves of which are more curved and less rigid. The verbal description will suit this plant also, but the colour is very different, yellow, with purple ridges to the lip. Leaving, then, this last or yellow variety, out of the question (as it is a Madras plant), it seems to me that in *V. carulescens*, var. *Borallii* (which might with almost greater propriety be called *V. parviflora*), we have the first step in advance from my simple white variety, upwards towards “The blue Vanda,” *V. carulea*. The next step is made by *V. carulescens* as figured in *Bot. Mag.* 5834, called “The pale blue Vanda.” Here, the form of the flowers remaining very nearly the same, their size is again enlarged, and the general colour more nearly approaches to blue. (I follow the description, and not the plate, which is certainly pink and not blue.) The two ridges of the lip are here, and the form of the lip is like that of var. *Borallii*, except that the terminal lobes are rather more pronounced and the intermediate notch more distinct. The other differences are, that the leaves are rather broader, the spur is slightly incurved, and the raceme is drooping instead of erect. A farther advance in size and colour is made in another variety of *V. carulescens*, figured in the new series of “The Floral Magazine.” Here the flowers are once more considerably larger, and the general colour of a deep violet. The very same two ridges remain on the lip, but the bilobed apex with the intervening notch is yet farther developed. The breadth of the leaves has slightly increased, the spur is slightly more incurved, and the raceme, as in the preceding variety, is pendulous. But one step more, and that not a great one, and we arrive at “The blue Vanda.” In all the stages, colour and size have been the distinguishing characteristics rather than structure. Possibly, yet other and intermediate varieties remain to be discovered. There is a gradual development upwards, and it is difficult to draw the line for species; but if I were asked to draw it between the varieties described, I would do so above *V. carulescens* var. *Borallii* and below *V. carulescens*, *Bot. Mag.* 5834, calling the former *Vanda parviflora*, var. *Borallii*; for it certainly has more affinity of habit with my *Aerides Wightianum* (which we have said is a synonym for *V. parviflora*) than with the other vars. of *V. carulescens*. There is (and this is the point to which I would specially advert) a greater difference in habit and in form, to say nothing of colour, between *Vanda carulescens*, var. *Borallii*, and the extreme blue variety figured in the *Floral Magazine*, than there is between the several *Vandas* of the *Roxburghii* group; yet these last have received distinct specific names, while the first is counted but a variety.

#### V. TERES.

This species differs widely from all the foregoing. Its leaves are terete, or quill-shaped, distant, few, alternate, 6–8 inches long. The racemes, which are few-flowered, are opposite to a leaf, 6–12 inches long. The flowers are very large and handsome, of a prevailing rose colour, quite 4 inches across, with a large conical spur. Lip 3-lobed, lateral lobes forming a tube round the column, middle lobe broad and fan-shaped, bifid. The stem, which is single or branched, and of a dry woody nature, though only about  $\frac{1}{2}$  of an inch in diameter, often attains a great length, ascending to the tops of trees, from among the highest branches of which it loves to thrust its handsome blossoms into the full blaze of the sun. The roots

are sparse, long and tough like cords, and take a firm hold of the tree on which it grows. Found sparingly all over the provinces.

GRAMMATOPHYLLUM, Bl.

As but one species of this genus is known to me, and I have never had the good fortune to see it in flower, I will describe its appearance as far as I know it, borrowing the rest from another source.

It is a very large ("gigantic," Hooker calls it) epiphytal, caulescent Orchid. The stems (it is straining a term to call them pseudo-bulbs) are numerous, and take their rise from a huge dense tangled mass of short, branched, fine wiry roots, 3, 4, or 5 feet in circumference according to the size of the plant, they (the stems) are 4 or 5 feet long, 2 or 2½ inches in diameter, rather flattened, clothed for nearly their whole length with long, membranous, strap-shaped distichous leaves, which are close-set and sheathing at their base. Roughly speaking, they may be compared to large-sized sugar canes. This is all I can say of the plant from personal knowledge. The rest of the description is from the *Bot. Mag.*, No. 5157, under the head of *G. speciosum*, which species I feel nearly sure that it must be. After stating that the plant sometimes attains the height of 8 or 10 feet, and the leaves a length of 2, the description proceeds as follows: "Scape nearly the size of one's finger, from 4 to 6 feet long, radical, erect, terete, quite smooth, many-flowered. Flowers distant, expanding from the base upwards, each with a large, broad, concave bract, an inch long. Flower-bud 2½ inches long. Expanded flower nearly 6 inches across. Sepals and petals much spreading and slightly reflexed, broad oblong or subovate, yellow, richly spotted and blotched with deep red purple. Lip small for the size of the flower, 3-lobed, 1½ inch long; the lobes obtuse, the side lobes convolute over the column; the disk furrowed with three plates more elevated in the centre, marked with red streaks, and where the red streaks are the lines are ciliated; middle lobe entire. Column curved a little downwards, semiterete (half-rounded), and partially spotted with red."

This "Queen of Orchidaceous Plants," to which for grandeur nothing in East or West can compare (unless my plant should prove a new and distinct species), is a native of the Mergui Archipelago, where it grows on Betel-nut trees. For years I had gone to and fro between Maulmain and Mergui without seeing or hearing anything of it. As soon as discovered, I procured two or three plants and brought them to Maulmain. The climate, however, proved unfavourable to them, and they yearly became smaller, and never gave the slightest indication of flowering. The plant seems to require a continually moist atmosphere throughout the year, which it can obtain in and around the Straits (where it was first discovered), and may in some fair measure have also in the islands of the Mergui Archipelago, which, probably, is its northern limit. It is to be hoped some resident at Mergui may yet have the flowers brought in to him, and the plant be verified.

RENANTHERA, Lour.

A genus nearly allied to Vanda, but distinguished from it by having the lip jointed with the column instead of being continuous with it; and saccate in the middle instead of at the base. The flowers are widely expanded; sepals and petals generally narrow and linear, nearly equal, or, if there be a difference, the two lower or lateral sepals are the larger. Column short, erect. Pollinia of the usual Vandaceous character.

R. COCCINEA.

Stem many feet long, climbing up trees to a considerable height, simple or branched, sending out long wiry roots here and there, leafy at the termination of the branches. Leaves two ranked, thick and fleshy, varying in length and breadth, 6 or 8 inches × 1 or 2. Flowers red, very handsome, 2½ or 3 inches across, in a large lateral panicle. Lip small, striped with yellow, bagged in the middle, 3-lobed; side lobes rounded, erect; middle lobe ovate, pointed. Discovered many years ago in Cochin-China. Found by me only on the Moscos Islands.

AERIDES, *Lour.*

Caulescent epiphytes with two ranked leaves. Flowers in racemes or spikes. Perianth spreading or more or less closed. Sepals and petals nearly equal, the lateral sepals being often oblique at the base, and connate with the prolonged base of the column. Column short. Lip jointed with the claw of the column, spurred or bagged, 3-lobed; side lobes small, centre variously shaped. Pollen-masses 2, normal.

## A. VIRENS.

One of our most lovely Orchids, one, too, which must be well known to all collectors in Burma. It is very near to the old *A. odoratum*, but far finer. Leaves broad, blunt and depressed; flowers in long elegant drooping racemes, individually about an inch long, waxy, white, spotted with violet, deliciously fragrant. Sepals and petals obovate, obtuse. The lip terminates in a pointed, curved, and up-turned spur or horn, its 3 lobes are connivent, the side lobes being erect and toothed, and the middle incurved between them and serrated. All three close over the column and anther, completely hiding them, and when the lip is forcibly opened, it flies back to its closed position much as the flower of the Snapdragon does. I have often been amused by watching the humble bees and the difficulties they meet with in their efforts to get at the honey which lies inside the horn. A bee settles on a flower, and, after a laborious effort, succeeds in pulling back the lip, and thrusting his hairy body inside. Now, while he is in this position, his hinder legs only remaining outside, the force of the spring of the lip presses his thorax against the anther, and when he backs out, he rubs the anther hard and lifts it, detaching the whole pollen-apparatus, and he presently reappears with it sticking to his back by its glutinous gland. This irritates him, and he sets to work with all his might to rid himself of it, but, his labour is vain, the pollen-masses stick as fast as the old man of the sea on Sinbad's back; so he gives it up, and attacks a second flower, with a similar result. He has now two humps on his back, and he becomes infuriated, and his frantic struggles to rub them off are very amusing. He must be a bold bee who ventures upon a third flower. I never saw one succeed in rubbing his burden off, so glutinous is the gland. The scene ends by the bee flying away with his load, going home, I suppose, to invoke the aid of his brother bees in unburdening himself. This has always been the result of the visit of bees to this flower when I have witnessed it: they have carried off the pollen-masses. If such is the case, they can hardly aid in the impregnation of the germ, rather the reverse, and yet *A. virens* is one of the Orchids which ripens its pods most freely. Perhaps the flowers become self-impregnated when unmolested (as many must be, humble-bees notwithstanding) by the falling forward of the pollinia on to the stigmatic surface at a later period.

## A. LOBBII.

Another lovely species, smaller than the last. The leaves are narrower and curved, and the flowers more numerous and dense, on a single or sometimes branched, drooping raceme, which gradually tapers to a point. The flowers are more generally purple than the last. The "Fox-brush *Aerides*," *A. Fieldingii* of gardeners, must be a variety of this species.

## A. AFFINE.

Somewhat resembling the last, but known from it at a glance by its habit of growth. The leaves are more fleshy, scimitar-shaped, and generally folded inwards, and the raceme, which is shorter and has fewer flowers, is much more rigid, and instead of drooping gracefully, hangs down perpendicularly without any curve. The flowers are of a deeper rose colour than those of *A. Lobbiai*. All the three species here last mentioned are widely distributed throughout the Tenasserim Provinces.

## A. DIFFORME.

A small almost stemless plant, with broad, smooth leaves and a panicle of small yellow flowers, of no remarkable beauty as a whole, but of most singular and interesting form individually, and very difficult to describe. The sepals and petals are thrown back, the column is thrust prominently forward horizontally and has two

curved horns or hooks at its extremity. The lip hangs down perpendicularly from the base of the column to which it is but slenderly attached by a sort of short claw. It consists of two distinct parts, a *hypochilium* and *epichilium*, or back and front lip; the former has a rigid curved spur and 2 oblong side lobes above. The latter, which may be called the middle lobe of an ordinary labellum, is also but slenderly attached to the former just above the spur. Looked at sideways, it is square in outline; viewed in front, it is semicircular and has a fringed edge, while a tuft of very fine hairs ornaments the back part. I find the following note in pencil attached to my drawing made in 1863: "That this is *A. difforme* there can be no reasonable doubt, but it is a much smaller plant than the figure in the frontispiece of Lindley's *Sertum Orchidaceum*, and possesses none of its fine colouring. Experience, however, shows that Orchids are much given to vary in size and colour according to locality, though tolerably true to form and habit."

#### SACCOLABIUM, Bl.

A genus so closely allied to *Aerides* that it is difficult to lay hold of a really satisfactory distinction. I look in vain for anything tangible, or that will hold good in every instance. Lindley, in his analytical table of genera, where he naturally seizes upon that point which most readily admits of distinct contrast, makes the difference to consist in the attachment of the lip, which in *Aerides* is affixed to the *lengthened*-base of the column, whereas in *Saccolabium* it has "very little connexion with the column." This, I presume, means much the same thing as to say (as Bentham has it in his recently published "Notes on Orchideæ") that *Aerides* has a "*mentum*" and *Saccolabium* has *no mentum*;<sup>1</sup> but this distinction is very slight, and in a variety of species not so easily determinable practically. Lindley does, indeed, in his after definition of the two genera, make another distinction in the *form* of the lip, which he makes *3-lobed* in *Aerides*, and *undivided* in *Saccolabium*. But, unfortunately, this will not hold good, for some species of (so-called) *Saccolabium* have as distinctly two side lobes to their lip as some species of *Aerides*. Neither does the form of the "*sac*" or spur (call it which you will) furnish any reliable distinction (though one plainly aimed at in the name): for, though the bag-lipped form is well illustrated in some species, e.g. in *Saccolabium calceolare*, and a small group closely allied to it, there are other species (so named) in which the appendage takes the ordinary *spur*-shape of *Aerides*. Nor (as far as my experience goes) is it distinctive of *Aerides* to have the spur "turned upward on the back of the labellum" (Bentham, p. 333), for there is a tendency in that of some *Saccolabia* to take the same direction, e.g. *Saccolabium ramosum* and others.<sup>2</sup> When, to all that has been said, it is further added, that there is hardly a *Saccolabium* which has not been called *Aerides* (while some have even received the name of *Vanda* and *Sarcanthus*), and that some of the species have probably not yet found their final resting-places, it will, I think, be admitted, that the task of satisfactorily defining genera is by no means an easy one. Species 14.

#### S. GIGANTEUM.

A species not to be confounded with any other, when once seen. Leaves very broad, 2-3 inches, fleshy, streaked, short comparatively, a foot or more, unequally two-lobed at the end. Stem simple or branched, short and stout, sending out thick fleshy roots. Flowers in a dense drooping raceme, very numerous, moderately sized, white, with a purple lip, and a few lilac spots on the petals. The lip is flat, turned upwards, and has 3 lobe-like divisions at the end. A noble species when seen in perfection in its native wilds, but ill suited for cultivation in hot-houses at home, owing to the room it requires and its extremely slow growth. Abundant about Toung-ngoo and elsewhere in the North; but, not found, I believe, in the Tenasserim Provinces.

<sup>1</sup> The "*mentum*" of an Orchid is the prolongation and bending forward of the column, in the way of a "*chin*," a feature specially noticeable in the genus *Bulbophyllum*.

<sup>2</sup> *Saccolabium Huttoni*, Bot. Mag. 5681, which is surely a typical *Aerides*.

*S. BLUMEL.*

Too well known in Burma to require an elaborate description here. The leaves are strap-shaped, a foot or more long and 1 inch or so wide, terminating abruptly, truncate and crose (*i.e.* with several irregular points). Flowers numerous, small, crowded in a long beautiful pendulous raceme, covered all over with lilac dots. Lip flat, turned upwards, parallel with the column. Spur blunt, flattened laterally, and slightly curved backwards. Widely distributed and abundant. This plant bears the same sort of relation to the old *S. guttatum* which *Aerides virens* does to *A. odoratum*, being, in fact, little, if anything, more than a fine variety of the same.

*S. CURVIFOLIUM.*

Stem short. Leaves long, narrow, curved, channelled, through being folded inwards, obliquely bidentate on the point. Racemes from the axils of the higher leaves, erect or slightly drooping, 4 or 5 inches long. Flowers numerous,  $\frac{3}{4}$  inch across, of an orange-red colour, with an orange-yellow lip. Sepals and petals ovate, equal, spreading. Lip small, oblong, with two small erect lobes on the base. Spur drooping, linear, swollen at the base. A showy Orchid, very abundant in the Tenasserim Provinces. This is *S. miniatum* of the *Botanical Magazine*. Every intermediate form of leaf between *S. miniatum* and *S. curvifolium* may be found.

*S. AMPULLACEUM.*

In general character very much like the last, but of shorter and denser growth; in shape of flower also similar, but the flowers are of a beautiful rose colour. In our Tenasserim plant the leaves are short, straight, and rigid, commonly stained with purple, not long and curved as they are in *S. curvifolium*, but they probably vary according to locality. The colour in *Bot. Mag.*, tab. 5595, is represented as lilac, though said in the text to be "*rose*," which they are. Local, but sometimes abundant where found, appearing to affect open arid jungle and small trees.

*S. CALCEOLARE.*

This species answers truly to its generic name of bag-lipped. It is a small plant, with a very short stem, the whole not more than about 6 inches in length, bearing a few leaves which are sheathed at the base, linear-oblong, bifid at the end, the two points being unequal and very acute. The flowers, which are few in number, are borne in a sort of umbellate raceme and form a roundish head on a short thick foot-stalk. The sepals and petals are oblong and blunt, being, indeed, rather broader at the end than at the base (or spatulate), spreading, but slightly curved forwards, yellow. The lip is simply a large inflated pouch with a semicircular lamina or plate in front, beautifully fringed. The colour of the pouch, is white at top and orange-yellow at bottom, the lamina and fringe white, but there are some bright red or purple spots on it, as there are also on the edge of the pouch and base of the very short column. From the top of the column and just below the anther a large two-lobed rostellum projects, in which the gland of the pollinia lies. *Saccolabium denticulatum* answers to the same general description, but is totally different in colour, somewhat also in form. I observe that the pollen-masses in this latter plant are hairy, a circumstance I have never noticed in any other orchid. They are so represented in my drawing. The former plant I found at Mergui, the habitat of the latter I forget.

## SARCANTHUS.

A genus of Vandaceous epiphytes varying much in appearance. Some have the ordinary flat leaf and short stem, and others a long slender stem, and terete or quill-shaped leaves. The flowers are small, but highly coloured, on leaf-opposed racemes. The sepals and petals are of a uniform shape and size, spreading; they have a fleshy 3-lobed lip, jointed with the column and spurred, the spur being partially divided internally. The Pollen-masses are of the usual Vandaceous type, but (if the species are all rightly placed) the stipes and gland vary much in form and size. I find, in *every* species, situated at the back but upper part of the spur, below the column, a bilobed fleshy appendage or callus. This varies in shape in different species, but is constant

in being 2-lobed, and, I think, may be relied upon as a sure and distinguishing character of this genus. Other genera, hereafter to be mentioned, have a callus in or near the same part of the spur, but in no case, as far as I have seen, is it 2-lobed. Species about 12.

*S. ERINACEUM.*

A pretty fleshy-leaved species, with stems only a few inches long. The leaves are lanceolate and pointed. The flowers are white, suffused with pink, and have a fleshy incurved pointed lip of a deep rose colour. They hang down in elegant racemes, varying from 3 to 6 inches. The rostellum, or beak of the column, is prominent. The pods are covered with short rigid hairs, hence I gave the plant the name of *S. dasycarpon* (shaggy-fruited), not "*dasypogon*" (shaggy-bearded), as erroneously stated in the *Botanical Magazine*, but it pleased Professor Reichenbach to change the name to its present one, derived from Pliny's word for hedgehog, a name of which I admit the equal fitness with my own, though not a greater. The flower-stem or rachis, and the exterior parts of the flower, are similarly clothed with hairs.

*S. LAXUM.*

Similar in general character to the last, so much so that one description might almost answer for both. The leaves, however, are more fleshy still, being, indeed, of a very remarkable thickness, about  $\frac{1}{2}$  inch thick and linear, with an unequally oblique termination. They are generally stippled on the under-side with greenish-purple. The flowers, which much resemble those of *S. erinaceus*, have the lip of a deep ruby-red, and a very prominent column and beak, which, together with the outspread sepals and petals, give them the appearance of tiny birds poised in mid flight. The pollen-gland of these two, as of the other flat-leaved species, is very small, and the stipes very long and slender. It seems to be rather rare, and when found by me it has always been on the boughs of small trees overhanging mountain streams, which I happened to be crossing. It is nicely figured in "*Saunders refugium Botanicum*," tab. 109.

*S. TERETIFOLIUM.*

This is a long slender pendulous plant, sometimes as much as 4 feet long. Leaves few, distant, all inclining to one side, terete, about the thickness of a crow-quill, and 6 to 8 inches long. Flowers small— $\frac{1}{2}$  inch across—distant, numerous, on a pendent raceme 8 or 9 inches long. Sepals and petals reddish-brown. Lip and interior of flower lilac, spur slightly 2-lobed.

*S. WILLIAMSONI.*

Another terete-leaved species, but of erect growth, with shorter and stouter stem and leaves, about the thickness of a goose-quill. The racemes, however, are slenderer, simple or branched, and the flowers rather more numerous and smaller. Sepals and petals pale salmon colour, lip lilac with deep ruby-red side-lobes.

*S. APPENDICULATUM.*

This is *Aerides appendiculatum* of Wallich (Lindl. Gen. and Sp. p. 242). It is also a species with terete leaves, stem erect, simple or branched, leaves about 4 inches long. Raceme curved and drooping, 15 or 16 inches long, flowers on the last third only,  $\frac{3}{4}$  inch across. Sepals and petals spreading and reflexed, nearly equal, linear-oblong. Lip 3-lobed with a pointed middle lobe and a conical spur. Colour, red-brown stripes on a yellowish ground, lip yellow and purple, also striped behind on the spur.

This plant received its name in consequence of a peculiar appendage, "*callo magno tabulari a dorso calcaris projiciente*," Lindley, inside the lip. It was the discovery of this plant in 1856, at "*The Three Pagodas*," and the observation of this singular appendage, together with the fact that notice of it was taken by Lindley (and so I was enabled unmistakably to identify the species), that led me to pay special attention to similar appendages, and to note their presence or absence, and accurately to draw their varying forms.

The result of my observations is much as follows. In all flat-leaved *Sarcantha* I find them, and always 2-lobed, or in some forms bipartite throughout, generally divaricating upwards. I find them also in the three terete-leaved species last described, but here they differ in shape from those in the flat-leaved species, though similar in the three; in all of which (though again not *identical* in outline) they are of one common type. The upper part is flat, semicircular, and undivided, resting on a narrow slightly bilobed base. I find a similar appendage again in *Cleisostoma*, but here it is simply a flat lamina, rounded in outline or more or less quadrate. This, I presume, is the "tooth" to which Lindley alludes in his definition of the genus where he says "*calcare dente clauso*." I further find an appendage agreeing with that of *Cleisostoma* in a small and obscure plant which Prof. Reichenbach has named "*Saccolabium bipunctatum*," but which I had ventured to name *Ceratochilus*; and, indeed, whether this genus of Blume be a good one or not, I cannot but think still that it is a *Ceratochilus* according to his definition, and that it may even be his *C. biglandulosus*, so remarkably does it agree with his characters at all points. Lastly, the genera *Thrixspermum* and *Appendicula* are also furnished with appendages, but they are either of a different character or in a different position.

#### CLEISOSTOMA, *Bl.*

Plants with distichous leaves, caulescent. The flowers are small and of little beauty. The distinguishing mark is that the baggy spur or pouch is closed by a large projecting tooth, described above, and has no partition. Species 2.

Bentham, in his "Notes," says, "*Aerides* (*Sarcanthus*) *appendiculatum* is a *Cleisostoma*." This may be; for the group of genera *hereabouts* is in great confusion, and it needs a master-hand to re-arrange them at once naturally and intelligibly, though, I fear, not a few will steadily refuse all artificial classification; I say, '*this may be*'; but, if so, then I think *Sarcanthus filiforme* and *S. Williamsoni* should go along with it, for in both, the callus or appendage which projects into the cavity of the spur, is met by a projecting lump on the opposite side, and thus the entrance is closed. My drawings distinctly show this, for they include longitudinal sections, though I unhappily omitted to make a similar section of *S. appendiculatum*. And this closing of the spur by the "tooth" or appendage is of the essence of the genus. Against this, however, is to be set the fact that in both these species the spur is partially divided by a membrane, which, again, is said to be the special mark of *Sarcanthus*, although, once more, in some instances I have not been able to detect this. In all my remarks, I must be understood to speak of Burmese Orchids only, known to myself.

#### CAMAROTIS, *Lindl.*

A small genus of slender climbing epiphytes, with long narrow linear leaves, and small flowers on leaf-opposed racemes. They have a long rostellum, and a fleshy incurved lip, and have much the appearance of *Sarcanthus*. *C. purpurea* is a very pretty species with purplish-lilac flowers. It must be rare, as I was twenty years in Burma before I found it, and then only one plant. It was discovered in Silhet many years ago. *C. obtusa* may be described as a pale pink variety of the same, which is distinguished by having the rostellum or beak turned at right angles to the column. Species 3.

#### THRIXSPERMUM, *Lour.*

This genus consists of a small number of caulescent epiphytes with distichous leaves, short woody stems, which emit a great number of wiry roots. The flowers are small and few on a rachis, which assumes various shapes, sometimes round, sometimes flat, but always more or less swollen and fleshy. The flowers are marked by a 3-lobed lip with a thick and solid middle lobe, articulated with the prolonged mentum or base of the column. The pods are long and cylindrical, open longitudinally by one valve, and are full of silky hair in which the seeds are enveloped. Species 5.

ACRIOPSIS, *Bl.*

Pseudo-bulbous epiphytes. Bulbs aggregate, about the size of a hazel-nut, terminated by two long slender, linear, pointed leaves. Flowers numerous, very small, in racemes or panicles on a long slender curved radical stem. They are remarkable for being *tetramerous*, i.e. the perianth has only four segments—two sepals and two petals. Pollen-masses 2, fusiform. Species 2. *A. Indica* has almost colourless pale-green flowers, and is more striking when in fruit. Its *pod*s freely, and the pods are of the size of a currant and golden-yellow. Flowers in a panicle. Those of *A. picta* are rather larger, coloured, and in a raceme.

THELASIS, *Bl.*

Pseudo-bulbous epiphytes. Bulbs terminated by a single leaf. Flowers very small on a radical scape. Pollen-masses 8, on a long slender stipes with a narrow elongated gland. Worthless obscure plants, from the ordinary point of view, but highly interesting from the botanical standpoint. Species 2.

APPENDICULA, *Bl.*

Small caulescent epiphytes, with hard woody stems a few inches long and remarkably flat bifarious leaves, the sheathing bases of which overlap each other alternately on the stem. Flowers *minute*, either in elongated spikes or crowded in small heads at the end of the stem. The pollen-masses are 8, and they have this peculiarity, that they have no *caudicle* in the sense in which Lindley uses the word, no *stipes* in Bentham's sense, but they taper gradually after the manner of *Calanthe* and *Limnæodes*, and are attached by their slender ends (which Bentham calls *caudicles*) to the gland, which I find is round or ovate and pointed. A similar remark to that made on the last genus may be made also on this. Species 2.

PODACHILUS, *Bl.*

Another genus of inconspicuous Orchids. Stems caulescent, a few inches long, leaves close-set and bifarious. Flowers most minute, sometimes no bigger than a large pin's head, solitary or spiked, generally terminal. The pollen-masses are 4, attached, in pairs, by 2 stipites (*caudicles* of Lindley), to a common gland, which is ovate and pointed. This is true of *P. cultratus*. But in *P. lucescens* I find 2 stipites with 4 pollen-masses seated on their *united connivent summit*, but *no gland*, and the stipites are divergent at the base! Altogether the structure of the *Pollinarium* in this genus is remarkable to a degree, and can only be shown properly by elaborate and highly magnified drawings, such as I have made from living plants. Species 3. The flowers of this and the two preceding genera have spurred or pouched bases, and are closed instead of spreading.

## Tribe IV. OPHRYDEÆ.

ACERAS, *R. Br.*

Terrestrial herbaceous plants with short leafy stems and fleshy fascicled roots with 1 swollen tuber. The flowers are small and of a dull colour in terminal spikes. Anther erect, 2-celled. Pollen-masses 2, with separate caudicles, but only 1 common gland. Species 1.

The Orchids of this and following genera, included in the tribe Ophrydeæ, are all terrestrial, and resemble in general appearance the Orchids of our home woods and pastures. The structure of the anther and pollen-masses differs much from any hitherto described. The former is no longer an easily detached lid or cap, but a firm and fixed part of the column, with two very distinct cells opening vertically by long slits or sutures. The pollen-masses, again, instead of being hard and waxy, consist of a number of small grains which cohere by means of an elastic cobwebby substance, and taper into a point below, and end in a gland. This extended or tapering portion is the true *caudicle*, so called by Bentham and by Lindley also, and it is a part of the

pollen-mass itself. It differs entirely from the so-called caudicle of Vandææ, which is no part of the pollen-mass, and to which Bentham prefers to give the name *stipes*. The Ophrydeæ are mostly Orchids of temperate or sub-tropical regions; evidently, however, not confined to them, as our ever-widening knowledge of this Order serves to prove. *Aceras anthropophora* is common in our English woods. Our solitary Burmese species, *Aceras angustifolia*, was first (I believe) found in Simla and elsewhere in Northern India. Wight, who figures it among his "*leones*," says, "This genus has not yet been found so far South," meaning, I suppose, as Madras. We have now brought it nearly as far South. It is a mean plant, but interesting in this fact, that it is so far separated from its congeners.

#### GYMNADENIA, *R. Br.*

As the object proposed in these "Notes on the Orchids of Burma" (as they may be called) is rather to make the subject popularly intelligible than to affect scientific accuracy, and as the distinctions between the different genera in this Section turn on minute and purely technical points, I shall omit them, and confine myself to a short and familiar description of a few of the most notable species.

##### G. SESAMOIDES.

A common terrestrial Orchid about Maulmain and Martaban. It is about a foot high and has a leafy stem, the leaves of which are little more than scales below, growing larger upwards. The flowers are solitary in the axils of the leaves, and of a large size,  $1\frac{1}{2}$  inch long. The sepals and petals are connivent, *i.e.* adhere together on the upper side of the flower, pointed, with upturned ends. The lip is very large, pure white, very broad when expanded, but in its undisturbed state convolute, undivided, and furnished with a spur behind. The roots are fleshy with 1 round bulb. Another species is equally or even more abundant, and is distinguished by a narrower lip and its varying colour, which is green, or lilac, or deep purple. This is *G. Helferi*.

#### PERISTYLUS *Bl.*

##### P. CONSTRICTUS.

A tall stout terrestrial Orchid, often 2 feet or more high, with large, broad, stem-clasping leaves and a dense spike of numerous pure white flowers, intermingled with long lanceolate bracts. The lip is trifid, and has a small, round, almost detached, scrotiform pouch at its base. Also common during the rains in the neighbourhood of Maulmain. Roots fleshy and fibrous, with a large bulb. There are 3 species of this genus.

#### PLATANThERA, *Richard.*

##### P. SUSANNÆ.

A very handsome and apparently a very rare terrestrial Orchid. Stem, a foot or more high, leafy, terminated by 4 or 5 pure white flowers of very large size, with an immensely long spur. The flowers of the plant found by me (I never found but one) were 3 inches across, and the spur 4 inches long only, but Wight, who figures it in his *Leones* (for it is also found in the Pulney Hills) represents it as  $4\frac{1}{2}$  inches across with a spur "twice its length." He calls it a magnificent species, and adds: "I have never met with it except once." The sepals are very large and broad, the petals very narrow and acute. The lip is 3-parted, the middle lobe being straight and linear, and the side lobes broad and laciniated, or deeply jagged. I may note here once for all that these terrestrial Orchids must be sought for in the rains, when only they flower. They die down at the approach of the dry season, when they are kept alive, as our European species are in the winter, by their underground bulbous root. *P. Susannæ* is also a native of Java, China, and Nipal, and is a plant that has been long known to botanists, having been called *Orchis Susannæ* by Linnæus himself.

HEMIPHILA, *Lindl.*

## H. CALOPHYLLUM.

A small terrestrial Orchid with a single broad ovate pointed leaf, which is most beautifully marbled. Root, a single ovate bulb, with several fleshy rootlets above it. Stem solitary, 6 or 8 inches high. Flowers 5 or 6, about an inch apart and an inch long, supported on pedicels (the germ) of the same length, each subtended by a small bract. The upper sepal and the two petals are erect and connivent, being arched over the column and anther, forming a sort of hood to them, as in some *Habenarias*. The lateral sepals are expanded and reflexed. They vary in colour from white to pink. The lip, which is  $\frac{3}{4}$  inch long and deep violet, is broad, ovate, slightly truncate, wavy at the margin, and produced into a spur behind. A very beautiful little plant. It is found on the limestone rocks which abound in the Tenasserim Provinces.

HABENARIA, *Willd.*

An extensive and widespread genus of terrestrial Orchids. They are found in Europe, Asia, and Africa. *Habenaria bifolia*, or "The butterfly Orchis," as it is called, is sufficiently common in our English woods to be familiarly known to very young botanists. Their general aspect is very similar, wherever found. They are commonly about a foot or 18 inches high, and have a leafy stem terminating in a spike of sessile white or yellow flowers, and a large bract under each. The sepals and petals are nearly equal, but the petals, if anything, the smallest. Lip almost always 3-lobed, often with its segments much elongated, or cut into fringes. The root is tuberous; sometimes one, sometimes two may be found, according as the last year's tuber has decayed sufficiently to fall off or not. There are 16 species enumerated in my list, and, no doubt, there remain many more yet to be discovered.

## Tribe V. ARETHUSEÆ.

## GALEOLA.

## G. HYDRA.

A very remarkable Orchid indeed, found once by me, and once only, in the year 1859, far away in the jungles near *Ko-tsay-ko-gwen* or "99 islands." It is entirely leafless, of the thickness of a small rattan, or, say, the little finger, and scrambles up and over trees to an indefinite length. My specimen was about 30 feet long, but Lindley speaks of it (or a similar species) as being "50 to 120 feet long." The colour of the stem is reddish-brown and the place of leaves is supplied by stiff leathery scales, at long intervals. It supports itself by aerial roots, and its flowers are in racemes, of a yellow colour, and, as far as I can recollect, about 1 inch across. It was in my early days of botanising in Burma that I found it; I had no drawing materials with me, and I was so loaded with new and strange things, that there was no time to do more than roll it up just as it was, in a coil as one would a rope, take it home, and finally send it to Kew. The structure of the flowers, therefore, is unknown to me, except as I read it in Prof. Reichenbach's printed notes. I took the plant at the time to be *Erythrorchis scandens*, Bl. and I do not even now know wherein *Galeola* differs from *Erythrorchis*.

VANILLA, *Plumier.*

## V. PARISHII.

I had the good fortune to find, in the same jungles, though not on the same occasion, a species of *Vanilla* which Prof. Reichenbach named after me. *Vanilla*, like *Galeola*, has a thick cord-like stem which climbs up and over trees and hangs down in festoons from them. It is leafy, however (one species excepted), the leaves being ovate, oblong, pointed and very green and fleshy. It attaches itself firmly to its support by short thick, fleshy roots. I had three species growing for many years in a shady part of my garden in Maulmain. I erected a large trellis for them which they soon covered with a tangled mass of vegetation. Nothing could be more rampant than their growth. Although I could not distinguish one from another when out of

flower, the flowers of all three were very different from each other. I received cuttings from Calcutta, being determined to experiment on Vanilla-pod growing. There was no difficulty in getting pods, for all my three species flowered profusely; the difficulty was to ripen and dry them, in which I signally failed. The pods, after growing to their full size, invariably fell off while yet green, and my attempts to dry them never got beyond producing black, leathery, soft, *slug-like* things with a smell of prunes, and the faintest possible taste of "Vanille." I am speaking here of the true species, or what was sent to me as the true species, which is supposed to produce the "Vanille" of commerce, *Vanilla planifolia*. The pods of this species succeeded with me no better than the others. I do not know why they so persistently fell off, as my plants were in the most robust health; but, so it was, that the ground was strewn with them every morning, which so disgusted me that at last I gave up paying any attention to them; when, of course, they flowered no more. To explain the reason of this, I may here say that, in the Vanilla flower, there is found between the anther and the stigmatic surface a projecting membranous flap which effectually prevents the pollen-masses from reaching that surface unless they are assisted thither by external aid. It was, therefore, necessary for me to go round every morning and impregnate all my flowers mechanically—*every* morning, for they only last one day—and the process was this: with a small pair of suitable pincers, thin but blunt and broad at the points, I seized the intervening flap described above, and tore it away, taking care not to disturb the pollen-masses. This done, I pressed the anther with the point of the pincers, so as to force the pollen-masses down upon the stigmatic surface. I soon got quite expert at this operation, so as to do several flowers in a minute, and I do not think that I ever failed in my object, *viz.* successfully impregnating the flowers. In nature, this result is said, or supposed, to be brought about by the agency of some insect. I am not aware if the insect be known to scientific men. Certainly, no insect was ever obliging enough to perform the operation for me, and indeed, I am at a loss to understand how any but a very strong insect, and the same acting of deliberate purpose, can perform it, so tough is the flap that has to be removed, and so closely does it cover the stigmatic surface.

#### POGONIA, *Juss.*

A small genus of terrestrial Orchids with round tubers, 1 to 1½ inch in diameter, which have short rigid papillæ (roots?) projecting from their surface at all points. The flowers are borne either singly or in loose drooping racemes on a leafless scape, which springs from the centre of the bulb, and is a few inches high, and has several sheathing scales. After this flowering scape, and when the flowers are faded, a solitary leaf appears, which takes its rise either at the base of the flowering scape and close to it, or a little way up, and also has sheathing scales at its base. The flowers, which vary from 1 to 2 inches in length, and are generally drooping, have long lanceolar, nearly equal, sepals and petals, which are free, but connivent (rarely expanded). The lip is long, undivided, or slightly 3-lobed, parallel with the column, and convolute round it, occasionally with a very short blunt spur. The column is also rather long and somewhat club-shaped, and terminated by a lid-like anther. The pollen-masses are 4, granular, long and tapering, without a gland. The leaves are large, rounded and heart-shaped, many-nerved and plicate, or fan-like. In one species they are smooth and green; in a second clothed with tawny hairs; in a third copper coloured; and in a fourth dark green, with a purple-black spot between every nerve. The flowers also vary much in colour, being green, or of different shades of white, pink, or purple. The germ is very short: I have never seen the fruit. They are propagated (as Roxburgh correctly says) by suckers from the petiole (leaf-stalk) just below the ground. The flowers come up in the rainy season, the leaves *after* the rains; consequently it is not easy to secure them. The best way is to dig up the roots and plant them in the garden. I have found 5 species, one very pretty, with a 2-flowered scape and flowers which have a rose-coloured lip, green at the base. Sepals and petals also pink and expanded. I have not seen the leaves, and have only a drawing of it. I have named it provisionally *P. pulchella*; it is my No. 322.

Tribe VI. *NEOTTEÆ*.

Of this section, although we have several genera in Burma, I must restrict myself to the mention of two—*Monochilus* and *Anactochilus*.

*MONOCHILUS*, Wall.

These two genera, although terrestrial, may be almost said to be also epiphytal, for they rest but lightly upon decayed leaves and sticks, together with which they may be lifted, having no real attachment to the soil. They are small plants, but a few inches high, with a thick nodose succulent rhizome, or root-stock, of 1 or 2 inches in length, one end of which turns up and becomes the flower-stem, and from the under-side of which issue small rootlets attaching them to the decayed vegetation. Their flowers, though botanically interesting, are of no beauty—their attraction lies in their leaves, some of which are extremely lovely, both for their colouring and the exquisite veining on their upper surface. They are much prized in England, and are carefully grown in hot-houses under bell-glasses, as they require an atmosphere abundantly charged with moisture to keep them alive. This is the reason that they cannot endure the plains in Burma, but affect the mountains, where the air is cooler and the atmosphere much more moist all the year round. I must have seen several species, but they nearly all slipped through my fingers, on account of the difficulty of preserving them alive in my hurried mountain journeys. Hundreds of beautiful things of the frail, succulent sort, not Orchids only, but other flowering plants, await discovery by the happy man who shall only have the opportunity and the resolution to pass a rainy season in the mountains. Among the most beautiful species known are *Monochilus regius*, a Ceylon plant, possibly to be found in Burma; and *Anactochilus selaceus* and *Dawsonianus*, which are found in its forests. Species ascertained of the two genera about 6 or 7. "*Monochilus* differs from *Anactochilus* in the absence of a spur, and in the adhesion of the lip to the column."—Lindley.

## B. Anthers two.

Tribe VII. *CYPRIPEDÆÆ*.*CYPRIPEDIUM*, L.

The plants of this last tribe differ remarkably in their fertilising apparatus from the rest of the order. I shall confine my remarks, however, to one genus, viz. *Cypripedium*, as I am wholly unacquainted with the other two or three genera which go to complete the tribe. We have no longer a lid-like or operculate anther here, as in our old familiar acquaintances *Dendrobium* and *Vanda*, nor an erect rigid anther opening by two slits as in *Habenaria*, no more pollen-masses of the ordinary type, waxy or granular, free or attached to stipes or gland, and always easily detached from the column; but something wholly different. As you look into the flower, all you will probably see is a large flat fleshy appendage to which you cannot give a name. If you want to examine the mysteries of the interior, you must open the flower and look behind this same appendage. Then all that is to be seen will be revealed. The structure is as follows: Theoretically there are 3 anthers, though practically, or apparently, only 2. "The column is short, bearing 2 perfect anthers" (the 2 rounded bodies visible beneath), "one on each side of the rostellum or style; the dorsal anther (the only one in other Orchideæ) is here usually reduced to a variously shaped barren *staminodium*" (the aforementioned strange appendage); "the rostellum or style is more or less prominent or elongated between the lateral anthers, and dilated at the end into a more or less oblique stigma."—*Bentham*. The genus is not confined to tropical regions, but extends into the colder temperate parts of the world, being found in Europe and N. America. The species found in the latter are terrestrial, those in the former mostly epiphytal. Species 3.

## C. CONCOLOR.

A dwarf terrestrial species. Leaves 5 or 6, or more, ovate, oblong, blunt, beautifully mottled above, with two shades of green, purple underneath, 4-5 inches long. Flower-stalk short, purple, 2-flowered; with a large bract at the base of the germ.

Flowers large, yellow, speckled with small red dots, 2 inches or more across. Upper sepal very broad, nearly round. Lower sepal very similar, but not quite so broad. (It should be mentioned here that it is a feature of *Cypripedium* to have the two lower or lateral sepals connate or united into one.) Petals broad, oblong, blunt. Lip, as in the genus generally, saccate, with the edges turned in.

Of the two excellent figures of this plant, one in *Bot. Mag.* t. 5513, and the other in *L'illustration Horticole*, 1865, t. 444, I give the preference to the latter, as, in it, the markings on the leaves are more carefully drawn and are truer to nature. It grows abundantly in large patches in the hollows of the limestone rocks which form so striking a feature in the scenery round about Maulmain. These hollows are commonly filled with light, black and well-drained vegetable mould. *C. concolor* affects such soil as does *Limatodes rosea*, and as do also many other beautiful plants, besides Orchids, which I could name. I discovered it in such a place at "The three Pagodas" in the year 1858. There is a similar species from the Straits with pure white flowers, *C. niveum*, which, although the flowers are not so large, is, in my opinion, a more elegant plant.

#### *C. villosum*.

An epiphyte, and a larger plant than the preceding. Leaves numerous, about 1 foot long by 2 inches broad, linear, flaccid, pointed, dark green, the lower ones stained with purple underneath. Scape 6-8 inches high, villous, as is the germ and all the exterior part of the flower. The flowers are 3 or 4 inches across, green outside, dark chocolate inside. Upper or dorsal sepal spatulate, *i.e.* expanding upwards from a narrower base, arched, concave. The lateral sepals obovate with a tapering base. The lip, which is of the usual form, is the same colour as the other parts of the flower, but of a much lighter shade. A very handsome species, growing in large tufts on trees. Found on Dauna-toung, East of Maulmain, but scarce. Abundant on the mountains of Toung-ngoo, about 4000-5000 of elevation.

#### *C. Parishii*.

Also an epiphyte. Stem and leaves together a foot or even 18 inches high, the latter 2 inches broad, dark green above, lighter underneath, linear and cleft at the end. Scape, 18 inches to 2 feet high, villous, 4-5 flowered. Bracts large, green. Sepals pale green, striped, broad, ovate, pointed, 2 inches long. Petals long, narrow, 4-5 inches, and twisted, pendulous, much expanded, upper portion green, lower dark purple with a green margin. The edges are waved and crisped, with, here and there, warty protuberances with a pencil of hairs. Lip sometimes green, but oftener, when of robust growth, of a dark purple tinge. First found in 1858 on the Shan border S.E. of Maulmain, but not there abundant, more so, apparently, northwards.

P.S.—The following supplementary list has been kindly furnished me by Mr. Low, of Clapton, since I wrote what goes before.

1. *BULBOPHYLLUM ALOPECURUM*, R. fil.
2. *ERIA TRILOPHOTA*, Lindl., a variety of *E. obesa*. "Flowers larger and the lower part of the lip very gradually passing into the upper. Flowers pure white with a lemon-coloured lip, marked by three longitudinal purple elevated lines."—Lindl. Journal of the Proceedings Linn. Soc. vol. iii. p. 34.
3. *DENDROBIUM LUBBERSIANUM*, R. fil. Gard. Chron. 1882, Ap. 8, p. 460, "in growth like a smaller *D. FORMOSUM*."
4. *DENDROBIUM CRASSINODE*, var. *BARBERIANUM*, R. fil.
5. *D. CRASSINODE*, var. *ALBIFLORUM* or *CANDIDUM*, R. fil.
6. *D. SUAVISSIMUM*, R. fil.
7. *D. MARMORATUM*, R. fil.
8. *D. WARDIANUM*, var. *WATSONI*, R. fil.?
9. *D. WARDIANUM*, var. *ALBUM*, R. fil.?
10. *D. BENSONIE*, var. *XANTHINA*, R. fil.
11. *CELOGYNE BRACHYPTERA*, R. fil. (near *C. lentiginosa*) in Gard. Chron. 1881, July 2, p. 6.
12. *LIMATODES LABROSA*, R. fil.

13. *THUNIA MARSHALLI*, R. fil.

14. *SPATHOGLOTTIS Plicata*, Blume. Lindl. Gen. and Sp. Orch. Pl. p. 119.

Lindley gives *Java* and *Penang* for this plant. Nothing is more likely than it should be found in Burma also, though Mr. Low may possibly have received it from the Straits, ascribing it through error to Burma.

15. *SPATHOGLOTTIS ALBA*, R. fil.?

16. *LUSIA*, sp. (EMARGINATA?).

17. *AERIDES LARPELLE* (?).

18. *SACCOLABIUM INTERMEDIUM*, R. fil. "near *S. bigibbum*." Another variety of the *S. calceolare* group, which seems to be only "constans in levitate." It appears to be almost impossible to find two plants alike in this group, and that, if only two could be fixed upon as the extremes at either end, the name *intermedium* might be applied to all the rest. Since writing my observations under the head of *S. calceolare* I received a living specimen from Mr. H. Veitch of *S. bigibbum*, said by him to be the plant so named by Prof. Reichenbach himself. On comparing the flowers with the figure of that species in the Bot. Magazine, I found that they did not agree with it either in form or in colour, but rather with the figure of *S. denticulatum*. On drawing his attention to this, Mr. Veitch writes me, "The flowers vary very much, and next year, if all is well, I will send you flowers *as light* as those figured in Bot. Mag. and *darker* than those I sent you last week."

19. *SARCANTHUS HINCKSIANUM*, R. fil.

20. *CYMBIDIUM COCHLEARE*, Lindl. Journal Linn. Soc. vol. iii. pp. 28, 178.

21. *VANDA CERULESCENS*, var. *LOWII*, R. fil. See my remarks under head of *V. cerulescens*.

22. *VANDA VIPANI*, R. fil. Gard. Chron. 1882, July 29, p. 134.

23. *CYPRIPEDIUM BOXALLII*, R. fil.

## ORCHIDS.<sup>1</sup>

"Where Java's Isle, horizoned with the floods,  
Lifts to the skies her canopy of woods;  
Pleased *Epidendra* climbs the waving pines,  
And high in heaven the intrepid beauty shines,  
Gives to the tropic breeze her radiant hair,  
Drinks the bright shower, and *feeds upon the air*.  
Her brood delighted stretch their callow wings,  
As poised aloft their pendant cradle swings,  
Eye the warm sun, the spicy zephyr breathe,  
And gaze uncenvious on the world beneath."

Erasmus Darwin's *Loves of the Plants*, Canto iii. 391.

## AN ENUMERATION OF BURMESE ORCHIDS SYSTEMATICALLY ARRANGED.

### A. Anther one only.

#### I. Pollen-masses waxy.

I. Tribe I. Malaxideæ. Pollen-masses free, *i.e.* without any caudicula or gland, or other connecting substance.

*Microstylis*, Lindley, Genera and Species of Orchidaceous Plants, xiii.

1. M. *RHEEDI*, Lindl. Gen. and Sp. p. 21. Wight's Icones. t. 992 (bad). C.P. No. 215.

<sup>1</sup> The whole of this account of the Orchids of Burma is from the pen of the Rev. C. Parish, formerly Chaplain of Maulmain, a zealous admirer and a successful cultivator of this charming class of plants.

2. *M. WALLICHII*, Lindl. Gen. and Sp. p. 20. C.P. 115.
3. *M. BILOBA*, Lindl. Gen. and Sp. p. 20. C.P. 191.
4. *M. FLAVESCENS*, Lindl. Gen. and Sp. p. 20. C.P. 364.
5. *M. PURPUREA*, Lindl. and Sp. p. 20. C.P. 356.

*Liparis*, Rich. Lindl. Gen. and Sp. Orch. xix. p. 26.

1. *L. SPATULATA*, Lindl. Bot. Register 1840. Miscellany. 189. Griffith, 772. C.P. 101.
2. *L. BIS-STRIATA*, Par. and Reichb. fil. Trans. Linn. Soc. xxx. p. 155. C.P. 80.
3. *L. STENOGLLOSSA*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 154. C.P. 154.
4. *L. PACHYPTIS*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 155. C.P. 233.
5. *L. PARADOXA*, R. fil. in Walpers' Annal. vi. p. 218. (EMPUSA of Lindl. Gen. and Sp. Orch. xi. p. 17.) C.P. 316.
6. *L. PARADOXA*, R. fil. *β. FLAVIDA*, Par. and R. fil. C.P. 316 and 317.
7. *L. LUTEOLA*, Lindl. Gen. and Sp. p. 32. C.P. 155.
8. *L. JOVIS-PLUVII*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 154. C.P. 323.
9. *L. CONDYLO-BULBOS*, R. fil. in Hamb. Gart. Zeit. 1862, p. 34. C.P. 71.
10. *L. GREGARIA*, Lindl. Gen. and Sp. p. 33. C.P. 332.
11. *L. LONGIPES*, Wallich. Pl. As. rar. 35. Wight's Icon. t. 906. Benthams in Flora Hong-kong, p. 352. C.P. 318.
12. *L. OLIVACEA*, Lindl. Gen. and Sp. p. 27. Wight's Icon. t. 903. C.P. 367.

*Malaxis*, Sw. (*Oberonia* of Lindl.), Gen. and Sp. Orch. x. p. 15.

1. *M. MYOSURUS*, Wall. Cat. No. 1947. Lindl. Gen. and Sp. p. 16. C.P. 300.
2. *M. IRIDIFOLIA*, Lindl. Gen. and Sp. p. 15. R. fil. in Walp. Ann. vi. 208. C.P. 290.
3. *M. ENSIFORMIS*, Smith in Rees' Encycl. C.P. 288.
4. *M. GRIFFITHIANA*, R. fil. Walp. Ann. vi. p. 208. Lindl. Sert. Orch. C.P. 59 and 315.
5. *M. BRUNONIANA*, R. fil. Walp. Ann. vi. p. 209. Wight's Icon. t. 1622. C.P. 287.
6. *M. ANTHROPOPHORA*, Lindl. Gen. and Sp. Orch. (*vide ejusdem*). C.P. 58.
7. *M. RUFILABRE*, Lindl. Gen. and Sp. Orch. (*vide ejusdem*). C.P. 255.
8. *M. ANCEPS*, Lindl. Gen. and Sp. Orch. (*vide ejusdem*). C.P. 256.
9. *M. BRACHYSTACHYS*, Gen. and Sp. Orch. (*vide ejusdem*). C.P. 257.

*Bulbophyllum*, Lindl. Gen. and Sp. Orch. xxxi. (including *CIRRHOPETALUM* and *TRIAS*).

1. *B. PSITTACOGLOSSUM*, R. fil. Botanical Magazine, tab. 5408. C.P. 140.
2. *B. LOBBII*, Lindl. var. *SIAMENSE*, Par. and R. fil. *vide* Bot. Mag. t. 4532. C.P. 187. Saund. Ref. Bot. t. 116.
3. *B. MACRANTHUM*, Lindl. Bot. Reg. 1844, t. 13. C.P. 158.
4. *B. (TRIAS) OBLONGUM*, Wall. Cat. No. 1977. Lindl. Gen. and Sp. p. 60. C.P. 90.
5. *B. (TRIAS) PICTUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 150. C.P. 264.
6. *B. (TRIAS) NASUTUM*, R. fil. Gardeners' Chronicle, 1871, p. 1482. C.P. 263. p. 128, t. 144. Bot. Mag. t. 6119. Saund. Ref. Bot. t. 115. C.P. 358.
7. *B. (TRIAS) DAYANUM*, R. fil. Gard. Chron. 1865, p. 434. Xenia Orchidacea,
8. *B. CAPILLIPES*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 150, tab. 30 A. C.P. 301.
9. *B. MONILIFORME*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 151. C.P. 96.
10. *B. PENECELLITUM*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 151, *compare*
- B. CALAMARIA*, Bot. Mag. t. 4088, and Bot. Reg. 1843, p. 70, No. 109. C.P. 303.
11. *B. LEMNISCATUM*, Par. in Bot. Mag. t. 5961. C.P. 211.
12. *B. LEMNISCATUM* var. *TUMIDUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 151. C.P. 211 *β*.
13. *B. ALCICORNE*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 151. C.P. 260.
14. *B. XYLOPHYLLUM*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 151. C.P. 82 *β*.
15. *B. KHASYANUM*, Griff. Notulæ, p. 284. C.P. 82 *a*.

16. *C. CAREYANUM*, Spreng. Wall. Cat. No. 1990. Hook. Exot. Fl. 149. Lindl. Gen. and Sp. p. 51. Bot. Mag. t. 4166. C.P. 49.
17. *B. CUPREUM*, Lindl. Bot. Reg. 1838. Misc. p. 183. Bot. Mag. 5316. C.P. 193 *a*.
18. *B. SICYOBULBON*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 152. C.P. 193 *β*.
19. *B. CUPREUM* var. *SILNOSEPALUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 152. C.P. 306.
20. *B. PARVIFLORUM*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 152. C.P. 305.
21. *B. AURICOMUM*, Wall. Cat. No. 1985. Lindl. Gen. and Sp. p. 50. R. fil. Trans. Linn. Soc. vol. xxx. p. 152. C.P. 16.
22. *B. LINDLEYANUM*, Griff. Notulæ, p. 287. C.P. 87.
23. *B. GRACILE*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 152 (not of Thouars). C.P. 208.
24. *B. LIMBATUM*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 152. C.P. 336.
25. *B. RUFILABRE*, Par. and R. fil. C.P. 262.
26. *B. TRISTE*, Par. and R. fil. in Walp. Ann. vol. vi. p. 253. C.P. 207. Saund. Ref. Bot. t. 117.
27. *B. ODORATISSIMUM*, Lindl. Gen. and Sp. p. 55. C.P. 50.
28. *B. OVALIFOLIUM*, Wight's Leon. 1736. *B. TRISEPERUM*, Griff. Pl. As. t. 293. (*ONYSEPALA OVALIFOLIA*). C.P. 84.
29. *B. RADIATUM*, Lindl. Gen. and Sp. p. 55. Benth. Fl. Hong-kong, p. 353. C.P. 114.
30. *B. STENOBULBON*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 153. C.P. 337.
31. *B. TENIOPHYLLUM*, Par. and R. fil. Otia Bot. Hamb. 1878, p. 49. C.P. 350.
32. *B. SIMILLIMUM*, Par. and R. fil. Otia Bot. Hamb. 1878, p. 49. C.P. 366.
33. *B. (CIRRHOPE TALUM) LASIOCHILUM*, Par. and R. fil. Trans. Linn. Soc. vol. xxx. p. 153. C.P. 307.
34. *B. (CIRRHOPE TALUM) PICTURATUM*, R. fil. Walp. Ann. vi. p. 262. C.P. 23.
35. *B. (CIRRHOPE TALUM) RETUTIUSCULUM*, R. fil. in Gard. Chron. 1869, p. 1182. C.P. 142.
36. *B. (CIRRHOPE TALUM) BOOTANENSE*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 153, tab. 32 B. C.P. 293.
37. *B. (CIRRHOPE TALUM) PUMILIO*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 153. C.P. 220.
38. *B. (CIRRHOPE TALUM) GRIFFITHIANUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 153. *CIRRHOPE TALUM GAMOSEPALUM*, Griff. Not. Part 3, p. 296? C.P. 138.
39. *B. (CIRRHOPE TALUM) TRIPUDIANS*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 154. C.P. 308.
40. *B. (CIRRHOPE TALUM) MERGUENSE*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 154. C.P. 201.
41. *B. (CIRRHOPE TALUM) BLEPHARISTES*, R. fil. in Flora, 1872, p. 278. C.P. 99.

*Epicranthes*, Bl. Bijdr. 306, tab. 9. Lindl. Gen. and Sp. Orch. xxxvi. p. 61.

1. *E. JAVANICA*, Lindl. Gen. and Sp. p. 61. R. fil. Otia Bot. Hamb. 1878, p. 48. C.P. 351.

*Drymoda*, Lindl. Sertum Orchidaceum, p. 8.

1. *D. PICTA*, Lindl. Sert. Orch. tab. 3. Bot. Mag. t. 5904. C.P. 289.

*Dendrobium*, Sw. Lindl. Gen. and Sp. Orch. xlvii. p. 74.

1. *D. (OXYSIOPHYLLUM, BL.) ATROPURPUREUM*, Miquel Fl. Ind. Bot. iii. p. 614. (*APORUM CONCINNUM*, Lindl. MSS. distrib. Wallich). R. fil. Trans. Linn. Soc. vol. xxx. p. 149. C.P. 265.
2. *D. CÆLOGYNE*, R. fil. in Gard. Chron. 1871, p. 136. Compare *D. AMPLUM*, Lindl. Gen. and Sp. p. 74. Wall. Cat. No. 2001. C.P. 221 and 330.
3. *D. (APORUM) SERRA*, Lindl. Journ. Linn. Soc. iii. p. 3. Gen. and Sp. p. 71. C.P. 374.

4. *D. (APORUM) ANCEPS*, Roxb. Fl. Ind. iii. p. 487. Griff. in Journ. of Nat. Hist. Calcutta, v. 369. Bot. Mag. t. 3608. Bot. Reg. t. 1239. Lindl. Gen. and Sp. p. 71. Journ. Linn. Soc. iii. p. 4. (*D. cuspidatum*, Wall. in Bot. Reg. 1841, Misc. 7.) C.P. 35.
5. *D. (APORUM) EULOPHOTUM*, Lindl. in Journ. Linn. Soc. iii. p. 5. C.P. 32.
6. *D. (APORUM) TERMINALE*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 149. C.P. 33.
7. *D. (APORUM) MULTIFLORUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 149, t. 31 B. C.P. 266.
8. *D. (STRONGYLE) ACEROSUM*, Lindl. Bot. Reg. 1841. Misc. p. 86. (*D. subteres*, Griff.) Lindl. in Journ. Linn. Soc. iii. p. 4. C.P. 34.
9. *D. MACREI*, Lindl. Gen. and Sp. p. 75. Journ. Linn. Soc. iii. p. 6. C.P. 85.
10. *D. CRUMENATUM*, Sw. Roxb. Fl. Ind. iii. p. 480. Lindl. Gen. and Sp. p. 88. Bot. Reg. 1839, t. 22. Bot. Mag. t. 4013. C.P. 30.
11. *D. ANGULATUM*, Wall. Cat. No. 2010. Lindl. Gen. and Sp. p. 88. C.P. 88.
12. *D. LAMELLATUM*, Bl. Bijdr. 326, t. 10. Lindl. Gen. and Sp. p. 89. Bot. Reg. Misc. 76, 1844, tab. 53. *D. compressum*, R. fil. Otia Bot. Hamb. 1878, p. 48. C.P. 354.
13. *D. AGGREGATUM*, Roxb. Fl. Ind. iii. p. 477. Bot. Reg. t. 1695. Bot. Mag. t. 3643. C.P. 13.  
(*D. GRIFFITHIANUM*, Lindl. Bot. Reg. xxi. t. 1756. C.P. 375.)
14. *D. CHRYSOTOXON*, Lindl. Bot. Reg. 1847, sub. t. 19. Bot. Mag. t. 5053. C.P. 7.
15. *D. TORTILE*, Lindl. in Gard. Chron. 1847, p. 797, cum Icône. Bot. Mag. t. 4477. C.P. 17.
16. *D. PYGMEUM*, Lindl. Gen. and Sp. p. 85. "Prome" *fide* Wallich. Bot. Reg. 1844, Misc. p. 62. C.P. 339.
17. *D. PEGTANUM*, Lindl. Journ. Linn. Soc. iii. p. 19. C.P. 91.
18. *D. PUMILUM*, Roxb. Fl. Ind. iii. p. 479 (first part only). Journ. Linn. Soc. iii. p. 6. Griff. Not. iii. 315. R. fil. Trans. Linn. Soc. xxx. p. 150, tab. 31 A. in part. C.P. 98.
19. *D. FUGAX*, R. fil. in Gard. Chron. 1871, p. 1287. C.P. No. ?
20. *D. FARMERI*, Lindl. Bot. Mag. 4659. Lindl. Mag. of Bot. v. 15, cum Icône. C.P. 14a.
21. *D. FARMERI AUREO-FLAVUM*, Hook. Bot. Mag. 5451. C.P. 14β.  
*D. PALFEBRE*, Lindl. Paxton Fl. Gard. i. p. 48. Journ. Hort. Soc. v. (1850) p. 33. C.P. 377.
22. *D. CAPILLIPES*, R. fil. in Gard. Chron. 1867, p. 897. C.P. 186.
23. *D. ALBOBANGUINEUM*, Lindl. Paxton's Fl. Gard. v. 2, t. 5. Bot. Mag. 5130. C.P. 15.
24. *D. DENSIFLORUM*, var. *ALBO-LUTEA*, Hook. Bot. Mag. 3418. *Compare* Wall. Plant As. var. 34 t. 40. C.P. 190.
25. *D. CHRYSOCREPIS*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 150. Bot. Mag. 6007. C.P. 309.
26. *D. REVOLUTUM*, Lindl. Bot. Reg. 1840, Misc. p. 110. *D. UNIFLORUM*, Griff. Icon. 303. C.P. 112.
27. *D. BICAMERATUM*, Lindl. Bot. Reg. 1839, Misc. p. 85. *D. BREVEFLORUM*, Lindl. Journ. Linn. Soc. iii. p. 14. C.P. 278.
28. *D. INCURVUM*, Lindl. Journ. Linn. Soc. iii. p. 18. Griff. Not. iii. 314, No. 9. C.P. 176.
29. *D. CUSPIDATUM*, Lindl. Wall. Cat. No. 2015. Gen. and Sp. p. 84. Bot. Reg. 1841, Misc. p. 7. C.P. 151.
30. *D. PYCNOSTACHYUM*, Lindl. Journ. Linn. Soc. iii. p. 19. C.P. 67.
31. *D. POLYANTHUM*, Wall. Cat. No. 2009. Lindl. Gen. and Sp. p. 81. "Moulmayne" *fide* Wallich. C.P. 340.
32. *D. PARCUM*, R. fil. in Gard. Chron. 1866, p. 1042. C.P. 81.
33. *D. RAMBUSIFOLIUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 149. C.P. 188.
34. *D. PACHYGLOSSUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 149. C.P. 145.
35. *D. SPHEGIDOGLOSSUM*, R. fil. Otia Bot. Hamb. 1878, p. 47. C.P. 353.

36. *D. SECUNDUM*, Wall. Cat. No. 1996. Lindl. Gen. and Sp. p. 81. Bot. Reg. t. 1291. Bot. Mag. t. 4352. (*D. PURPUREUM*, Roxb. Fl. Ind. iii. p. 481.) C.P. 333.
37. *D. FORMOSUM*, Roxb. Fl. Ind. iii. p. 485. Lindl. Gen. and Sp. p. 81. Bot. Reg. t. 64. Wall. Plant. As. rar. t. 39. C.P. 6.
38. *D. URBANEUM*, Par. Bot. Mag. t. 5459. C.P. 131.
39. *D. JAMESIANUM*, R. fil. in Gard. Chron. 1869, p. 551. C.P. 132*a*.
40. *D. DRACONIS*, R. fil. in Bot. Zeit. 1862, p. 214. C.P. 132*β*.
41. *D. INFUNDIBULUM*, Lindl. in Journ. Linn. Soc. iii. p. 16. Bot. Mag. t. 5446. C.P. 130.
42. *D. XANTHOPHILEBICUM*, Lindl. in Gard. Chron. 1857, p. 268, and 1856, No. 196. Journ. Linn. Soc. iii. p. 16. Bot. Mag. t. 5454. C.P. 133.
43. *D. SENILE*, Par. Bot. Mag. t. 5520. C.P. 135.
44. *D. SCABRILINGUE*, Lindl. Journ. Linn. Soc. iii. p. 15. R. fil. Trans. Linn. Soc. xxx. p. 150. (*D. HEDYOSMUM*, Bateman, Bot. Mag. 5515.) C.P. 134.
45. *D. DALHOUSIANUM*, Paxt. Mag. of Bot. xi. t. 145. Bot. Reg. 184, t. 40. Griff. Not. iii. 313, No. 7. C.P. 19.
46. *D. CALCEOLARIA*, Hook. Exot. Flora, 184. Lindl. Gen. and Sp. p. 83. (*D. CUPREUM*, Bot. Reg. 1779.) C.P. 136.
47. *D. MOSCHATUM*, Wall. Pl. As. rar. ii. 195. Lindl. Gen. and Sp. p. 82. Bot. Mag. tab. 3837. (*D. CALCEOLUS*, Roxb. Fl. Ind. iii. p. 488.) C.P. 8.
48. *D. FIMBRIATUM*, Wall. Cat. No. 2011. Hook. Exot. Fl. 71. Lindl. Gen. and Sp. p. 83. Bot. Mag. 4160. C.P. 88.
49. *D. BINOCULARE*, R. fil. Gard. Chron. 1869, p. 785. Otia Bot. Hamb. No. 23; p. 48. C.P. 344.
50. *D. BRYMERIANUM*, R. fil. in Gard. Chron. 1875, p. 323, and 1876, p. 366. Bot. Mag. tab. 6383. C.P. 369 *b*.
51. *D. PIERARDII*, Roxb. Fl. Ind. iii. p. 482. Lindl. Gen. and Sp. p. 79. Wight's Icon. 908 (indifferent). Bot. Mag. 2584. C.P. 10.
52. *D. TRANSPARENS*, Wall. Cat. No. 2008. Lindl. Gen. and Sp. p. 79. Bot. Mag. 4663? C.P. 185.
53. *D. GRATIOSISSIMUM*, R. fil. in Bot. Zeit. 1865, p. 99. (*D. BULLERIANUM*, Bateman, Bot. Mag. 5652.) C.P. 202 and 206.
54. *D. BOXALLII*, R. fil. Xenia, vol. ii. t. 194. Jennings Orch. t. 19. Floral Mag. new series, t. 114. C.P. 360.
55. *D. CRYSTALLINUM*, R. fil. in Gard. Chron. 1868, p. 570. Xenia Orchidacea, vol. ii. p. 211, tab. 193, f. 1. C.P. 206 *b*.
56. *D. PARISHII*, R. fil. in Bot. Zeit. 1863, p. 236. Bateman in Bot. Mag. 5488. C.P. 18.
- D. RHODOPTERYGIUM*, R. fil. in Gard. Chronicle. C.P. 376.
57. *D. BENSONÆ*, R. fil. Bot. Mag. 5679. C.P. 203.
58. *D. FYTCHIANUM*, Par. Bot. Mag. t. 5444. Compare *D. BARBATULUM*, Bot. Mag. t. 5918, also Wight's Icones, 910. C.P. 126.
59. *D. DEVONIANUM*, Paxt. Mag. i. p. 469. Bot. Mag. 4429, *β*. *RHODONEURUM*, R. fil. in Gard. Chron. 1868, p. 682. C.P. 310.
60. *D. FALCONERI*, Hook. Bot. Mag. 4944 and 5058. C.P. 359.
61. *D. HETEROCARPUM*, Wall. Pl. As. rar. 196. Lindl. Gen. and Sp. p. 78. (Bot. Reg. Misc. p. 49, No. 11. *D. AUREUM*). Bot. Mag. 4708 and 4970. var. *HENSHALLII*, Bot. Mag. 4970. C.P. 137.
62. *D. FINDLAYANUM*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 149. C.P. 192.
63. *D. CRASSINODE*, R. fil. Gard. Chron. 1869, p. 164. Bot. Mag. 5766. C.P. 26.
64. *D. NODATUM*, R. fil. Bot. Mag. 5470. C.P. 106.
65. *D. LUTEOLUM*, Balm. Bot. Mag. 5441. Gard. Chron. 1861, p. 269. C.P. 139.
66. *D. CUMULATUM*, Lindl. in Gard. Chron. 1855, p. 756. Bot. Mag. 5703. C.P. 200.
67. *D. LASIOGLOSSUM*, R. fil. in Gard. Chron. 1868, p. 682. Bot. Mag. 5825. C.P. 304.
68. *D. CILIATUM*, Par. Bot. Mag. 5430. C.P. 156.

69. *D. DIXANTHUM*, R. fil. Gard. Chron. 1865, p. 674. Bot. Mag. 5564. C.P. 21.
70. *D. CRETACEUM*, Lindl. Bot. Reg. vol. 33, t. 62. Bot. Mag. 4686. C.P. 65.
71. *D. CREPIDATUM*, Lindl. Paxt. Fl. Gard. v. 1. Gleanings, No. 99, f. 95. Bot. Mag. 4993 and 5011. C.P. 66.
72. *D. LUTEIFLORUM*, Lindl. Gard. Chron. 1856, p. 185. *D. HAMBRYANUM*, R. fil. in Bonplandiä, vol. iv. p. 357.

Tribe II. *EPIDENDREÆ*.

Pollen-masses attached to a distinct caudicle, or joined together by some elastic material, but without a gland.

*Cryptochilus*, Wall. Lindl. Gen. and Sp. Orch. exix. p. 193.

1. *C. MEXICANUS*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 148. (*AGGEIANTHUS MARCHANTIODES*, Wight's Icones, 1737?). C.P. 251.

*Eria* (including *ANIA*), Lindl. Gen. and Sp. xlii. p. 65, and lxvi. p. 129.

1. *E. (ANIA) HOLOGLOSSA*, Par. and R. fil. Trans. Linn. Soc. xxx. p. 148. (*ANIA LATIFOLIA*, Lindl. Gen. and Sp. p. 130. Wight's Icon. 914?). C.P. 253.
2. *E. ANIA*, R. fil. in Walpers' Ann. vi. p. 70. *ANIA ANGUSTIFOLIA*, Lindl. ? Gen. and Sp. p. 129 "Tavoy." *CALANTHE VIRIDIFUSCA*, Bot. Mag. 4669? C.P. 244 and 73.
3. *E. DISCOLOR*,<sup>1</sup> Lindl. Journ. Linn. Soc. iii. p. 51. *CALLOSTYLIS RIGIDA*, Bl. ? Lindl. Gen. and Sp. p. 129. C.P. 314. Same as following?
4. *E. PULCHELLA*, Lindl. Wall. Cat. No. 7407. Bot. Reg. 1841. Misc. 106. Journ. Linn. Soc. p. 51. C.P. 314 (not *E. PULCHELLA* of Griff.). Same as preceding?
5. *E. ORNATA*, Lindl. Gen. and Sp. p. 66. Journ. Linn. Soc. iii. p. 48. *E. ARMENIACA*, Bot. Reg. 1841, t. 42. C.P. 109.
6. *E. ELONGATA*, Griff. Not. iii. 301. Lindl. Journ. Linn. Soc. iii. p. 49. (*ERIA FLAVA*, Griff.) C.P. 119.
7. *E. LANATA*, Griff. Not. iii. 301. Lindl. Jour. Linn. Soc. iii. p. 49. C.P. 51?
8. *E. PANNEA*, Bot. Reg. 1842. Misc. 79. (*E. TERETIFOLIA*, Griff. Notul. iii. 298, t. 300, fig. 2. Itinerary, 202, No. 1185.) Lindl. Journ. Linn. Soc. iii. p. 50. C.P. 313.
9. *E. SICARIA*, Lindl. Journ. Linn. Soc. iii. p. 50. C.P. 100.
10. *E. FRAGRANS*, R. fil. in Bot. Zeit. 1864, p. 415. (*E. STELLATA*, Sp. aff. B.M. 3605 and Bot. Reg. t. 904.)
11. *E. OESA*, Lindl. Gen. and Sp. p. 68. Journ. Linn. Soc. iii. p. 53. (*E. LINDLEYANA*, Griff. Not. iii. 300.) Bot. Mag. 5391. C.P. 24.
12. *E. ACERVATA*, Lindl. Paxton Fl. Gard. i. p. 170. C.P. 276.
13. *E. AFFINIS*, Griff. Not. iii. p. 297. Lindl. Journ. Linn. Soc. iii. p. 54. C.P. 196.
14. *E. GRIFFITHII*, R. fil. in Xenia, Orch. ii. p. 163. (*E. PULCHELLA*, Griff. Not. iii. p. 297. Lindl. Journ. Soc. iii. p. 54.) Very near to *E. BRACDESCENS*. C.P. 102 and 107.
15. *E. CONCOLOR*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 148. C.P. 128.
16. *E. DASYPUS*, R. fil. in Bot. Zeit. 1864, p. 416. C.P. 235.
17. *E. ERIOPSIDOBULBON*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 148. C.P. 281.
18. *E. CONVALLARIOIDES*, Lindl. Gen. and Sp. p. 70. Bot. Reg. 1841, t. 62, and 1847, t. 63. Wall. Pl. Asiat. rar. ii. 159. C.P. 141.
19. *E. FLORIBUNDA*, Lindl. in Bot. Reg. 1844, t. 20. C.P. 282.
20. *E. RINGENS*, R. fil. in Bonplandiä, 1855, p. 222. (*E. OVATA*, Bot. Reg. 1844, sub tab. 29). C.P. 321.
21. *E. PULVINATA*, Griff. Mergui, No. 2, Aug. 17, 1834. Lindl. Journ. Linn. Soc. iii. p. 56. C.P. 274.

<sup>1</sup> I incline to believe that *E. pulchella* No. 277 and *E. discolor* No. 278 of p. 51, Journ. Linn. Soc. iii. together with *Callostylis rigida*, are all one and the same.—C.P.

22. *E. TRUNCATA*, Lindl. Journ. Linn. Soc. iii. p. 58. "Moulmein T. Lobb." C.P. 273.
23. *E. DASYPHYLLA*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 147. C.P. 79.
24. *E. PUMILA*, Lindl. Gen. and Sp. p. 68. C.P. 234.
25. *E. MERTENSIS*, Lindl. Journ. Linn. Soc. iii. p. 52. C.P. 52.
26. *E. MYRISTICIFORMIS*, Hook. Bot. Mag. t. 5415. C.P. 413.
27. *E. MUSCICOLA*, Lindl. Journ. Linn. Soc. iii. p. 47. R. fil. Linn. Soc. Trans. xxx. p. 148. (*DENDROBIUM MUSCICOLA*, Lindl. Gen. and Sp. p. 75. *D. FILIFORME*, Wight Icon. 1642. *E. DALZELLI*, Lindl. Journ. Linn. Soc. iii. p. 47.) C.P. 320.
28. *E. PARISHII*, Lindl. R. fil. Linn. Soc. Trans. xxx. p. 147. C.P. 61.
29. *E. USTULATA*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 147. C.P. 62.
30. *E. EXTINGUATORIA*, Hook. fil. Bot. Mag. t. 5910. (*DENDROBIUM EXTINGUATORIUM*, Lindl. Bot. Reg. sub t. 1756. Journ. Linn. Soc. iii. p. 11.) R. fil. Walp. Ann. vi. p. 308. C.P. 74.
31. *E. PLEUROTHALLIS*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 147, tab. 30 C. C.P. 160.
32. *E. VESTITA*, Lindl. Bot. Reg. 1844. Misc. 1845, p. 79, t. 2. Walp. Ann. vi. p. 284. Lindl. Gen. and Sp. p. 82. (*DENDROBIUM VESTITUM*, Wall. Cat. 2005). C.P. 64.
33. *E. PERPUSILLA*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 148. C.P. 97.

*Dendrochilum*, Bl. Lindl. Gen. and Sp. Orch. xx.

1. *D. PALLIDE-FLAVENS*, Bl. Bijdr. 398, t. 52, Lindl. Gen. and Sp. p. 34. C.P. 270.

*Celogyne*, Lindl. (including *PHOLIDOTA*, *OTOCHILUS* and *PLEIONE*), Lindl. Gen. and Sp. Orch. xxv.

1. *C. (OTOCHILUS) PORRECTA*, Lindl. Gen. and Sp. p. 36. R. fil. Walp. Ann. vi. p. 236. C.P. 209.
2. *C. (OTOCHILUS) FUSCA*, Lindl. Gen. and Sp. p. 35. Bot. Mag. 3921. C.P. 342.
3. *C. (PHOLIDOTA) IMBRICATA*, Lindl. Gen. and Sp. p. 36. Bot. Reg. t. 1213. Wight Icon. 907. C.P. 39.
4. *C. (PHOLIDOTA) ARTICULATA*, Lindl. Gen. and Sp. p. 38. C.P. 38.
5. *C. (PHOLIDOTA) CONVALLARIA*, R. fil. in Flora, 1872, p. 277. C.P. 210.
6. *C. (PHOLIDOTA) ADVENA*, Par. and R. fil. Otia Bot. Hamb. Fase. I. 1878, p. 47. (*CHELONANTHERA GIBBOSA*, Bl. Lindl. Gen. and Sp. p. 178?). C.P. 296.
7. *C. (PLEIONE) REICHENBACHIANA*, Hook. fil. Bot. Mag. 5753. C.P. 72.
8. *C. (PLEIONE) PRECOX*, Lindl. Gen. and Sp. p. 43. (*C. WALLICHIANA*, an eadem? Bot. Mag. 1496.) C.P. 213.
9. *C. (PLEIONE) SCHILLERIANA*, R. fil. in Koch. Berl. Allg. Gart. Zeit. 1858, p. 189. Bot. Mag. 5072. C.P. 40.
10. *C. UNIFLORA*, Lindl. Gen. and Sp. p. 42. R. fil. Linn. Soc. Trans. xxx. p. 146. C.P. 129.
11. *C. TESTACEA*, Lindl. Bot. Reg. 1843, Misc. 34. Bot. Mag. 4785. C.P. 41.
12. *C. LENTIGINOSA*, Lindl. Fol. Orch. (*C. FULIGINOSA*, p. 3). Bot. Mag. 5958. C.P. 189.
13. *C. CYNOCHES*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 147. C.P. 195.
14. *C. FUSCESCENS*, var. *BRUNNEA*, Lindl. Fol. Orch. and in Gard. Chron. 1848, p. 71, cum icon. Bot. Mag. 5494. C.P. 161.
15. *C. OCHRACEA*, Lindl. Bot. Reg. 1846, t. 69. *C. CONFERTA*, sub-species, Par. and R. fil. Linn. Soc. Trans. xxx. p. 146, tab. 30 B. C.P. 150.
16. *C. GRAMINIFOLIA*, Par. and R. fil. Linn. Soc. Trans. p. 146. C.P. 252.
17. *C. ELACIDA*, Lindl. Gen. and Sp. p. 39. Bot. Mag. 3318. (*C. HÖFTNERIANA*? R. fil.) Compare *C. OCELLATA*, Bot. Mag. t. 3767. C.P. 143.
18. *C. PROLIFERA*, Gen. and Sp. p. 40. C.P. 174 B.
19. *C. RIGIDA*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 146. C.P. 42.
20. *C. USTULATA*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 146. C.P. 174 A.

21. *C. FIMBRIATA*, Lindl. Gen. and Sp. p. 41. Griff. Icon. Pl. As. t. 291, No. 1. C.P. 118.
22. *C. OVALIS*, Lindl. Bot. Reg. 1838, Misc. p. 171. C.P. 243.
23. *C. APICULATA*, Par. and R. fil. in Walp. Ann. xvii. p. 225. C.P. 214.
24. *C. TRINERVIS*, Lindl. Gen. and Sp. p. 41. C.P. 343.
25. *C. PARISHII*, Hook. fil. Bot. Mag. 5323. C.P. 105.

*Sumipia*, Buchan. in Rees' Cyclop. Lindl. Gen. and Sp. Orch. cviii.

1. *S. SCARIOSA*, Lindl. in Wall. Cat. 7373. Gen. and Sp. p. 179. Sert. Orch. Frontispiece, x. C.P. 271.

*Agrostophyllum*, Bl. Lindl. Gen. and Sp. clxiii.

1. *A. PLANICAULE*, R. fil. in Walp. Ann. vi. p. 909. APPENDICULA HASSELTII of Wight's Icones, t. 1748, iii. Lindl. Gen. and Sp. p. 230. See *A. JAVANICUM*. Bl. Tabellen 53. C.P. 103.

*Spathoglottis*, Bl. Lindl. Gen. and Sp. Orch. lix.

1. *S. PUBESCENS*, Lindl. Wall. Cat. 3744. Gen. and Sp. p. 120. Wight's Icon. 1739. (*PACHYSTOMA WIGHTII*, R. fil. Walp. Ann. vi. p. 464.) C.P. 153.
2. *S. LOBBII*, R. fil. Walp. Ann. vi. 455. Gard. Chron. 1856, p. 534. C.P. 368.
3. *S. HARDINGIANA*, Par. and R. fil. Otia Bot. Hamb. Fasc. i. p. 45. C.P. 352.

*Calanthe*, R. Br. Lindl. Gen. and Sp. Orch. clxiv.

1. *C. VESTITA*, Wall. Cat. 7345. Lindl. Gen. and Sp. p. 250. Paxt. Fl. Gard. v. i. p. 106, t. 72. Bot. Mag. 4671. C.P. 20.
2. *C. BILOBA*, Lindl. Fol. Orch. (var. *OBTUSATA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 144). C.P. 254.
3. *C. VIRIDIFUSCA*, Bot. Mag. 4669 (vide sub *ERIA ANIA*, *suprà*). C.P. 73 and 244.

*Limnates*, Bl. Lindl. Gen. and Sp. Orch. clxvi.

1. *L. ROSEA*, Lindl. in Paxt. Fl. Gard. t. 81. Bot. Mag. t. 5312. C.P. 41.

*Arundina*, Bl. Lindl. Gen. and Sp. Orch. lxii.

1. *A. BAMBUSIFOLIA*, Lindl. Wall. Cat. 3751. Gen. and Sp. p. 123. Wight's Icon. t. 1661. (*CYMBIDIUM BAMBUSIFOLIUM*, Roxb. Fl. Ind. iii. p. 460.) C.P. 362.

*Phaius*, Lour. Lindl. Gen. and Sp. Orch. lxiii.

1. *P. BLUMEI*, Lindl. Gen. and Sp. p. 127. C.P. 371.

*Thunia*, R. fil.

1. *T. XANTHOPHLEBIA*, Par. and R. fil. (*T. FULCHRA*, R. fil. in Flora, 1872, p. 276.) C.P. 5.
2. *T. BENSONI*, Hook. fil. Bot. Mag. 5694. C.P. 199.
3. *T. ALBA* (*PHAIUS ALBUS*). Lindl. Gen. and Sp. p. 128. Wall. Pl. As. rar. vol. ii. t. 198. C.P. 378.

#### Tribe III. *VANDEÆ*.

Pollen-masses with a caudicula, united to a deciduous stigmatic gland.

*Monomeria*, Lindl. Gen. and Sp. Orch. xxxvii.

1. *M. CRABRO*, Par. and R. fil. in Linn. Soc. Trans. vol. xxx. p. 143, tab. 28. (*Compare* Lindl. Sert. Orch. Frontispiece and Gen. and Sp. p. 61. *MONOMERIA BARBATA*.) C.P. 312.

*Eulophia*, R. Br. Lindl. Gen. and Sp. Orch. ex.

1. *E. BRACTEOSA*, Wall. Cat. 7366. Lindl. Gen. and Sp. p. 180. (Journ. Linn. Soc. iii. p. 23, *E. GRANDIFLORA*.) C.P. 157.

2. E. PROMENSIS, Wall. Cat. 7365. Lindl. Gen. and Sp. p. 181. C.P. 242.
3. E. GRAMINEA, Wall. Cat. 7372. Lindl. Gen. and Sp. p. 182. C.P. Nos. 205 and 295.
4. E. ANDAMANENSIS, R. fil. in Flora, 1872, p. 276. C.P. 94.

*Cyrtopera*, Lindl. Gen. and Sp. Orch. cxv.

1. C. MACROBULBON, Par. and R. fil. Linn. Soc. Trans. xxx. p. 144. C.P. 37.
2. C. SQUALIDA, R. fil. in Bonpl. Feb. 15, 1857. Otia Bot. Hamb. 1878, p. 44. (EULOPHIA SQUALIDA, Lindl. Bot. Reg. 1844, Misc. 164.) C.P. 347.

*Geodorum*, Jackson. Lindl. Gen. and Sp. Orch. cii.

1. G. CANDIDUM, Lindl. Fol. Orch. No. 8. Gen. and Sp. p. 176. (G. PALLIDUM, Don.) C.P. 111.
2. G. CITRINUM, Lindl. Bot. Reg. 626. Gen. and Sp. p. 176. Jackson in Bot. Rep. t. 626. Bot. Mag. 2495. C.P. 275.
3. G. CITRINUM, var. ALBIDOPURPUREUM, Par. and R. fil. Linn. Soc. Trans. xxx. p. 145. (G. DILATATUM, R. Br. Lindl. Bot. Reg. t. 675. Gen. and Sp. p. 175. LIMODOLUM RECURVUM, Roxb.) C.P. 180.

*Cymbidium*, Sw. Lindl. Gen. and Sp. Orch. xevii.

1. C. ALBOFOLIUM, Sw. Willd. iv. 401. Lindl. Gen. and Sp. p. 165. Wight's Icon. 1687. Bot. Mag. t. 387. Roxb. Fl. Ind. iii. 6, 458. C.P. 12.
2. C. LOWIANUM, R. fil. in Gard. Chronicle. C.P. 361.
3. C. TIGRINUM, Par. Bot. Mag. 5457. C.P. 144.
4. C. PARISHII, R. fil. Linn. Soc. Trans. vol. xxx. p. 144. (CYMBIDIUM EMBURNUM, var.? See Bot. Mag. 5126. Bot. Reg. v. 33, t. 67.) C.P. 56.

*Thecstele*, R. fil.?

1. T. ALATA, Par. and R. fil. Linn. Soc. Trans. xxx. p. 144, t. 29. (T. ZOLLINGERI, R. fil. in Bonplandiâ, v. 37, 1857. Xenia, ii. t. 147, p. 133. (CYMBIDIUM ALATUM, Roxb. iii. p. 459.) C.P. 47.

*Bromheadia*, Lindley, Wight's Icon. vol. v. p. 18.

1. B. APOROIDES, Par. and R. fil. Otia Bot. Hamb. 1878. Fasc. i. p. 41. C.P. 346.

*Luisia*, Gaudichaud?

1. L. BRACHYSTACHYS, Lindl. L. FLAVEOLA, Par. and R. fil. Linn. Soc. Trans. xxx. p. 144. C.P. 43.
2. L. PLATYGLOSSA, R. fil. Linn. Soc. Trans. xxx. p. 144. Walp. Ann. vi. p. 622. (CYMBIDIUM TRISTE, Wight's Icon. 911 1689. Bot. Mag. 3648.) C.P. 41.
3. L. PRIMULINA, Par. and R. fil. Linn. Soc. Trans. xxx. p. 144, t. 30 A. C.P. 302.
4. L. PSYCHE, R. fil. in Bot. Zeit. 1863, p. 38. Bot. Mag. 5558. C.P. 121.
5. L. BURMANICA, Griff.

*Coltonia*, Lindl. Wight's Icones, 1755.

1. C. CHAMPIONI, Lindl. in Hook. Journ. vii. p. 35. Journ. Linn. Soc. iii. p. 89. Bentham Fl. Hong-kong, p. 357. C.P. 277.

*Trichoglottis*, Bl. Lindl. Gen. and Sp. Orch. cxxxv.

1. T. DAWSONIANA, R. fil. in Gard. Chron. 1872, p. 699. C.P. 163 and 179.

*Phalanopsis*, Bl. Lindl. Gen. and Sp. Orch. cxxxiv.

1. P. CORNU-CLAVI, R. fil. in Gard. Chron. Bot. Mag. 5570. C.P. 54.
2. P. LOWII, R. fil. in Bot. Zeit. 1862, p. 214. Bot. Mag. 5345. C.P. 125.
3. P. PARISHII, R. fil. in Gard. Chron. 1865, p. 410. Bot. Mag. 5815. Saunders Refugium Bot. t. 85. C.P. 110.
4. P. WIGHTII, R. fil. in Bot. Zeit. 1862, p. 214. C.P. 175.

*Vanda*, R. Br. Lindl. Gen. and Sp. Orch. cxxxvii.

1. *V. (ACAMPE) WIGHTIANA*, Wight's Icon. 1670. C.P. 77.
2. *V. (ACAMPE) LONGIFOLIA*, Wall. Cat. 7322, Lindl. Gen. and Sp. 215. C.P. 78.
3. *V. GIGANTEA*, Wall. Cat. 7326, Lindl. Gen. and Sp. p. 215. Bot. Mag. 5189. C.P. 1.
4. *V. PARISHII*, R. fil. Xenia, ii. p. 138. Gard. Chron. 1870, p. 800. C.P. 178.
5. *V. ROXBURGHII*, var. *UNICOLOR*, Bot. Mag. 3416. C.P. 177.
6. *V. BENSONI*, Veitch, R. fil. in Gard. Chron. 1867, p. 180. Bot. Mag. 5611. C.P. 204.
7. *V. DENISONIANA*, R. fil. in Gard. Chron. 1868, p. 528. Bot. Mag. 5811. C.P. 294.
8. *V. CÆRULESCENS*, Griff. Not. p. 352. Icon. 331. Lindl. Fol. Orch. Vand. p. 9. Walp. Ann. vol. vi. p. 868. Gard. Chron. 1870, p. 529. Fig. 97. Bot. Mag. 5834. C.P. 335.
9. *V. CÆRULESCENS*, var. *BOXALLII*, R. fil. in Gard. Chron. 1877, p. 749. C.P. 372.
10. *V. PARVIFLORA (AERIDES WIGHTIANUM, infra)*, Lindl. Bot. Reg. 1844. Misc. p. 57. *Vide* Bot. Mag. 5138. Wight's Icon. 1669. *V. TESTACEA*, R. fil. Gard. Chron. C.P. 22 and 162.
11. *V. TERES*, Wall. Cat. 7324. Lindl. Gen. and Sp. p. 217. Bot. Mag. 4114. Bot. Reg. 1809. (*DENDROBIUM TERES*, Roxb. iii. p. 485.) C.P. 9.

*Grammatophyllum*, Bl. Lindl. Gen. and Sp. Orch. C.

1. *G. SPECIOSUM*, Bl. Bijdr. p. 377. Lindl. Gen. and Sp. p. 176. Blume, Rumphia, v. 4, p. 47, t. 191. Paxton, Fl. Gard. t. 69. Bot. Mag. t. 5157. C.P. 168.

*Renanthera*, Lour. Lindl. Gen. and Sp. Orch. cxxxviii.

1. *R. COCCINEA*, Loureiro, Flor. Cochinch. ii. p. 637. Bot. Mag. 2997-8. C.P. 167.
2. *R. BILINGUIS*, R. fil. Xenia, i. p. 7, t. 4. C.P. 201.

*Æcoclades*, Lindl. in Bot. Reg. fol. 1522, Gen. and Sp. clvi.

1. *Æ. FLEXUOSA*, Lindl. Gen. and Sp. p. 236, "ad ripas fluminis Attaran," Wallich. C.P. 261.

*Aerides*, Lour. Lindl. Gen. and Sp. clvii.

1. *A. VIRENS (ODORATUM, var.)*, Lour. Bot. Reg. 1843, Misc. 48. *Vide* Bot. Mag. 4139. C.P. 2.
2. *A. LOBBI*, Hort. L'illustration Horticole. Gaud. 1868, pl. 559. C.P. 25.
3. *A. AFFINE*, var. *ROSEUM*, Wall. Cat. 7316. Sert. Orchid. t. 15. Bot. Mag. 4059. Lindl. Gen. and Sp. p. 41. (*A. ROSEUM*, Loddiges, Paxt. Fl. Gard. t. 60). Warner's Select Orchids, 21. C.P. 63.
4. *A. CRASSIFOLIUM*, Par. and R. fil. Linn Soc. Trans. xxx. p. 145. Gard. Chron. t. 96. C.P. 146.
5. *A. CRISPUM*, Lindl. Gen. and Sp. p. 41. Bot. Reg. 1842, t. 55. Bot. Mag. 4127. (*A. BROOKER*, Batm.) *SACCOLABIUM SPECIOSUM*, Wight's Icon. 1674. C.P. 183.
6. *A. DIFFORME*, Wall. Lindl. Gen. and Sp. p. 242. Sert. Orch. Frontispiece. C.P. 184.
7. *A. WIGHTIANUM*=*VANDA PARVIFLORA, supra*. C.P. 22 and 162.

*Saccolabium*, Bl. Lindl. Gen. and Sp. Orch. cxliv.

1. *S. GIGANTEUM*, Wall. Cat. 7306. Lindl. Gen. and Sp. p. 221. Bot. Mag. 5635. C.P. 83.
2. *S. BLUMEI*, Sert. Orch. t. 47. Bot. Reg. 1841. Misc. 115. L'illustr. Hort. 1868, pl. 545. C.P. 3.
3. *S. CURVIFOLIUM*, Lindl. Gen. and Sp. p. 222. (*S. MINIATUM*, Lindl. Bot. Reg. 1847, t. 26, 1848, t. 58.) L'illustr. Horticole, 1866, pl. 493. C.P. 4.
4. *S. AMPULLACEUM*, Lindl. Bot. Mag. 5595. *S. RUBRUM*, Lindl. Gen. and Sp.

- p. 222. Wall. Cat. 7310. *AERIDES AMPULLACEUM*, Roxb. Fl. Ind. iii. p. 476. Sert. Orch. t. 17. C.P. 50.
5. *S. FRAGRANS*, Par. and R. fil. Otia Bot. Hamb. Fasc. i. 1878, p. 41. C.P. 349.
  6. *S. MICRANTHUM*, Wall. Cat. 7300. Lindl. Gen. and Sp. p. 220. Saund. Ref. Bot. t. 110. C.P. 45.
  7. *S. PAPILLOSUM*, Lindl. Bot. Reg. t. 1552. Gen. and Sp. p. 222. Wight's Icon. 1672. (*CYMBIDIUM PRÆMOISUM*, Roxb. iii. p. 465.) Very like an *Acampe*! C.P. 258.
  8. *S. RAMOSUM*, Lindl. Gen. and Sp. p. 224. Wall. Icon. t. 654. C.P. 29.
  9. *S. CALCEOLARE*, Wall. Cat. 7302. Lindl. Gen. and Sp. p. 223. Griff. Not. 356, t. 334. Paxt. Mag. vi. 97. Journ. Linn. Soc. iii. p. 33. (*VANDA PULCHELLA*, Wight's Icon. 1671.) Sert. Orch. Front. C.P. 95.
  10. *S. DENTICULATUM*, Paxton, Mag. vii. 145. Bot. Mag. 4772. R. fil. Otia Bot. Hamb. Fasc. i. 1878, p. 42. C.P. 95 B.
  11. *S. BIGIBBUM*, R. fil. Bot. Mag. 5767. C.P. 279.
  12. *S. BUCCOSUM*, R. fil. in Gard. Chron. 1871, p. 938. C.P. 268.
  13. *S. BIPUNCTATUM*, Par. and R. fil. in Linn. Soc. Trans. xxx. p. 145. C.P. 280.
  14. *S. GRIFFITHII*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 145, in appearance like a *TMESIPTERIS*. C.P. 334.

*Sarcanthus*, Lindl. Gen. and Sp. Orch. cliii.

1. *S. TERETIFOLIUM*, Lindl. Gen. and Sp. p. 234. (*AERIDES APPENDICULATUM*, Lindl. Gen. and Sp. p. 242. *A. TERETIFOLIUM*? Bot. Reg. t. 676.) Wall. Cat. 7315. Bot. Mag. 3571. C.P. 28.
2. *S. WILLIAMSONI*, R. fil. in Hamb. Gart. Zeit. 1865, p. 353. Gard. Chron. 1865, p. 674. C.P. 272.
3. *S. FILIFORME*, Lindl. Bot. Reg. 1842. Misc. p. 61. Bot. Mag. 4639. (Wight's Icon. 1684?) C.P. 284.
4. *S. PARISHII*, Hook. fil. Bot. Mag. 5217. C.P. 27.
5. *S. LAXUM*, R. fil. Bot. Zeit. 1866, p. 378. Saund. Ref. Bot. t. 139. C.P. 153.
6. *S. ERINACEUM*, R. fil. Bot. Zeit. 1864, p. 298. C.P. 149.
7. *S. OXYPHYLLUM*, Wall. in Lindl. Bot. Reg. xxvi. Misc. 123. C.P. 86.
8. *S. DENSIFLORUM*, Par. and R. fil. (*SACCOLABIUM DENSIFLORUM*, Lindl. Gen. and Sp. p. 220.) Wall. Cat. 7311. C.P. 194.
9. *S. PANICULATUM*, Lindl. Illust. of Orch. pl. t. 9. Gen. and Sp. p. 233. C.P. 283.
10. *S. INSECTIFER*, R. fil. in Bot. Zeit. 1857, p. 159. C.P. 267.
11. *S. RUTILUS*, Par. MS. C.P. 197.
12. *S. LORIFORME*, Par. MS. C.P. 117.<sup>1</sup>

*Camarotis*, Lindl. Gen. and Sp. Orch. cxli.

1. *C. PURPUREA*, Wall. Cat. 7329. Lindl. Gen. and Sp. p. 219. Sert. Orch. t. 19. C.P. 345.
2. *C. PALLIDA*, (*MICROPERA PALLIDA*, Lindl. Gen. and Sp. p. 219.) C.P. 46.
3. *C. OBUSA*, Lindl. Bot. Reg. xxx. Misc. 71. C.P. 148.

*Cleisostoma*, Bl. Lindl. Gen. and Sp. Orch. cxlvi.

1. *C. LANATUM*, Lindl. Journ. Hort. Soc. iv. p. 164. C.P. 48.
2. *C. WENDLANDORUM*, R. fil. in Seem. Bonpl. iii. p. 219. C.P. 93.

*Thrixspermum*, Lour.

1. *T. LEOPARDINUM*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 145. C.P. 269.
2. *T. TERES*, R. fil. Xenia, ii. p. 121. C.P. 212.
3. *T. LUNIFERUM*, R. fil. in Gard. Chron. 1868, p. 786. C.P. 55.
4. *T. ARACHNITES*, R. fil. Xenia, x. p. 121. C.P. 246.
5. *T. HYSTRIX*, R. fil. Linn. Soc. Trans. xxx. p. 145. (*DENDROCOLLA HYSTRIX*, Bl. Bijdr. p. 291.) Mergui, Griffith n. 1066. C.P. 285.

<sup>1</sup> I am unable to identify these last two *Sarcantha* with Prof. Reichenbach's names. —C.P.

*Acropsis*, Bl. Lindl. Gen. and Sp. Orch. lxxv.

1. *A. INDICA*, Wight's Icon. 1748 (bad). C.P. 76.
2. *A. JAVANICA*, Reinw. in Flora, 1825, ii. 4. Bl. Bijdr. 376. Griff. Pl. As. 318. C.P. 299.

*Thelasis*, Bl. Lindl. Gen. and Sp. Orch. clxviii.

1. *T. PYGMÆA*, Lindl. Journ. Linn. Soc. iii. p. 63. (*EUPHROBOSIS PYGMÆA*, Griff. in Cale. Journ. of Nat. Hist. v. 372, t. 26. Wight's Icon. t. 1732. C.P. 108.
2. *T. CARINATA*, Bl. Bijdr. p. 253. Lindl. Gen. and Sp. p. 253. C.P. 171.

*Appendicula*, Bl. Lindl. Gen. and Sp. Orch. clxvii.

1. *A. CALLOSA*, Bl. Lindl. Gen. and Sp. p. 230. R. fil. Otia Bot. Hamb. Fasc. i. p. 45. C.P. 355.
2. *A. REDUPLICATA*, Par. and R. fil. Otia Bot. Hamb. Fasc. i. p. 145. C.P. 365.

*Podochilus*, Bl. Lindl. Gen. and Sp. Orch. cliv.

1. *P. LUCESCENS*, Bl. Bijdr. p. 295, t. 12. Lindl. Gen. and Sp. p. 234. C.P. 159.
2. *P. MICROPHYLLUS*, Lindl. Wall. Cat. 7335. Gen. and Sp. p. 234. C.P. 247.
3. *P. ULTRATUS*, Lindl. Wall. Cat. 7336. Gen. and Sp. p. 234. C.P. 222.

## II. Pollen-masses, powdery, granular or sectile. Lindl.

Tribe IV. *OPHRYPEE*. Anther terminal, erect.

*Accras*, R. Br. Lindl. Gen. and Sp. Orch. clxxiv.

1. *A. ANGUSTIFOLIA*, Wall. Cat. 7061. Lindl. Gen. and Sp. p. 282. Wight's Icones, tab. 1691. C.P. 250.

*Gymnadenia*, R. Br. Lindl. Gen. and Sp. Orch. clxxi.

1. *G. SESAMOIDES*.
2. *G. HELFERI*, R. fil. in Flora, 1872, p. 276. Otia Bot. Hamb. Fasc. i. 1878, p. 39. C.P. 2.

*Platanthera*, Rich. Lindl. Gen. and Sp. Orch. clxxvii.

1. *P. SUSANNE*, Wall. Cat. 7052. *P. GIGANTEA*.—Bot. Mag. 3374, *HABENARIA GIGANTEA*.—Lindl. Gen. and Sp. p. 295. Wight's Icon. 920. Benth. in Flora Hong-kong, p. 362. C.P. 122.
2. *P. ROBUSTA*, Wall. Cat. 7036. Lindl. Gen. and Sp. p. 296, "*in regno Burmano, Promæ*." C.P. 370.

*Hemipilia*, Lindl. Gen. and Sp. Orch. clxxviii.

1. *H. CALOPHYLLA*, Par. and R. fil. Otia Bot. Hamburgh, 1878, p. 38. C.P. 348.

*Peristylus*, Bl. Lindl. Gen. and Sp. Orch. clxxix.

1. *P. CONSTRICTUS*, Lindl. Gen. and Sp. p. 300. Wall. Cat. 7043. C.P. 181.
2. *P. GOODERYOIDES*, Lindl. Gen. and Sp. p. 299. Wall. Cat. 7066. C.P. 169.
3. *P. PARISHII*, R. fil. Linn. Soc. Trans. xxx. p. 139. C.P. 216.

*Habenaria*, Willd. Lindl. Gen. and Sp. Orch. clxxxvii.

1. *H. STENOSTACHYA*, Benth. Fl. Hong-kong, p. 362. (*PLATANTHERA*, Lindl. in Kew Journ. Bot. vii. 37. *CLEOGLOSSUM CERNUUM*, R. fil. in Bonpland. 1855, 250. *C. PERISTYLOIDES*, R. fil. in Bonpland. 1856, 321. Wight's Icon. 1702.) C.P. 231.
2. *H. PELORIOIDES*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 139, tab. 27 a. C.P. 327.
3. *H. TIPULIFERA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 139, No. 8. C.P. 232.

4. *H. CHLORANTHA*, Par. and R. fil. Linn. Soc. Trans. xxx. p. 140, No. 9. C.P. 218 and 245.
5. *H. DIGITATA*, Wall. Cat. 7063. Lindl. Gen. and Sp. p. 307. R. fil. Linn. Soc. Trans. vol. xxx. p. 140, No. 10. C.P. 124.
6. *H. SPATULIFOLIA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 140, No. 11. C.P. 217.
7. *H. VIDEA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 140, No. 12, tab. 27 B. C.P. 223.
8. *H. CORYMBOSA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 141, No. 13. C.P. 329.
9. *H. TRICHOSANTHA*, Wall. Cat. 7208, Lindl. Gen. and Sp. p. 324, "*in regno Burmano*." C.P. 219.
10. *H. GENICULATA*, Wall. Cat. 7542. Lindl. Gen. and Sp. p. 324, "*in regno Burmano*." C.P. 226.
11. *H. COMMELINÆFOLIA*, Wall. Cat. 7037. *ORCHIS COMMELINÆFOLIA*, Roxb. iii. 451. Lindl. Gen. and Sp. p. 325. C.P. 227. "*in regno Burmano*."
12. *H. ROSTRATA*, Wall. Cat. 7051. Lindl. Gen. and Sp. p. 325, "*in regno Burmano*." C.P. 228.
13. *H. ACUTIFERA*, Wall. Cat. 7045. Lindl. Gen. and Sp. p. 325, "*Tavoy*." C.P. 229.
14. *H. PROMENSIS*, Wall. Cat. 7033. Lindl. Gen. and Sp. p. 320, "*in montibus Prome*." C.P. 225.
15. *H. LUCIDA*, Wall. Cat. 7047. Lindl. Gen. and Sp. p. 319, *Rangoon*. C.P. 224.
16. *H. LACERTIFERA*, Benthams, Flora Hong-kong, p. 362. *CELOGLOSSUM LACERTIFERUM*, Lindl. Gen. and Sp. p. 302. "*Tavoy*," Wallich. C.P. 230.

Tribe V. *ARETHUSEÆ*. "Anther terminal, opercular," Lindl.

*Galeola*, R. fil. (*ERYTHROCHIS*, Bl.) Lindl. Gen. and Sp. Orch. cclxix.

1. *G. HYDRA*, Xenia, Orch. ii. p. 77. Otia Bot. Hamb. Fasc. i. 1878, p. 40.  
*G. ALTISSIMA*, R. fil. Linn. Soc. Trans. vol. xxx. p. 125. (*ERYTHROCHIS ALTISSIMA*, Bl. Lindl. Gen. and Sp. p. 438.) C.P. 70.

*Vanilla*, Plum. Lindl. Gen. and Sp. Orch. cccxvii.

1. *V. PARISHII*, R. fil. Otia Bot. Hamb. Fasc. i. 1878, p. 39. C.P. 286.

*Pogonia*, Juss. Lindl. Gen. and Sp. Orch. cccxxii.

1. *P. VELUTINA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 142. (*EPICACTIS PLICATA*, Roxb. Fl. Ind. iii. 454. *POGONIA PLICATA*, Lindl. Gen. and Sp. p. 415). Compare *P. DISCOLOR*, Bl. Flora Javie, tom. 4, p. 128, tab. 53. C.P. 182.
2. *P. FLABELLIFORMIS*, Wall. Cat. 7400. Lindl. Gen. and Sp. p. 415. C.P. 164.
3. *P. MACULATA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 143. C.P. 165.
4. *P. CUPREA*, Par. MS. (*EPICACTIS JULIANA*, Roxb. iii. 453? *POGONIA JULIANA*, Lindl. Gen. and Sp. p. 414.) C.P. 166.
5. *P. PULCHELLA*, Par. MS. C.P. 322.

Tribe VI. *NEOTTEÆ*. "Anther dorsal," Lindley.

*Cnemidia*, Lindl. Gen. and Sp. Orch. cclxvi.

1. *C. SEMILIBERA*, Lindl. Gen. and Sp. p. 463. C.P. 239.

*Monochilus*, Lindl. Gen. and Sp. Orch. cclxxiv.

1. *M. FLAVUM*, Wall. Cat. 7380 (*EEFERIA FLAVA*). Lindl. Gen. and Sp. p. 487. C.P. 326.
2. *M. AFFINE*, Wall. Cat. 7383 (*EEFERIA AFFINIS*), Lindl. Gen. and Sp. p. 487. Wight's Icones, tab. 1728. C.P. 241.

*Cheirostylis*, Bl. Lindl. Gen. and Sp. Orch. cclxxv.

1. *C. FLABELLATA*, Wight's Icon. 1727. (*ZEPHANE MONILIFORMIS*, Griff. Not. iii. 397, t. 350. C.P. 311.

2. *C. MALLEIFERA*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 141. C.P. 248.
3. *C. PUBESCENS*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 141. C.P. 154.
4. *C. GRIFFITHII*, Lindl. Journ. Linn. Soc. i. p. 188. (*GOODYERA*, No. 9.) Griff. Not. iii. 393. C.P. 236.

*Hemaria*, Lindl. Gen. and Sp. Orch. cclxxvii.

1. *H. DISCOLOR*, Lindl. Gen. and Sp. p. 490. Ker. in Bot. Reg. fol. 271. R. fil. Linn. Soc. Trans. vol. xxx. p. 142. Var. *DAWSONIANA*, Benth. Fl. Hong-kong, p. 361. C.P. 324.

*Eleria*, Bl. Lindl. Gen. and Sp. Orch. cclxxxix.

1. *E. MOULMEINSIS*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 142. C.P. 237.
2. *E. MOLLIS*, Lindl. Journ. Linn. Soc. vol. i. p. 184, "*Burma, Griffith.*" C.P. 238.

*Georchis*, Lindl. Gen. and Sp. Orch. cclxxxii.

1. *G. FOLIOSA*, Lindl. Gen. and Sp. p. 496. (*GOODYERA*, Griff. Icon. t. 346, i. "*in regno Burmano.*") C.P. 240.

*Tropidia*, Lindl. Gen. and Sp. Orch. cclxxxiv.

1. *T. CURCULIGOIDES*, Wall. Cat. 7386. Lindl. Gen. and Sp. p. 497, "*ad ripas fluminis Attaran,*" Wallich. Benth. Fl. Hong-kong, p. 359. C.P. 338.

*Anactochilus*, Bl. Lindl. Gen. and Sp. Orch. cclxxxvi.

1. *A. ALBOLINEATUS*, Par. and R. fil. Linn. Soc. Trans. vol. xxx. p. 141. C.P. 325.
2. *A. SETACEUS*, Bl. Bot. Reg. t. 2010. Lindl. Gen. and Sp. p. 499. Bot. Mag. t. 5208. C.P. 379.
3. *A. DAWSONIANUS*. C.P. 172.

B. Anthers 2.

Tribe VII. *CYPRIPEDÆÆ*.

*Cypripedium*, L. Lindl. Gen. and Sp. Orch. cccxix.

1. *C. CONCOLOR*, Par. in Gard. Chron. 1865, p. 626. Bot. Mag. 5513. L'illustration Horticole, 1865, tab. 444 (very good). C.P. 57.
2. *C. PARISHII*, R. fil. in Gard. Chron. 1869, pp. 814 and 1858. Bot. Mag. 5791. C.P. 198.
3. *C. VILLOSUM*, Lindl. in Gard. Chron. 1854, p. 135. C.P. 92.

## CATALOGUE OF ORCHIDS

### GATHERED IN THE ANDAMAN ISLANDS, BY S. KURZ.

1. *MICROSTYLIS TRILOBULATA*, Kurz.
2. *LIPARIS*, Sp.?
3. *BULBOPHYLLUM ANDERSONII*, Kurz.
4. *BULBOPHYLLUM* (near to *B. TRISETORUM*, Griff. and *OXYSEFALA ORALIFOLIA*, Wight).
5. *DENDROBIUM CRUMENATUM*, Sw.
6. *DENDROBIUM*, Sp. 2=*OXYSTOPHYLLUM*, No. 5065 and 5066, Herb. Helfer.
7. *DENDROBIUM*, Sp. 3. (*APORUM*, near to *SERRA*.)
8. *ERIA KURZII*, T. Anderson.
9. *ERIA ELONGATA*? Lindl.
10. *PHOLIDOTA IMBRICATA*, Sm.
11. *PHAJUS*? Sp.
12. *LUSIA*? Sp.
13. *VANDA*, No. 1. Flowers white, on Mt. Harriet.

14. VANDA, No. 2. Flowers rose-coloured. Common.
15. VANDA, No. 3?
16. VANDA TERES, Lindl.
17. TENIOPHYLLUM NORMALE, Kurz.
18. CLEISOSTOMA, Sp.? (or C. GALEATA, Thwaites?).
19. APPENDICULA, Sp.? (or AGROSTOPHYLLUM?).
20. CYMBIDIUM ALOIFOLIUM, Sw.
21. ACRIOPSIS, Sp.?
22. PERISTYLUS, Sp.?
23. VANILLA, Sp.?
24. ETERIA, Sp.?
25. TROPIDIA CURCULIGOIDES, Lindl.

\* \* \* Albumen floury. Embryo distinct.

#### ANOMALES.

*Flowers* usually hermaphrodite and very irregular (except in *Bromeliaceæ*). *Perianth* of 5 or 6 segments. *Stamens* 6, with 1 or 5 anthers, the rest petaloid. (In *Bromeliaceæ* all bear anthers.) *Ovary* usually 3-celled. Fruit a berry or capsule.

#### Order BROMELIACEÆ.

*Flowers* hermaphrodite, regular or nearly so. *Perianth* sex-merous, bi-seriate, the exterior calycoid, the inner petaloid. *Stamens* 6. *Ovary* 3-celled. Fruit a berry indehiscent, or a 3-valved capsule. Generally stemless herbaceous plants, with perennial stock and fibrous roots and mostly epiphytic.

#### ANANASSA.

\*A. SATIVA, Schult.

Cultivated all over Burma and the Nicobars.

Na-nat. Pine-apple.

The *Bromeliaceæ* are all American plants. The pine-apple is the most important, and when fine is the most delightful fruit of the tropics, being juicy, wholesome, and fragrant. The leaves yield a beautiful fibre, which in countries like Burma, where the pine-apple flourishes like a weed about villages, should become of commercial importance; and a cheap and simple way of extracting and preparing the fibre seems all that is necessary to insure its becoming so.

#### Order MUSACEÆ.

*Flowers* hermaphrodite or unisexual, irregular. *Perianth* superior, corolla-like, secpartite in 2 distinct rows, the outer perianth triphyllous, the inner 3 segments developed, or the 2 perianths united into 2 lip-like segments. *Stamens* 6, adnate to the base of the perianth, or free, or often the postichous stamen aborted. *Anthers* linear, 2-celled, turned inwards. *Ovary* inferior, 3-celled, with many, or rarely a solitary ovule in each cell. *Style* simple; *stigma* usually trilobed. Fruit either a 3-celled woody capsule, opening loculicidally, or succulent and indehiscent or irregularly bursting. *Seeds* usually imbedded in pulp, or rarely with a hair-like arillus, the testa usually crustaceous. *Albumen* mealy. *Embryo* straight, oblong-linear, or mushroom-shaped.

A small order of great economical importance. It contains only a single woody tree, the rest being either low or tree-like tall herbs. The plantains and banana are well known as nutritive fruits, and many, if not all, of the species of *Musa* yield more or less valuable fibre, amongst which the Manilla-hemp (*Musa textilis*) is best known in commerce. The juice of most plantains may be used for blackening leather.

RAVENALA, *Sonnerat*.

\* R. MADAGASCARIENSIS, Sonn.

Occasionally cultivated by Europeans.

The traveller's tree.

An evergreen palm-like tree, all parts glabrous; the trunk annulate. *Leaves* distichous and crowded at the apex of the trunk. *Flowers* large, whitish, sessile,  $\frac{1}{2}$ -whorled at the base of the bract. *Capsules* 2 or 3-cornered, and 2 or 3 inches long, tardily dehiscing into 3 woody valves. *Seeds* numerous, covered with a beautiful azure, fibrous arillus. *Albumen* almost bony.

MUSA, *Linnaeus*.

\* M. SAPIENTUM, L.

Cultivated throughout Burma and in Kamorta.

*M. paradisiaca*.

M. SIMIARUM, Rumph.

Kurz is uncertain if the wild plantains of Kamorta belonged to this species or not, as they were out of flower.

M. RUBRA, Wall.

Pegu. Martaban.

M. COCCINEA, Roxb. vol. i. p. 625. (P.).

M. SUPERBA, Roxb. vol. i. p. 667. (P.).

M. GLAUCA, Roxb. vol. i. p. 669. (P.). Pegu.

Under the head of *M. paradisiaca*, Dr. Mason makes the following remarks: "The plantain or banana, though a far less palatable fruit, holds the same place in this country that the apple does in England and the United States. It is used as a vegetable as well as an article for dessert, the great proportion being eaten with rice and meat in the place of potatoes. . . . .

"Like the mango, the tree is indigenous, but the wild fruit is too full of seeds to be eatable. The plantain and banana, which were formerly regarded as distinct, are now considered by botanists as one species, but it embraces many varieties. I have the Burmese names of 25 before me. 'The numerous varieties,' writes Voight, 'we have in vain tried to put in some order. The attempt made for this purpose in Schultens appears to us to have only increased the confusion.'

"The *Mauilla hemp*, from which a fabric of the finest texture is prepared, is made from the leaves of a species of plantain-tree, *M. textilis*. Another distinct species of this genus grows wild in our jungles and is rather an ornamental plant, which is all that it has to recommend it. Unlike the common plantain, it never throws up shoots from its roots. The name of the plantain in Pali is *Mauza*, which is its Arabic name *Mauz* with a final vowel added to pronounce the last consonant, no words in Pali ending in any consonant excepting *n*. Now if its Arabic name be so widely diffused, it seems quite certain, that had the plant been known to the Hebrews, the Hebrew being cognate with Arabic, it would have had a similar name. This fact is a sufficient refutation of the conjectural interpretations of certain passages of Scripture that we meet with from time to time. Thus, Loundolf's conjecture that *dudaim* (Mandrakes) were the fruit of *Musa paradisiaca* (plantain-tree), which has been recently revived in a modern work, cannot stand, on account of its name. For the same reason the conjecture that the grapes which the spies brought from Canaan were plantains cannot be sustained. The plantain seems a favourite plant to build fancies upon. Gesenius, in defining *tecnah*, the fig-tree, refers to Gen. iii. 7, 'where,' he says, 'the *Ficus indica*, or *Musa paradisiaca*, plantain-tree (Engl.), with very large leaves, seems to be meant.' This is perfectly conjectural, and is wholly unsustained by the usage of the word, as well as that it bears no resemblance to its Arabic name."

It is commonly supposed that the *Mandrake* of the above passage is the *Atropa mandragora* (see Kitto's Cyclopædia); but according to S. J. Hooker (Maout and Decaisne's Botany, Trans. p. 580), the *Mandragora* has somewhat analogous properties to *Belladonna*, and was formerly used by sorcerers to produce delusions in their dupes. The *Dudaim* or '*Mandrake*' of Scripture was, however, used as a simple 'philtre,' just as over the entire East, the '*Salep*' is so esteemed, and there is no valid reason why some species of *Orchis*, or root having similar reputed virtue, may not

rather be the true Love-apples intended. Dudaim are but twice mentioned in Scripture (Gen. xxx. 11, 18, and in Solomon's Song, vii. 13), in both instances in connexion with scenes of love, or in other words as 'philtres' or provocatives of the passion; but for a fuller exposition of this subject reference may be made to Inman's work,<sup>1</sup> under the heading 'Mandrakes,' and La Mythologie des Plantes,<sup>2</sup> vol. ii. p. 213.

#### Order ZINZIBERACEÆ.

*Flowers* hermaphrodite, irregular. *Prianth* superior, double; outer herbaceous, triphyllous; inner petaloid, irregular, composed of petals and staminodes. *Stamen* solitary, anterior. *Anther* 2-celled. *Ovary* inferior, usually 3-celled. *Ovules* anatropous. *Fruit* usually a capsule. *Seeds* with 2 albumens, a farinaceous and a horny. *Embryo* with the cotyledonary end sheathed by the vitellus, the radicular free and touching the hilum. Herbs with creeping or tuberous rhizome.

#### *COSTUS, Linnæus.*

*C. ARGYROPHYLLUS*, Wall. (M.).

Pa-lang-toung-weh.

Thu-leh-lpe-dō (Sgau).

*C. SPECIOSUS*, Sm. (M.).

This is not the 'costum' of the ancients, which is still largely used in China in precisely the same way as it was in Rome for burning as incense.

"Costum molle date et blandi mihi thuris honores

Terque focum circa laevis orbis eat."—*Propertius*, Lib. iv. 6, 5.

The root of *C. speciosus* is void of scent, and the plant above alluded to has been ascertained by Falconer to be the root of *Aucklandia costus*, Falconer, one of the *Compositæ*, which grows on the Himalaya between 7500 and 9000. Its name in Kashmir is 'Kooth,' and it is there used to scent shawls and protect them from the moth. The roots are dug up in September and simply dried, after being cut up in lengths of 6 inches. In Kashmir it costs about 1 rupee 3 annas a hundredweight, but at Jagadri, on the Jumna, the price averages 10 rupees, and nearly double in the Chinese ports, where it ultimately finds its way. In the markets of Calcutta and Bombay it is called Putchuk. See Balfour's *Cyclopædia of India*.

#### *MONOLOPHUS, Wallich.*

*M. ELEGANS*, Wall. (M.).

Kwōn-ka-dō.

#### *CURCUMA, Linnæus.*

\* *C. LONGA*, Roxb.

Hsū-nwen.

Common turmeric.

*C. ROSCOEANA*, Wall.

Hmān-then.

*C. ERUGINOSA*, Roxb.

*C. ATTENUATA*, Wall.

*C. COMOSA*, Roxb.

*C. ELATA*, Roxb.

*C. ORNATA*, Wall.

*C. CORDATA*, Wall.

*C. PARVIFLORA*, Wall.

*C. PETIOLATA*, Roxb.

*C. PPLICATA*, Wall.

*C. STROBILINA*, Wall.

<sup>1</sup> Ancient Faiths embodied in Ancient Names, by Thomas Inman, M.D. London, 1868.

<sup>2</sup> La Mythologie des Plantes ou les Legends du Règne végétal, par Angelo de Gubernatis, Paris, 1882.

To the above species given by Mason may be added—

C. ZEDOARIA, Roxb.	Bengal. Chittagong. China.
C. <i>aromatica</i> , Salis.	
C. RUBESCENS, Roxb.	Bengal. Pegu.

The genus *Curcuma* is a very important one, as yielding turmeric and arrowroot.

Turmeric is the root of *C. longa*, and some other species yield a similar but distinguishable condiment. The principal use of turmeric is as an ingredient of curries, as it assists digestion by its stimulant and carminative properties, care being taken to cook it thoroughly, whereby its peculiar odour is entirely dissipated. It is also universally applied externally with the belief in its curative powers in fever and other complaints, and though not used in European medicine, a decoction applied cold on a piece of linen to the eye is said by Waring<sup>1</sup> to give great relief to the burning sensation in ophthalmia. It is also used by dyers, and in various religious ceremonies among the Hindus. Paper coloured yellow by an alcoholic tincture of turmeric is a highly sensitive test of the alkalinity of any solution, an alkaline solution turning the yellow to red or brown. Various species of *Curcuma* yield arrowroot, collectively known as East Indian arrowroot, which, though inferior to the best West Indian, is, when well prepared, an excellent article, both as a food and for any purpose for which a pure starch is required. The species mostly used are *C. caulina*, *C. angustifolia*, *C. rubescens*, and *C. leucorhiza*, but the roots of many species of this order yield starch in profitable quantity.

#### KEMPFERIA, *Linnaeus*.

K. GALANGA, L. (M.).

Kha-noung.

So named by Linnæus, from its being supposed by him to yield the 'Galangal' root of commerce, a brown tuberous root with a faint aromatic smell, and pungent taste something between pepper and ginger. 'Galangal' root would, however, seem to be produced by several species of Zinziberaceous plants of the genus *Kempferia* and *Alpinia*.

\* K. ROTUNDA (M.).

Mye-ban-touk.

Cultivated, according to Mason, for its sweet scented flavour.

K. MARGINATA, Carey (M.).

K. CANDIDA, Wall. (M.).

Pan-n-hpyu (M.). Padat-zā (Th.).

K. ROSCOEANA, Wall. (M.).

K. PARVIFLORA (M.).

Ka-mung-ni.

Ka-mung-net.

K. ELEGANS, Wall.

K. PARISHII, Hook. fil. Bot. Mag. tab. 5763. (P.).

Mason gives as vernacular names for other species of *Kempferia*, Ka-mung-taing-byā. Ka-mung-kyet-lā. Kyo-ka-mung.

*K. candida* or an allied species is one of the most conspicuous harbingers of the hot season, thrusting up its crocus-like flowers from the parched earth as the hot weather begins to make itself felt. It is called padāt-za, from constituting the favourite food of the *Padāt* (*Liolepis guttatus*). It is also cooked and eaten.

#### AMOMUM, *Linnaeus*.

A. CARDAMOMUM, L.

Men or Ben.

<sup>1</sup> Manual of Therapeutics, E. J. Waring.

A. CORYMBOSTACHYUM, Wall. (M.).

Gung-men.

A. XANTHOIDES, Wall.

A. (DYMCEWICZKIA) FLEZLI, Kz. Kamorta (K.).

ELETTARIA, *Rheede*.

E. CARDAMOMUM, White (M.).

Ba-la or Pa-la.

ALPINIA, *Linnaeus*.

*Ouler perianth* tubular or campanulate, stiff, 3-toothed, and often splitting to the base. *Inner perianth* petal-like, united at the base, with the stamens in a tube, the limb of 3, usually unequal lobes. *Staminal whorl* consisting of 1 large petal-like labellum, opposite to a single fertile stamen, and in some species a small linear lobe on each side between the labellum and the stamen. *Filament* not dilated. *Anther* 2-celled. *Style* filiform, with a concave terminal stigma. *Ovary* 3-celled, with many ovules. *Fruit* globular, scarcely succulent, but not opening in valves. *Seeds* few, arillate. Erect herbs with a tuberous rhizome.

A. ALLUGHAS, Roscoe (M.).

A. BRACATA, Roxb. (M.)

A. NUTANS, Roscoe (M.). India. Ceylon. S. China.

Pa-gan-theing or Pa-gau-gyi.

A. PHENICEA, Kamphœvener. Nicobars (K.).

A. MALACCENSIS, Roscoe. Roxb. vol. i. p. 64. (P.).

*Cardamoms* are the product of several species of *Amomum*, *Elettaria*, *Renealmia*, and *Alpinia*, whereof the finest are produced by *E. cardamomum*, a native of Travankor and Canara, but included by Mason among the plants of Burma. Cardamom seeds are aromatic and stimulant, and highly prized in native cookery, and for chewing with 'pān,' and are also largely exported to Europe as spice.

ZINZIBER, *Gaertner*.

\* Z. OFFICINALE, Roscoe (M.).

Khyen-seing.

Z. ZERUMBET, Roscoe (M.).

Z. PARDOCHILUM, Wall. (M.).

Z. SQUARROSUM, Roxb. (M.).

Z. PANDURATUM, Roxb. (M.).

Z. BARBATUM, Wall. (M.).

Mi-tha-len.

The following vernacular names are also given by Mason for different species of *Zinziber*:—Kan-cik. Khung-htai-wen. Sa-kwā.

DISCHEMA, *Wight*.

D. GLAUCUM, Voigt. (M.).

HEDYCHUM, *König*.

\* H. CORONARIUM, Koch. (M.).

Lan-theh or Thit-khet-lan-theh.

Of this species Mason writes: "The garland flower, a species of *Hedychium*, but regarded by Europeans as a lily, is much cultivated, both by natives and foreigners. The yellow and white varieties are both common. Mason also describes two other species, one "a very fragrant species with long narrow petals and an epiphytic habit, often seen in Tavoy, and another, with a "sulphur-coloured flower," found on the Bghai mountains.

H. BARBATUM, Wall. (M.).

GASTROCHILUS, *Wallich*.

G. PULCHERRIMUS, Wall.  
G. LONGIFLORUS, Wall.

HEMIOCHILUS,<sup>1</sup> *Kurz*.

*Flowers* spicate, sessile. *Calyx* tubular, trifold. *Perianth tube* filiform, shorter than the calyx. *Ovary* 1-celled, placentas 3, parietal. *Style* filiform. *Stigma* slightly thickened, obliquely truncate. *Capsule* 1-celled, subplicate 10-furrowed, 3-valved. *Seeds* conical, basally albo-arillate. Perennial herbs with the habit and essential character of *Gastrochilus*.

II. BURMANICA, Kz.

Pegu and Tenasserim.

MONOLOPHUS, *Wallich*.

M. ELEGANS, Wall.  
Kwōn-ka-do.

GLOBBA, *Linnaeus*.

G. MARANTINA, L.  
G. CAREYANA, Roxb.  
Pa-deing-ngō.

G. SCHOMBURGKII, Hook. fil. Bot. Mag. tab. 6298. (P.).

Dr. Mason writes: "On shady banks, where violets grow in England, the pretty orange-flowered *globba* is common. The long curved filament, ornamented with a large orange-coloured 2-lobed lip, or apron, attracts the attention of most observers. The Burmese call it "the weeping crim."

G. EXPANSA, Wall.  
G. BRACTEOLATA, Wall.

The root and seeds of *Zinziberaceæ* contain various volatile oils, an aromatic resin, a bitter principle, a variable amount of starch and sometimes a yellow colouring matter (*curcumine*), hence some species are cultivated for their stimulating and carminative properties and agreeable flavour, as those yielding ginger, turmeric, and cardamoms, whilst an excellent arrowroot is obtained from the tuberous rhizome of other species, in some cases possessing, however, a yellowish tint. 'Grains of Paradise' are the seed of an African species of *Amomum*, and are chiefly used for purposes of adulteration.

## Order CANNACEÆ.

*Flowers* hermaphrodite, irregular. *Perianth* sex-partite, 3 outer segments herbaceous, regular; inner segments petaloid, irregular. *Stamen* 1, lateral. *Anther* 1-celled.

PHRYNIUM, *Willdenow*.

P. MACROSTACHYUM, Wall. (M.).  
Wa-thaing.

Mason also gives as names for species of *Phrynium* Myen-wā and Yung.

MARANTA, *Linnaeus*.

M. (PHRYNIUM) SPICATA, Roxb. (M.).

\* M. ARUNDINACEA, L.

Burma. Andaman.

Pen-bwā.

M. DICHOTOMA, Wall.

Katchall. Kamorta and Nankowry.

M. grandis, Miq.

Then.

The stems of this plant Mason says are split and made into mats.

<sup>1</sup> Characters abbreviated from Latin description, J.A.S.B. 1873, p. 108.

Mason observes, "The true arrowroot plant (*M. arundinacea*) was introduced several years ago by Mr. O. Riley, and is beginning to be largely cultivated. The arrowroot made is not inferior to any imported, while it is sold at half the price at a good profit. A gentleman at Tavoy has sold a considerable quantity for exportation this year, and has orders for more than a thousand pounds of the next crop."

The name 'arrowroot,' which of course refers to the specific term '*arundinacea*,' was originally applied to the plant from a belief in its efficacy as an antidote to the wounds made by arrows, poisoned with the juice of the *Manchineel*.

#### CANNA, *Linnaeus*.

*Outer perianth* of 3 short stiff persistent segments. *Inner perianth* petal-like, united at the base in a tube with the stamens, and deciduous with them; the limb of 3 nearly equal segments. *Staminal whorl* consisting of 4 petal-like segments, 3 barren (often called inner corolla), the fourth bearing a 1-celled anther on one side. *Ovary* 3-celled, with several ovules. *Style* flattened, with a terminal stigma. *Capsule* muriculate, 3-valved. Herbs with erect stems. *Flowers* on a terminal interrupted simple or branched spike.

C. INDICA, L. (M.).

Bud-da-tha-ra-nā.

C. GLAUCA, Ditcher.

Mopoon (Maulmain). (P.).

The seeds of several species of *Canna* can be used as a substitute for coffee, and some yield a blue dye. The plant is much cultivated by the Burmese, who use its seeds for their rosaries. Its addiction to marshy localities was alluded to by Ovid,

"Quam Platanus rivo gaudet, quam Populus unda  
Et quam limosa Canna palustris humo,  
Tam Venus otia amat."—*Remedium Amoris*, 141.

The *Cannaceæ* are by some united with the *Zinziberaceæ* which last, however, differ in their 2-celled anther and the presence of aromatic principles, which the former want.

\*\*\* *Albumen none. Embryo distinct.*

#### HYDRALES.

*Flowers* usually diclinous, regular. *Perianth* 6-partite. Three outer segments herbaceous, 3 inner petaloid or none. *Stamens* 3 or more, epigynous, or inserted on the base of the perianth-segments. *Ovary* 1, 3, or 6-celled. *Fruit*, a berry. Embryo distinct. Exalbuminous. Aquatic herbs.

#### Order HYDROCHARIDEÆ.

*Flowers* usually diclinous, inclosed in a membranous spathe. *Perianth* 6-merous, 2-seriate (*calyx* and *corolla*). *Fruit* a berry. *Leaves* usually radical. Aquatic plants.

#### STRATIOTIDIEÆ.

*Stemless, scapigerous. Ovary many-celled. Stigmas 6.*

ENHALUS, L. C. Rich.

E. ACOROIDES, Steud.

Shallows round the Nicobars, especially opposite the debouchures of rivers.

This plant, observes Kurz, forms submarine meadows, and grows to 4 feet in length. On the coral-reefs of Katchall a small form occurs with leaves never more than 6 inches long.

BOOTTIA, Bigel.

B. CORDATA, Wall. (M.).

#### VALLISNERIEÆ.

*Stemless, scapigerous. Ovary 1-celled. Stigmas 3. Leaves all radicle, linear.*

BLYXA, *Thouars.*

*Flowers* usually diœcious, in a long tubular spathe, 2-toothed at the top. *Male flowers* several in the spathe, protruding from it as they expand. *Perianth* of 3 outer herbaceous, and 3 inner petal-like segments. *Stamens* 8 or 9. *Anthers* linear. *Female flowers* solitary in the sheath, with a long filiform perianth-tube, the segments as in the males. *Ovary* linear, with 3 parietal placentas. *Stigmas* 3, entire. *Capsule* linear, with a few seeds.

B. ROXBURGHII, Rich.

Rivulets in Kamorta (K.). India.  
Ceylon. S. China.VALLISNERIA, *Linnaeus.*

This genus is not mentioned by Mason, but no doubt it occurs in Burma. As it grows submerged, a remarkable provision is noticeable with reference to its fertilization. *Vallisneria* is diœcious, but the male plants always grow near the female ones. "The *female flower*, protected by a spathe, is borne on a long peduncle which rises from a tuft of radical leaves, and the *ovary* bears three forked *stigmas*. The *male flowers* are borne on a very short peduncle, and are sessile on a conical axis enveloped in a spathe. At the flowering period the female peduncle gradually lengthens, so that the flower finally floats on the surface of the water, and opens its *perianth* of six very minute segments. Then the *male flowers*, which have hitherto remained submerged, detach themselves spontaneously from their peduncles, and rise to the surface, where numbers of them may be seen floating around the *female flower*, on which the *anthers* elastically project an abundance of pollen. After fertilization, the peduncle of the *female flower* contracts spirally, and the *ovary* descends to the bottom of the water to ripen its seed."<sup>1</sup>

## ANACHARIDIEÆ.

Canescent. *Leaves* opposite or whorled.

To this tribe belongs the American water weed *Anacharis*, which has proved such a nuisance in some English canals, where it flourishes luxuriantly, having been introduced probably into the English docks in timber.

## CLASS IV. DICOTYLEDONS.

STEM WHEN PERENNIAL FURNISHED WITH A PITH, SURROUNDED BY CONCENTRIC LAYERS OF WOOD, AND THE WOOD BY A SEPARABLE BARK. FLORAL WHORLS USUALLY IN FOURS OR FIVES, OR MULTIPLES OF THOSE NUMBERS.

## Sub-class GYMNOSPERMS.

Ovules naked. *Ovary* or *stigma* none (save in *Gnetaceæ*). Seeds naked, fertilized by the direct application of the pollen to the apex of the nucleus, which the pollen-tube penetrates. Flowers unisexual (except in *Welwitschia*).

## Order CYCADEÆ.

*Flowers* diœcious, the *males* in large cones consisting of numerous thickened flat, or variously peltate scales bearing the numerous pollen-cells on the under-surface or on both surfaces. *Pollen-cells* dehiscing by a longitudinal slit, sessile or very shortly stalked, often stellately connected by threes or fours, rarely free. *Female flowers* either consisting of a carpellary leaf (spadix), and in this case crowded round the apex of the trunk, or more usually consisting of flat, or thickened, or variously peltate scales forming a large cone. *Ovules* large, sessile, either several inserted along the border of the spadical stalk, or solitary at each side of the scale. *Seeds* more or less ovoid, dry and hard, or the integument thin and coloured outside, and fleshy under the

<sup>1</sup> Maout and Decaisne, p. 156.

epidermis, so as to appear somewhat drupaceous. Endosperm copious, fleshy, or more usually hard and bony. *Embryo* usually solitary by abortion, minute, the radicle continuous with the persistent suspensory thread. *Cotyledons* 2, oblong, the plumule distinct. Small trees with a thick simple or sometimes branched, often scarred trunk, or the trunk very short or altogether subterranean. *Leaves* usually pinnate, rarely simply or doubly pinnatisect, of a very firm texture, and arising from and around the apex of the trunk. *Flower-cones* often peduncled, cylindrical or ovoid, terminal or lateral.

All species abound in a mucilaginous nauseous juice, with which is often mixed a great quantity of starch, which sometimes serves for food to the natives.

*Cycas, Linnæus.*

*Scales of the male cones* almost imbricate, more or less euneate, and often produced in an acumen, the under side covered with pollen-cells. *Female spadices* loosely imbricated round the top of the trunk, rather thick, narrowed into a shorter or longer stalk, and more or less dilated above the ovules into an entire or pectinate blade. Ovules 1-5 on each side of the carpellary stalk, distant, alternate or opposite, more or less immersed and almost erect.

\* *Fruits densely tomentose.*

*C. REVOLUTA.*

Coast of Tavoy (P.).

\*\* *Fruits when ripe glabrous.*

‡ *Trunk epigeous, 6-30 feet high. Ovules 2-5 on each side of the frond-stalk.*

*C. CIRCINALIS.*

Limestone hills of Martaban (P.).

Female spadices with a pectinate-toothed sterile lamina tapering to a pectinate tip.

*C. RUMPHII, Miq.*

Beach forests of Southern Tenasserim. The Andamans.

Mu-daing.

Kamorta. Katchall and Car Nicobar (K.).

Female spadices with a sparingly toothed or almost entire sterile lamina, the tip quite entire.

The wood of this species is rich in sago, the seeds yield flour, and the stem exudes a resin used for dressing sores.

*C. PECTINATA, Griff.*

Female spadices with a very broad, deeply pectinate, lacerate sterile lamina, the tip entire.

‡‡ *Trunk hypogeous, or shortly protruding from the ground. Ovules solitary on each side of the frond-stalk.*

*C. SIAMENSIS, Miq.*

Eng forests of Prome.

Female spadices with a very broad, deeply pectinate, lacerate, sterile lamina, the acumen broad and as long as the lamina itself, with a few spiny serratures.

Exudes a whitish gum like tragacanth.

From the pith of the stems of some trees of this order a considerable quantity of sago is prepared by simply grating and washing it. The seeds also yield a sort of flour, and the mucilaginous sap of some species concretes into a gum resembling tragacanth.

Order GNETACEÆ.

*Flowers* in catkins, diœcious or monœcious, rarely polygamous. *Bracts* numerous, very rarely distinct, but usually more or less connate into an entire cup, or into a more or less deeply 2-lobed involucre. *Male flowers*: *Bractlets* 2, connate, and forming a perianth-like usually 2-lobed involucre to the anthers. *Perianth* none. *Stamen* 1 or few inserted on the bottom of the involucre; *filament* simple or bifid at the apex, or if several are present, connate at the base. *Anthers* 2, very rarely 3-celled, opening by a terminal transverse slit or pore. *Female flowers*: *Bractlets* 2

to 4, decussately opposed and connate, forming a simple or double closed cup, perforated only at the apex, the outer cup, if present, winged, and rarely enlarging with ripening of the fruit. *Ovary* solitary in the axil of the bractlets, 1-celled, with a single erect ovule. *Stigma* obliquely ligulate, discoid, or fringed. *Seed* solitary, with coriaceous or fleshy testa, and forming a fleshy or dry drupe. *Albumen* fleshy. *Cotyledons* 2, large or small, and tooth-like. *Radicle* superior. Trees or shrubs, often scandent, with jointed branchlets. *Leaves* either broad and opposite, or reduced to a minute 2-4 toothed sheath at the joints. *Flowers* forming interrupted or imbricate dense globular or cylindrical catkins, arranged singly, or by twos, or a few on a brachiate branched peduncle.

GNETUM,<sup>1</sup> *Linnaeus*.

*Flowers* monœcious or diœcious, intermixed with bristle-like, jagged, jointed white or rusty-coloured scales. *Catkins* cylindrical, jointed, the females often interrupted. *Males*: *Involucre* 2-valved. *Stamens* 1. *Filament* simple, or forked at the apex. *Anthers* didymous. *Females*: *Involucre* consisting of decussate bractlets connate by pairs and forming an outer and inner ureole, each perforated at the apex. *Ovary* solitary, erect. *Style* long, filiform, with a fringed stigma.

\* *Fruit* narrowed into a stalk. *Hair-like scales* round the flowers, tawny or rusty.

G. EDULE, Bl. *E.S.*

Tree forests of Arakan. Pegu. Tenasserim and the Andamans.

Gyut-nweh (Kurz).

Diœcious. Fruit covered with silvery scales, the stalk thick and short, leaves of a thinner texture, with a very lax thin net-venation.

G. FUNICULARE, Bl.<sup>2</sup>

Tree forests of Chittagong and Tenasserim.

Gyut-nweh (Kurz).

Diœcious. Fruits quite glabrous, the stalk slender, about 2-3 lines long or more. Leaves rigidly coriaceous, the net-venation rather close, elegant and conspicuous.

\*\* *Ovary and fruit sessile and glabrous.*

G. NEGLECTUM, Bl.

Arakan and Southern Tenasserim.

A diœcious climber. Leaves rigidly coriaceous, turning black in drying. Hairs round the ovary copious, brown.

G. GNEMON, L.

Southern Tenasserim.

var. *macrophylla*.

Tree forests of Kamorta. Trice and Track.

A monœcious shrub. Leaves thick-membranous, remaining yellowish-green on drying. Hairs round the flowers copious, white. The Nicobar race is well marked.

<sup>1</sup> There would seem to be a difference of opinion among botanists as to the true structure of this peculiar plant. Lindley says of the Order: "*Ovary* O. Ovule pointed by a style-like process formed from a third membrane, surrounding the nucleus."—*Vegetable Kingdom*, p. 232. Endlicher, on the other hand, *Genera Plantarum*, vol. i. p. 262, says of the same Order, *Gnetaceæ*: "*Ovarium sessile, apice pervium*;" and under the genus *Gnetum*, he says (after repeating the previous words), "*Ovulum solitarium, e basi ovarii erectum, apice in styliformam attenuato, longe exserto, pertuso*."

To throw a little light on this remarkable discrepancy, the following observation is added from Lindley (*in loco*): "In the genus *Gnetum* the development of the ovule is so peculiar that botanists at one time, including myself, supposed that the real ovule was in truth an ovary pierced at the summit, for it consists of an exterior shell of considerable thickness and of a green colour; within which is a thinner envelope through which passes a *tubular projection fringed at the point*, and within lies a nucleus, etc." He adds further: "It is to Mr. Griffith that I owe the knowledge of these plants."

The "*tubular projection fringed at the point*" is doubtless Kurz's "style long erect, filiform with a *fringed stigma*." If, farther, for "ovary" we read "ovule," he will be in fair accord with Endlicher, though not with Lindley.—C. Parish.

<sup>2</sup> Bentham remarks: "Miquel after Blume describes the *G. funiculare* as diœcious. The Hong-kong specimens I have examined have certainly the female flowers intermixed with the males, as described by Roxburgh."—*Flora Hongkongensis*, p. 336.

Kurz also adds for the Nicobars:

*G. MACROPODUM*, Kz.

Tree forests of Kamorta.

And Mason adds:

*G. SCANDENS*.

*G. BRUNONIANUM*.

### Order CONIFERÆ.

*Flowers* monœcious or diœcious in catkins. *Bracts* in *males* numerous, inserted to the rachis, more or less crowded, and imbricate at the base, very often narrowed into a stalk, peltate or half-peltate at the apex, sometimes produced on the back in a resinous gland, bearing the anthers on the under-surface or laterally. *Stamens* usually reduced to sessile anthers, or rarely with a short filament, by twos or more, under each bract, the anthers arranged in a single or double row, 1-celled, opening by a longitudinal (rarely by a transverse) slit. *Bracts* in *females* 4 or more, free, or more or less connate, arranged in spirals decussately, or in whorls of 3 or 4 each, the lower and uppermost ones sometimes sterile, membranous, chartaceous, or coriaceous, or (along with the rachis) fleshy. *Involucre* (in *Taxinæ*) simple or double, short or urceolate, and inclosing the ovary. *Ovaries* 2 or more, rarely solitary, usually collateral or superposed, more or less compressed, with a solitary orthotropous ovule. *Style* short, or very short. *Stigma* almost orbicular, often more or less bifid. *Fruit-cones* either consisting of coriaceous or woody imbricate or decussate scales, or of variously connate fleshy ones, and truly or spuriously drupaceous. Nuts by twos, or more rarely solitary, usually shorter than the scales. *Pericarp* usually bony, woody or membranous, often with 1 or 2 or 3 wings, rarely wingless. *Embryo* (sometimes several embryos in the same seed) resting in the axis of the oily-fleshy or mealy albumen, and almost as long. *Cotyledons* 2, but often deeply lobed so as to simulate 3 or 5 separate cotyledons. The radicle short, inferior or superior. Trees or shrubs, usually evergreens, abounding in resin, with usually clustered or solitary linear, or more or less terete or angular, rarely broad leaves. *Catkins* terminal, solitary or variously clustered, racemose or racemose-panicled.

An order which is represented only by 5 species in Burma, but which is of the highest importance to the forester, especially in temperate climates. Deal, fir, pine, and cedar are all woods generally known, but the timber of most of the other species is of equal value. Some of them attain an enormous height, like *Sequoia sempervirens* and *gigantea*, of California, which reach 330 and even 450 feet in height, with a girth of 80–100 feet. Oil of turpentine, pitch, balsams, and resins are yielded by trees of this family in great quantity.

### *Pinus*, *Linnaeus*.

*Flowers* monœcious in catkins. Scales numerous, narrowed at the base or almost stalked, the males bearing the 2 anthers on the under surface. The *female scales* composed of a fleshy or coriaceous lepidium, and a thin bract, either distinct or adnate to the base. *Nuts* in pairs, or solitary by abortion, with a membranous or bony pericarp, winged or wingless. Evergreen trees with linear or acicular leaves, solitary or clustered by 2–5 and sheathed at the base.

*P. KASYA*, Royle.

Lushai Hills and Martaban Hills at  
3000 to 7000 feet.

Tin yu (Kurz). Generic.

Leaves by threes, opercle of scales not zonate. A stately tree growing to 200 feet in height according to Brandis. Wood very resinous.

*P. LATTERI*, Mason.

Salween and Thoungyeen Valleys at  
500 to 2500 feet.

*P. Merkusii*, Jungh.

*P. Massoniana*, Lamb (apud Brandis).

Leaves by pairs. Opercle zonate.

This pine appears to have been first noticed and described by Dr. Mason, who believed that "Capt. Latter was the first European to visit the locality where the tree

is indigenous, and from specimens of the foliage and fruit which he brought away, it appears to be a new species that must be characterized thus." After briefly describing it, Dr. Mason goes on to add: "The wood appears to contain more resinous matter than any other species of conifer I ever saw, and large quantities of both pitch and tar might be manufactured in the forests, if a remunerative price could be obtained for the article. A pine grows very abundantly beyond the water-shed East of Toung-ngoo, and a few in the South are seen on the West side. This Dr. Brandis regards as another new species, of which he has a description in preparation." This last species is doubtless the *P. Khasyana* of Dr. Brandis' list of 1862, where only the above 2 species are entered.<sup>1</sup>

Of the pine De Gubernatis thus writes: "Arbre funéraire et phallique . . . . Nous avons déjà dit plusieurs fois que les arbres funéraires sont symboliques de l'immortalité, de la génération et de la vie éternelle. Le pin,<sup>2</sup> comme le cyprès et le sapin, à cause de la solidité de leur bois et de leur feuillage toujours vert, figurait la perpétuité de la vie; ce symbole semblait donc convenir aux cérémonies funéraires chez les peuples qui croyaient à l'immortalité de l'âme."

Horace, for example, in his Ode to Posthumus, alludes to the funeral use of the Cypress:

"Linquenda tellus et domus et placeus  
Uxor; neque harum quas colis arborum  
Te, præter invisas cupressus  
Ulla brevem dominum sequetur."—Lib. ii. Ode xiv.

The reason sometimes assigned for the selection of the Cypress as a funeral tree is that, when once cut down, it never, as some trees, sends up a new shoot from its stump; but De Gubernatis philosophically observes, "Mais le Cyprès est surtout honoré à cause de sa signification funéraire, en sa qualité d'arbre immortel, toujours verdoyant (*Cupressus sempervirens*), parfumé, dont le bois, comme celui du cèdre, est incorruptible. L'arbre de la mort, symbolisait en même temps l'immortalité."—*I.e.* p. 118.

According to De Gubernatis, "Dans les contes orientaux, le cyprès représente souvent le jeune amoureux, et la rose la bien-aimée." This remark gives additional interest and meaning to those exquisite lines of Byron on Zuleika's tomb—

"Within the place of thousand tombs  
That shine beneath, while dark above  
The sad but living cypress glooms  
And withers not, though branch and leaf  
Are stamped with an eternal grief,  
Like early unrequited love,  
One spot exists, which ever blooms,  
Even in that deadly grove—  
A single rose is shedding there  
Its lonely lustre, meek and pale;  
It looks as planted by despair—  
So white—so faint—the slightest gale  
Might whirl the leaves on high:  
And yet, though storms and blight assail,  
And hands more rude than wintry sky  
May wring it from the stem—in vain—  
To-morrow sees it bloom again!  
The stalk some spirit gently rears,  
And waters with celestial tears;

<sup>1</sup> For further remarks of a very interesting nature on the significance of pine-cones, but which cannot be reproduced here, reference may be made to Inman's "Ancient Faiths embodied in Ancient Names," vol. ii. p. 490.

<sup>2</sup> *Mythologie des Plantes*, ii. p. 289.

For well may maids of Helle deem  
 That this can be no earthly flower,  
 Which mocks the tempest's withering hour,  
 And buds unsheltered by a bower;  
 Nor droops, though Spring refuse her shower,  
 Nor woos the Summer beam:  
 To it, the livelong night there sings  
 A bird unseen—but not remote:  
 Invisible his airy wings,  
 But soft as harp that Hour strings  
 His long entrancing note!  
 It were the bulbul; but his throat,  
 Though mournful, pours not such a strain;  
 For they who listen cannot leave  
 The spot, but linger there and grieve  
 As if they loved in vain!  
 And yet so sweet the tears they shed,  
 'Tis sorrow so unmixed with dread,  
 They scarce can bear the morn to break  
 That melancholy spell,  
 And longer yet would weep and wake,  
 He sings so wild and well!  
 But when the day-blush bursts from high  
 Expires that magic melody.  
 And some have been who would believe  
 (So fondly youthful dreams deceive,  
 Yet harsh be they who blame)  
 That note so piercing and profound,  
 Will shape and syllable its sound  
 Into Zuleika's name.  
 'Tis from her cypress' summit heard,  
 That melts in air the liquid word;  
 'Tis from her lowly virgin earth  
 That white rose takes its tender birth."

*Bride of Abydos.*

One curious legend may be here quoted, if only as a lesson to Christian missionaries when tempted to enlarge with unction on the folly of pagan legends, forgetting all the while, as they are too apt to do, the puerile legends which once flourished (and in some countries do so still) in connexion with the faith they themselves profess. "M. Pitré<sup>1</sup> nous a communiqué cette légende: 'Il pino si tiene in molta stima perchè fornisce l'incense per le funzioni religiose e richiama a Gesù Bambino. Raccogli una pina, sgusciane il frutto e tugliane verticalmente il gheriglio. Se tu vi guardi bene dentro, vedrai qualche cosa che somiglia a una mano; è quella del Bambino in atto di benedire. È da sapere che, nella Fuga in Egitto, la Sacra Famiglia non avendo ove adagiarsi, incontrato per via un Lupino (un lupin), vi si accostò. A quel tempo il Lupino, come il Tameriggio (*tamarix*), era un bell'albero e il frutto squisito assai. Il Lupino egoista si rifiutò ad accogliere sotto di sé i poveri fuggitivi, e strinse e raccolse i suoi larghi rami, sicchè essi rimasero allo scoperto e dovettero proseguire tra la stanchezza e il panico il doloroso viaggio; ma visto indi a non molto, un pino e sotto di esso ricoveratisi, il pino allargò i suoi bei rami ed amorosamente nascose nel suo frutto il Bambino. Da quel giorno in poi, ebbe il favore della mano del Bambinello e prosperò sempre, e il Lupino maladetto pe' condannato a non sollevarsi una spanna sulla terra e il suo frutto ad essere amaro quale oggi si trova."

<sup>1</sup> *Mythologie des Plantes*, vol. ii. p. 291.

DACRYDIUM, *Solander*.

*Flowers* diœcious in catkins. *Male catkins* terminal, solitary, small. *Anther-bearing bracts* usually many, crowded and very shortly-stalked. *Female flowers* usually solitary, rarely collected by 3 or 9 in a stiff but lax spike. *Nut* minute, almost long, at the base surrounded by a lax outer involucre and inclosed in the inner fleshy involucre, gaping at the apex.

D. ELATUM, Wall. *E.T.*

Burma (probably Tenasserim).

All parts glabrous. Leaves of two sorts: one, scale-like, densely imbricate, ovate-linear, blunt, mucronate; the other acicular, 4-8 lines long, pungent-acute, somewhat 4-cornered, curved.

NAGEIA, *Gaertner*.

*Flowers* diœcious in catkins. *Anther-bearing bracts* numerous, crowded, very shortly-stalked. *Female flowers* solitary or few, the bracts connate with the fleshy rachis, and free only at the apex. *Fruit* fleshy, with a long pericarp, almost globular, or ovoid, seated on a fleshy thickened rachis. *Embryo* at the summit of the mealy albumen.

N. (PODOCARPUS) LATIFOLIA, Wall. *E.T.*

Tenasserim.

*Agathis loranthifolia* (apud Mason).*Dammara orientalis*, Lamb (M.).

Thyt-myn.

Leaves opposite, or nearly so, many-nerved, oblong-lanceolate. Fruit the size of a small cherry. Wood pale yellowish, fine grained. Weight 41 lbs.

For some reason the Burmese highly value this tree as sacred, and often insert a wedge or plug of it into the stem of a new canoe or boat, to insure good luck. This must be the tree, I think, which Dr. Mason refers to under the name of Dammer pine: "Griffiths mentions *Agathis loranthiflora* (*sic*) or the dammer pine, as a member of the Tenasserim Flora, and I have seen the young plants of the tree to which he must refer. The leaf is precisely that of the dammer pine, but it is not known to yield any dammer. The wood is white, rather light, and bears considerable resemblance to some kind of pine. It is used by native carpenters for various purposes, and the Burmese have a superstition that the beams or balances of their scales ought to be formed of this wood. They call it 'Thyt-myn,' king of woods. It is used by them, says Major Berdmore, to avert evil, by driving a peg of it into a house post or a boat. It is very hard." This last remark, however, is an error of Major Berdmore. It is not a little curious that a somewhat similar observance seems to have traditionally come down to us, as performed in building the first ship, *Argo*. In the work of that name, by the Earl of Craufurd and Balcanquhall, Minerva is represented as appearing to Jason on the eve of his voyage, and commanding him to repair to Dodona and its holy oak.

"There in the midst, one tree stands hoar, sublime,  
Whose date coeval, knows no peer but Time;  
No sire it owns, no children, there is none  
Like it on earth, it lives to God, alone."

\* \* \* \* \*

I will be with thee to sustain thy prayer.  
Thee praying, veiled thy face, and prostrate there;  
A conscious limb will sever from on high,  
That none may near, that none may touch but I.  
Of Life and Truth, *this, within Argo's keel*  
*Will I imbed*, that long as nightly wheel  
The 'Dancers' round the Polestar, shall impart  
A life immortal to her."

*Argo*, Book I. line 585 *et seq.*

The passage above quoted is, however, a mere poetic amplification of the allusion to the same fact by Apollonius Rhodius :

σπερδαλέον ἐὶ Λιὸν Περμασίος ἡδὲ καὶ αὐτὴ  
 Πηλεὺς ἰαχεν Ἀργεῖ ἐπισπέρχουσα νέεσθαι  
 ἐν γὰρ οἱ ἑόρῃ Θείῳ ἐλθέμετο, τὸ ρρ' ἀνα νέεσθην  
 στείραν Ἀθηναίῃ Δαδωνίδος ἤρμωσε φηγοῦ.

*Argonautica*, Book A. v. 521.

The same story too is referred to by Claudian :

“Lict omnia vates  
 In majus celebrata ferant, ipsamque secandis  
 Argois trabibus jactent sudasse Minervam ;  
 Nec nemoris tantum junxisse carentia sensu  
 Robora, sed, cresco Tmarii Jovis augure luco,  
 Arbore præsagâ tabulas animasse loquaces.”

*De Bello Gatico*, l. 14.

This incorporating a portion of a sacred tree in the keel of Argo is precisely what is now done with a new canoe in Burma, a piece of the Thit-myn or ‘Prince of trees,’ being substituted for the mystical oak of Dodona, and the interesting question rises (since we may be tolerably sure that the myth had no historical foundation *quoad* the building of the Argo), did the myth originate in a custom similar to that now practised in Burma, but in those early days, perhaps, far more widely extended, or did it originate in the highly coloured accounts of some such custom, which spread to Greece from the distant region, lying beyond the Golden Chersonese? Questions such as these, so easy to ask, so impossible to answer, only prove the vast fund of interesting materials bearing on the life history of our race, which has slipped and is slipping almost irrecoverably from our grasp.

Since writing the above I see that the custom exists in other parts of the world besides Burma, in a modified form. Speaking of the Argonautic voyage, De Gubernatis says: “L’aurore ou la *dame vert* du printemps, représentée par Médée, la belle magicienne, et la soleil, représenté par le jeune et beau Jason, se retrouvent dans le ciel oriental, après avoir voyagé toute la nuit, ou tout l’hiver, dans un navire sur lequel la fille de Zeus, la sage déesse Athénè, un fois elle-même plus élevée de l’aurore, avait prudemment placé un copeau du chêne de Dodone, pour garantir les Argonautes du naufrage. Il est fort curieux maintenant d’observer que la même superstition consacrée par l’ancien mythe hellénique existe encore, légèrement modifiée, dans la campagne de Roma et en Toscane; seulement il ne s’agit plus ici, comme de raison, d’un orage de mer, d’un naufrage, mais d’un orage terrestre.”—*Mythologie des Plantes*, vol. ii. p. 66.

N. BRACTEATA, Bl. *E.T.*

Tree forests of Tenasserim and the Andamans.

Thyt-myn (Kurz).

Leaves scattered, 1-nerved, linear to linear-lanceolate. Fruit the size of a large pea. Kurz describes the wood as pale brown, close-grained, weight 50 lbs.

I cannot here refrain from quoting<sup>1</sup> the curious mediæval legend of the Cross, wherein are incorporated the names of certain coniferous trees, which are known to have possessed a mystical significance ages before the date when the legend was conceived, and which, by a well-known process of purification, became transformed from symbols of what we, from our higher spiritual standpoint, should term impurity into the emblems of a Christian’s faith.

“When our first father was banished Paradise, he lived in penitence, striving to recompense for the past by prayer and toil. When he reached a great age and felt death approach, he summoned Seth to his side, and said, ‘Go, my son, to the terrestrial Paradise, and ask the archangel who keeps the gate to give me a balsam which will save me from death. You will easily find the way, because my footprints

<sup>1</sup> Curious Myths of the Middle Ages, by S. Baring-Gould, p. 379.

scorched the soil as I left Paradise. Follow my blackened traces, and they will conduct you to the gate whence I was expelled.'

"Seth hastened to Paradise. The way was barren, vegetation was scanty and of sombre colour; over all lay the black prints of his father's and mother's feet. Presently the walls surrounding Paradise appeared. Around them nature revived, the earth was covered with verdure and dappled with flowers. The air vibrated with exquisite music. Seth was dazzled with the beauty which surrounded him, and walked on forgetful of his mission. Suddenly there flashed before him a wavering line of fire, upright like a serpent of light continuously quivering. It was the flaming sword in the hand of the cherub who guarded the gate. As Seth drew nigh, he saw that the angel's wings were expanded so as to block the door. He prostrated himself before the cherub unable to utter a word. But the celestial being read in his soul better than a mortal can read a book the words which were there impressed, and he said, 'The time for pardon is not yet come. Four thousand years must roll away ere the Redeemer shall open the gate to Adam, closed by his disobedience. But as a token of future pardon, the wood whereon redemption shall be won shall grow from the tomb of thy father. Behold what he lost by his transgression.' At these words the angel swung open the great portal of gold and fire, and Seth looked in. He beheld a fountain, clear as crystal, sparkling like silver dust, playing in the midst of the garden, and gushing forth in four living streams. Before this mystic fountain grew a mighty tree, with a trunk of vast bulk, and thickly branched, but destitute of bark and foliage. Around the bole was wreathed a frightful serpent or caterpillar, which had scorched the bark and devoured the leaves. Beneath the tree was a precipice. Seth beheld the roots of the tree in Hell. There Cain was endeavouring to grasp the roots and clamber up them into Paradise; but they laced themselves around the body and limbs of the fratricide, as the threads of a spider's web entangle a fly, and the fibres of the tree penetrated the body of Cain as though they were endued with life.

"Horror-struck at this appalling spectacle, Seth raised his eyes to the summit of the tree. Now all was changed. The tree had grown till its branches reached heaven. The boughs were covered with leaves, flowers and fruit. But the fairest fruit was a little babe, a living sun, who seemed to be listening to the songs of seven white doves, who circled round his head. A woman more lovely than the moon bore the child in her arms.

"Then the cherub shut the door and said, 'I give thee now three seeds taken from that tree. When Adam is dead, place these seeds in thy father's mouth and bury him.'

"So Seth took the seeds and returned to his father. Adam was glad to hear what his son told him, and he praised God. On the third day after the return of Seth, he died. Then his son buried him in the skins of beasts, which God had given him for a covering, and his sepulchre was on Golgotha. In course of time, three trees grew from the seeds brought from Paradise: one was a Cedar, another a Cypress, and the third a Pine. They grew with prodigious force, thrusting their boughs to right and left. It was with one of these boughs that Moses performed his miracles in Egypt, brought water out of the rock, and healed those whom the serpents slew in the desert. After a while the three trees touched one another, then began to incorporate, and confound their several natures in a single trunk. It was beneath this tree that David sat when he bewailed his sins.

"In the time of Solomon, this was the noblest of the trees of Lebanon; it surpassed all in the forests of King Hiram, as a monarch surpasses those who crowd at his feet. Now, when the son of David erected his palace, he cut down this tree to convert it into the main pillar, supporting his roof. But all in vain. The column refused to answer the purpose; it was at one time too long, at another too short. Surprised at this resistance, Solomon lowered the walls of his palace to suit the beam, but at once it shot up and pierced the roof, like an arrow driven through a piece of canvas, or a bird recovering its liberty. Solomon, enraged, cast the tree over Cedron, that all might trample on it as they crossed the brook. There the Queen of Sheba found it, and she, recognizing its virtue, had it raised. Solomon

then buried it. Some time after, the King dug the pool of Bethesda on the spot. This pond at once acquired miraculous properties, and healed the sick who flocked to it. The water owed its virtues to the beam which lay beneath it.

"When the time of the Crucifixion of Christ drew nigh, this wood rose to the surface, and was brought out of the water. The executioners, when seeking a suitable beam to serve for the cross, found it, and of it made the instrument of death of the Saviour. After the Crucifixion it was buried on Calvary, but it was found by the Empress Helena, mother of Constantine the Great, deep in the ground with two others, May 3, 328; Christ's was distinguished from those of the thieves by a sick woman being cured by touching it. The same event is, however, ascribed by a Syriac MS. in the British Museum, unquestionably of the fifth century, to Protonice, wife of the Emperor Claudius. It was carried away by Chosroes, King of Persia, on the plundering of Jerusalem; but was recovered by Heraclius, who defeated him in battle, Sept. 14th, 615: a day that has ever since been commemorated as the Feast of the Exaltation of the Cross.

"Such is the Legend of the Cross, one of the wildest of mediæval fancies. *It is founded, though unconsciously, on this truth, that the Cross was a sacred sign long before Christ died upon it.*"

The last sentence is the key, not only to this but many other legends, ceremonies, and symbols, which, although now called *Christian*, and as I have said purified of their original significance, are yet, all the same, built-up of materials originally symbolizing what we should term low and sensuous ideas. This may seem a truism to those who are well read on the subject; but owing to a mistaken reticence, it is by no means so widely known as, in the interest of abstract truth,<sup>1</sup> it deserves to be.

#### Sub-class *ANGIOSPERMS*.

*Ovules* produced in a close ovary, fertilized by the pollen-tube traversing a stigmatic tissue, to reach the cavity of the ovary- and the embryo-sac of the ovule.

### Division *MONOCHLAMYDEÆ* or *APETALOUS PLANTS*.

Perianth really or apparently simple, the lobes or segments all calycine, or herbaceous, or all petaloid or scarious, or entirely wanting.<sup>2</sup>

<sup>1</sup> The relationship subsisting between Religions which still possess a living force (the Christian of course included) and those which may be termed 'dead,' from their having, wholly, or in part, lost their hold on men's minds, is not only a curious subject for the consideration of all thoughtful men, but is an essential element in the History of the Science of Religion, and the laws regulating its development. Yet how carefully is any discussion of this momentous question, or I may even say any allusion to its existence, avoided by religious professors and teachers, as though they would imply that their particular Religion sprang into being as spontaneously and miraculously as Minerva did from the head of Jupiter! And yet our aforesaid religious teachers are ever complaining that they cannot command the same respect for their utterances they formerly did! My clerical friends, the mind of man has not stood still all these years, and hence you inevitably find yourselves (with some bright exceptions) in the rear, and clinging to the skirts of the intelligence of the age rather than leading and directing it; but if you would only take to heart the words of a modern poet, you would once again not lack attentive and respectful audiences.—(W.T.)

"Leave your dry unfruitful dogmas, Faith unreasoning, Credence blind;  
All the little narrow circles, where you wander self-confined,  
Plashing in the mire and puddle of your small sectarian pond,  
Heedless of the mighty ocean and the boundless Heaven beyond.  
Is there nothing more to preach of than the letter of the Law?  
Nothing left to feed the People, but the barren husk and straw?  
Nothing for the Unbelievers in a creed their souls disclaim  
But Eternity of torment, and the Unconsuming Flame?  
Nobler themes than these invite you, if you'd throb as throbs the Time,  
And would speak to hearts responsive, words more Human, more Sublime,  
God is Love, and Love Eternal—All things change, but nothing dies.  
Find this Gospel, and expound it, in the Bible of the skies!"—*Gauntiel Brown*.

<sup>2</sup> Exceptions. A double floral envelope occurs in some *Paronychia*, *Euphorbiaceæ*, *Rufifoliceæ*, *Loranthaceæ*, *Santalaceæ*, and *Podostemaceæ*.

Sub-division *a*. OVARY INFERIOR. PERIANTH MORE OR LESS DISTINCT IN THE MALE, OR FEMALE, OR BOTH. Obscure in some *Balanophoreæ*.

#### SANTALES.

*Flowers* hermaphrodite or diclinous. *Perianth* usually conspicuous, coloured, polymorphous, and valvate. *Ovary* 1 or 2-celled. *Ovules* usually reduced to a naked nucleus. *Fruit* a 1-seeded berry or drupe. Parasitic herbs or shrubs.

#### Order BALANOPHOREÆ.

*Flowers* male or female, rarely hermaphrodite. *Perianth* of male usually trilobate, valvate, of female various or none. *Stamens* usually 3, monadelphous (in *Cynomorium*, 1). *Ovary* 1 or 2-celled, *cells* 1-ovuled. *Ovule* pendulous, often adnate to the cell-wall. *Embryo* undivided, in fleshy or granular albumen. Fleshy, scapigerous, leafless parasites, on forest trees.

#### EUBALANOPHORIEÆ.

*Perianth* in hermaphrodite flowers 3-5 lobed. In females, none. *Stamens* monadelphous. *Anthers* extrorse. *Ovary* 1-celled. *Style* 1. *Ovule* pendulous, anatropous.

#### BALANOPHORA, *Forst.*

*B. TYPHINA*, Wall. (M.).

*B. GIGANTEA*, Wall. (M.).

These parasites give rise to the enlarged knots on the roots of maple, oak, and other trees, from which the Tibetans manufacture drinking cups, which are susceptible of a good polish and are often handsomely mounted with silver. Dr. Mason, however, makes no mention of these knots being so used in Burma.

#### CYNOMORIEÆ.

*Flowers* hermaphrodite or unisexual by arrest; with a distinct perianth superior in the male, sometimes wanting in the female. *Stamens* free. *Anthers* 2-celled, dehiscing longitudinally. *Ovary* 1-celled. *Style* single. *Ovule* solitary, pendulous.

#### CYNOMORIUM.

*C. sp.*

Wallich records a species of this genus from Tenasserim, which is valuable for its styptic qualities. *C. coccineum* was similarly valued by the Crusaders for its styptic virtues in hæmorrhage and diarrhœa.

#### Order SANTALACEÆ.

*Flowers* hermaphrodite or polygamous. *Perianth* simple or very rarely double, the tube wholly or partially adnate to the ovary and confluent with the pedicel, the limb 3 or 5 lobed or cleft, valvate or nearly so, deciduous or persistent. *Stamens* as many as perianth lobes and opposite to them, inserted at the base or within the free part of them. *Filaments* short. *Anthers* 2-, rarely 4-celled, erect or dorsifixed, usually opening by longitudinal slits. *Disk* epigynous and often plain, sometimes with free margins and crenate. *Ovary* inferior or first free, and soon adnate, or half inferior (rarely superior), 1-celled, with 2 or 5 ovules suspended from a free central erect placenta. *Fruit* an indehiscent nut or berry, 1-seeded from abortion. *Albumen* fleshy. *Embryo* straight, with a superior radicle. *Cotyledons* linear or oblong, convex, shorter than the radicle. Shrubs or herbs, rarely trees, terrestrial, or sometimes parasitic with alternate, rarely opposite, simple leaves. *Stipules* none. *Flowers* usually small, green or purplish, in terminal or lateral heads, cymes or spikes.

\* *Ovary inferior.*

† *Placenta slender, bearing the ovules at the apex.*

HENSLOWIA, *Blume.*

*Flowers* monœcious. *Perianth lobes* and *stamens* 5 or 6. *Disk* epigynous without free margins. *Drupe* very small. *Ovary* inferior, 1-celled, with 2-4 ovules suspended from the apex of the free central placenta. *Fruit* a fleshy drupe containing a hard 1-seeded putamen. Parasitic shrubs, with alternate 3-5 nerved simple leaves.

*Flowers* in peduncled involucred umbellets. *Bracts* acute, without membranous borders.

H. HETERANTHA, H. f. Hills east of Young-ngoo at 4000 to 7000 feet.

*Flowers* sessile, or nearly so. *Perianth-lobes* 5. *Leaves* coriaceous.

var. *a heterantha*. *Flowers* sessile. *Perianth-lobes* 5.

var. *β coriacea*. *Flowers* shortly peduncled. *Perianth-lobes* 6.

H. ERYTHROCARPA, Kz. Tree forests of Kamorta.

†† *Placenta spindle-shaped, bearing the ovules near the base.*

SANTALUM, *Linnaeus.*

*Perianth* bell-shaped. *Lobes* and *stamens* 4 or 5. *Disk* conspicuously lobed. *Drupe* globose. Trees, parasitical while young.

\* S. ALBUM, L. E.T. Chittagong (cultivated). Tenasserim (*vide* Mason).

San-da-ku.

All parts glabrous. *Leaves* opposite, 1½ to 3 inches long, coriaceous, glaucous beneath. *Flowers* small, yellowish, soon turning brownish-purple. *Drupe* globular, the size of a large pea. *Wood* yellowish, in young trees white. *Ground* to powder it is a favourite cosmetic, and in Burma replaces violet powder and other less innocuous preparations of the West. A valuable oil is distilled from the wood, from which also deliciously fragrant boxes, cabinets, and other small articles are made.

\*\* *Ovary superior.*

LEMONCURUS, *Blume.*

*Calyx* adnate to the cup-shaped disk. *Flowers* 4-merous. *Petals* 4 at base, cohering in a tube, valvate. *Stamens* 4, opposite the petals. *Filaments* very short. *Ovary* free, 1-celled. *Ovule* single, pendulous. *Stigma* sessile.

L. SYLVESTRIS, Bl. E.T. Ava Hills.

L. oblongifolius, Mart.

*Leaves* 6-8 inches long, very shortly petioled, entire, membranous, glabrous. *Flowers* small, white.

CHAMPEREIA, *Griffith* (not *Baillon*).

*Flowers* 5-merous. *Perianth* 5-sepalous, rotate. *Stamens* 5. *Hypogynous disk* annular. *Ovary* with a single erect anatropous ovule. *Style* none. *Flowers* minute. *Bracts* very minute.

C. GRIFFITHII, Planch. E.T. Tree forests of Tenasserim and the Andamans.

All parts glabrous. *Perianth-lobes* about ½ a line long, reflexed. *Drupe* ¼ inch long or more, orange-coloured, glabrous.

Order LORANTHACEÆ.

*Flowers* usually hermaphrodite, regular. *Calyx-tube* adnate to the ovary, the limb with as many lobes or teeth as petals, or forming an entire border, or none. *Petals* or *perianth* segments (when the calyx is inconspicuous) 4 to 6 or rarely more, usually 5-6, free, or united in a lobed corolla, inserted round an epigynous disk, valvate,

rarely wanting. *Stamens* as many as petals, opposite to and usually inserted on them. *Filaments* more or less adnate at the base. *Anthers* basifix, adnate, or dorsifix, sometimes versatile, opening by longitudinal slits or by pores. *Ovary* inferior, adnate to the calyx, and forming one mass of which only the upper part protrudes a little, 1-2-celled with 1 to 3 erect ovules, usually not perceptible till the flowering is past. *Style* filiform, or thick with a simple stigma. *Fruit* an indehiscent viscid-fleshy berry or drupe, with a single or 1-seeded putamen. *Albumen* fleshy. *Cotyledons* 2-4, semiterete, fleshy. *Embryo* fungiform, straight, with a superior radicle. Parasitical shrubs, usually much-branched, very rarely terrestrial shrubs or trees, with opposite, or rarely alternate simple leaves; sometimes the leaves reduced to mere scales, or wanting. *Bracts* usually present, rarely wanting. *Bractlets* 2, close under the flower, concave or united in a cup, sometimes wanting.

All the species are more or less injurious to trees, on account of their parasitism. The bark is usually astringent. Bird-lime is made from the berries of mistletoe and several *Loranthi*.

#### LORANTHUS, *Linnaeus*.

*Flowers* hermaphrodite. *Corolla* well developed, the lobes more or less united (rarely free). *Style* filiform, with a terminal stigma. *Albumen* perforated.

Kyi-boung. Generic.

\* *Bracts* large, leaf-like, forming either a free 4-6 leaved involucre, or united in a monophyllous one.

L. INVOLUCRATUS, Roxb.

Chittagong.

Leaves glabrous, calyx tawny-tomentose, corolla whitish hairy, involucre 4-flowered and 4-leaved, the leaflets free and as long as the flowers.

\*\* *Bracts* minute or small, supporting each single flower.

† *Each flower* 3 bracted, i.e. 1 bract and 2 bractlets, free or united at the base.

+ *Corolla* 6-lobed, the tube inflated, short and straight.

× *Flowers* sessile, in short spikes.

L. GLOBOSUS, Roxb.

Chittagong, Pegu and Tenasserim.

Corolla greenish-white, 5 lines long. From the base arceolate-inflated.

L. SUBGLOBOSUS, D.C.

Like the last, but corolla  $\frac{1}{2}$  an inch long, and the leaves narrower and more coriaceous. It is probably a sessile-flowered variety of the next species (Kurz).

× × *Flowers* pedicelled on short racemes.

L. AMPULLACEUS, Roxb.

Martaban and Tenasserim.

Corolla greenish-purple, the tube angular, upwards under the limb inflated.

++ *Corolla* 5-lobed, straight or curved.

L. BRANDSIANUS, Kz.

Martaban, over 3000 feet.

Leaves not glaucous beneath. Corolla straight, and urceolate-inflated, nearly an inch long. Racemes glabrous, poor-flowered, cymose at apex.

L. HYPOGLAUCUS, Kz.

Leaves as in the last, but glaucous beneath, flowers by 2- or 3-clustered, on short glabrous peduncles. Corolla curved and slightly inflated,  $1\frac{1}{2}$  to  $1\frac{2}{3}$  inches long.

L. FORMOSUS, Bl.

Tenasserim.

Leaves one coloured and glossy on both sides. Corolla 2-3 inches long, curved and slightly inflated. Cymes reduced, usually 2-flowered, puberulous.

†† *Each flower* with a single bract only, or the bract sometimes obsolete.

+ *Petals* united into a tubular corolla.

× *Flowers* 4-merous, the corolla usually slit laterally. Berries obconical to pear-shaped.

*L. PUBERULENTUS*, Wall.

Ava and Kambalu Toung in the Pegu Range.

Indument of inflorescence, flowers, berries, and shoots densely tomentose, white, scurfy. Corolla  $1\frac{1}{2}$ –2 inches long. Berries club-shaped.

*L. SCURRULA*, L.

All over Burma and the Andamans  
(except var. *a* not yet found).

Indument of inflorescence, flowers and young shoots velvety or villous, rusty to whitish. Corolla  $\frac{1}{2}$  to  $1\frac{1}{4}$  inch long. Berries club-shaped, 2–3 lines long.

var. *a scurrula*, L. Corolla long.

var.  *$\beta$  obtectus*, Wall. Petioles long.

var.  *$\gamma$  buddleioides*, Desv. Flowers smaller, whitish.

var.  *$\delta$  graciliflorus*, Wall. Flowers small, tawny-velvety.

*L. RHOPALOCARPUS*, Kz.

Indument thin, puberulous, whitish or yellowish. Corolla  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch long. Berries elongate, club-shaped,  $\frac{1}{2}$  an inch long, thin-velvety.

× × Flowers 5–6-merous, the corolla slit laterally. Berries rounded at the base.

† Shoots, inflorescence and flowers densely villous-tomentose.

*L. SIAMENSIS*, Kz.

Siam.

Leaves thick, coriaceous, cordate, beneath rusty-tomentose. Bract 3 times longer than the ovary. Flowers long, spiked.

†† All parts glabrous.

*L. PENTANDRUS*, L.

Pegu. Martaban and Tenasserim up to 3000 feet.

Racemes thinly greyish-tomentose. Corolla  $\frac{1}{2}$  to 1 inch long, 5-merous, yellow or orange, the tube short, inflated, scurfy-tomentose outside.

var. *a pentandrus*. Pedicels  $\frac{1}{2}$  to 1 inch.

var.  *$\beta$  farinosus*, Desv. Flowers on shorter pedicels or sessile.

*L. LONGIFLORUS*, Desv.

All over Burma and the Andamans.

Racemes glabrous, rarely puberulous. Corolla 1–2 inches long, crimson or rose-coloured, curved and somewhat inflated in the middle, quite glabrous, 5-merous.

var. *a longiflorus*. Flowers only  $1-1\frac{1}{4}$  inch long.

var.  *$\beta$  bicolor*, Roxb. Flowers  $2-2\frac{1}{2}$  inches long.

var.  *$\gamma$  falcatus*, L.f. Leaves linear to linear-lanceolate, more or less falcate.

+ + Petals free to the base. Corolla bright red or crimson.

*L. ELEUTHEROPETALUS*, Kz.

Tenasserim.

Flowers about  $1\frac{1}{2}$  inch long, 6-merous. Petals equal and elongate-linear.

*L. PENTAPETALUS*, Roxb.

Khakyen Hills and Upper Tenasserim.

Flowers only 4 lines long, 5-merous. The petals dilated at the base, and forming apparently a short ovately inflated straight tube. Leaves tapering at the base.

*L. COCCINEUS*, Jack.

Tenasserim.

As the last, but flowers 4-merous. Leaves cordate at the base.

*VISCUM*, *Linnaeus*.

Floral parts reduced to an apparently simple perianth. Albumen solid. Anthers opening inwards by several pores. Flowers very small, monocious and clustered at the nodes or diocious, in the forks of the branches.

\* Leafy shrubs. Perianth-lobes deciduous.

*V. ALBUM*, L.

var.  *$\beta$*  Martaban above 5000 feet.

Branchlets terete. Leaves rounded at the apex. Flowers sessile, or shortly-peduncled, cup-shaped involucre at the end of the branches or in their forks.

var. *a album*. Inflorescence sessile or nearly so. Perianth-lobes 4.

var.  *$\beta$  Karenium*. Inflorescences peduncled. Perianth-lobes 3.

## V. ORIENTALE, Willd.

Chittagong.

Branchlets angular. Leaves blunt. Flowers dioecious, in peduncled cup-shaped involucre, and axillary.

## V. MONOICUM, Roxb.

Martaban and Tenasserim.

Branchlets terete. Leaves acuminate. Flowers monoecious, in sessile cup-shaped involucre and axillary.

## V. OVALIFOLIUM, Wall.

Tenasserim.

Branchlets terete. Leaves blunt. Flowers all solitary in the cup-shaped involucre, forming dense clusters in the leaf axils, or round the joints.

\*\* *Leafless shrubs. Perianth-lobes usually persistent.*

## V. ARTICULATUM, Burm.

All over Burma.

Articles slightly narrowed at the joints, longitudinally ribbed, each article of the lateral branchings placed at a right angle with the other and therefore decussate, but twisted so as to appear in one plane. Berries minute.

var. *a articulatum*. Articles narrow, 2 lines broad.

var. *β dichotomum*, Don. Articles broader, 3-4 lines broad.

V. MONILIFORME, W.A. Martaban, from 4000 to 6000 feet, on oaks and *Eurya*.

Articles all in one plane and complanate, without any other rib than the median one, at their truncate joints dilated into a complanate cup, in which the flowers rest.

The fruit of the Mistletoe, and that of other *Loranthaceæ*, yields a tenacious paste known as birdlime, commonly used by fowlers to secure small birds. The fowler provides himself with several light bamboo rods made to fit together like a fishing rod. Applying this substance to the terminal portion of the thin top joint, he gradually elevates it into some tree, wherein the bird is sitting he desires to capture. The fowler cautiously adds joint to joint from below, exciting no fear in the bird sitting unconsciously in the foliage till a sudden twist brings the stick daubed with the birdlime against the wings of the bird, which the fowler rarely then fails to secure. It is stated (with what truth I know not) that tigers and leopards are also taken by means of 'limed' leaves. A vast number of these are spread in some convenient spot, with a man armed with a gun or bow in ambush. On the tiger treading on one of these leaves, it adheres at once to his paw, which, cat-like, he shakes to rid himself of the encumbrance. Failing in this, he rubs his paw against his face, thereby transferring the leaf to his head, and in a short time several others also get attached in the same manner. The animal now rolls on the ground, and ends by getting so covered with leaves as to be half blinded by them. His roars of distress announce the helpless state of the animal, whom the hunter now finds small difficulty in destroying.

The reverence for the mistletoe grown on an oak among the Druids is well known, and in the Scandinavian mythology it was the same plant which was used by the envious Loki, to form the shaft which laid Balder, Odin's gallant son, low on the bed of death. The genesis of the myth etymologically considered is, according to A. L. Matthew, as follows: "Prof. Skeat, in his Dictionary, thinks he can explain why the 'mistletoe' in the legend should be, of all created things, the slayer of the Sun-god. The myth represents the tragedy of the solar year, the sun overwhelmed by the 'gloom' of midwinter. In ancient Scandinavian '*mist*' means 'gloom,' and '*mistel*' is used for the plant 'mistletoe.' So, according to Prof. Skeat, the mistletoe appears in the Balder myth as fatal to the solar hero from the similarity of the old Teutonic words for 'gloom' and the plant '*viscum*.'"—*Notes and Queries*, Dec. 24, 1881, p. 509.

The story runs, that the gods, who all love Baldr, are so confident in the obligation taken by all created things not to harm him, that they make his body the mark for their arrows in sport; but now the trick of Loki succeeds, and the mistletoe, the one thing in nature overlooked, and not included in the great oath, is placed in the hands of the luckless Hödr, the blind brother of Baldr, and the

playfully-intended shot takes fatal effect.<sup>1</sup> Neither, however, Prof. Skeat nor Mr. Cox dispose of the difficulty which exists in identifying Baldur, the son of Odin, with the Great Luminary, in the fact that in the Scandinavian mythology the Sun was feminine. On this Mr. W. Taylor observes<sup>2</sup>—"The Goths make the sun feminine and the moon masculine. This is natural in a cold climate. Among savages every male is a foe; every female a friend. Displeasing and unwelcome objects therefore are in their language masculine, pleasing and welcome objects feminine. In hot countries, where the night is more welcome than the day, an opposite allotment of gender takes place." In exemplification of this statement we find the place of torment assigned to the wicked, in religious systems originating in the East, a place of heat, where the worm dieth not and the fire is not quenched; whereas, among our Northern ancestors, Hell was a place of intense and unendurable cold! To support the statement that the Sun among the Scandinavian nations was a female deity, it will suffice to quote two couplets from the Cosmogonical Edda, entitled the "Lay of Vafthrudni" (Taylor, *l.c.* p. 27). The lay describes a contest of knowledge between Odin and Vafthrudni, King of the Jutes.

Odin asks—

"Far I've wander'd, much sojourn'd  
In the kingdoms of the Earth:  
But I've still a wish to know  
Whence, to deck the empty skies,  
Shall another Sun be drawn,  
When the jaws of Fenrir ope  
To ingorge the lamp of day?"

Vafthrudni replies—

"Ere the throat of Fenrir yawn  
Shall the Sun a daughter bear,  
Who, in spite of shower and sleet,  
Rides the road her mother rode."

#### GINALLOA, *Korth.*

*Flowers* monœcious. *Perianth* 3-4-petalled. *Anthers* almost sessile, opening by longitudinal slits, 2-celled, and almost didymous. *Fruit*, a 1-seeded berry. *Flowers* spicate.

\* *Spikes very slender, the flowers surrounded by an annular cup-shaped involucre. Leaves thin-coriaceous.*

G. HELFERI, Kz.

Tenasserim.

Leaves elongate, 5-nerved.

\*\* *Spikes robust, the flowers immersed in grooves of the thick rachis, destitute of the annular cup-shaped involucre.*

G. ANDAMANICA, Kz. Tree forests of South Andaman on *Artocarpus Chaplasha*.

Leaves thick coriaceous.

#### QUERNALES.

*Flowers* diclinous, male in catkins, female solitary or in spikes. *Perianth* green; if male, lobed or reduced to a scale; if female, minute, lobed or toothed. *Ovary* inferior, 1 to 6-celled. *Ovule* 1, basal or 1 or more pendulous. *Fruit* 1-seeded. *Albumen* none.

<sup>1</sup> Mythology of the Aryan Nations, by Rev. G. W. Cox, vol. ii. p. 95.

<sup>2</sup> Historic Survey of German Poetry, vol. i. p. 28, *note* 1.

## Order JUGLANDACEÆ.

*Flowers* unisexual, the males in axillary spikes or catkins, the females solitary, or in terminal or axillary spikes or clusters. *Males*: *Perianth* simple, irregularly 2-6-cleft, adnate to the scale-like bracts. *Stamens* indefinite, sometimes 3 or more in 2 or many rows. *Anthers* sessile or nearly so, 2-celled, the cells opening longitudinally. *Female flowers* more or less connate with the bract, or free. *Perianth* double or simple; if double, the outer one more or less connate with the ovary, cup-shaped, 3 or more toothed at the apex, or forming a bracted involucre, the inner perianth connate with the ovary, 4-toothed; if simple, forming a 4-toothed cup. *Ovary* inferior, 1-celled (or 2- or 4-celled at the base) with a solitary erect or pendulous ovule in each cell. *Style* short. *Stigmas* usually 2, rarely 4. *Fruit* a drupe with a fleshy or membranous pericarp (the enlarged perianth), indehiscient, or dehiscing irregularly or in 4 valves. *Nut* consisting of the indurated ovary bony, usually free from the pericarp. *Testa* membranous. *Albumen* none. *Cotyledons* fleshy, with a superior radicle. Trees with unpaired or rarely spuriously abruptly pinnate leaves. *Stipules* none.

The timber of all the members of this family is valuable. The bark is acrid and often astringent.

*JUGLANS*, *Linnaeus*.

Fruit a large drupe, with a fleshy pericarp.

J. REGIA, L.

Ava Hills.

Walnut.

Valuable for furniture. The nearest approach to this wood in appearance among common Burmese woods is *Hpangah* (*Terminalia tomentella*), selected planks of which would be no bad substitute for ordinary walnut. Logs of walnut wood are transplanted from Kashmir across the passes on men's shoulders to Jammu, and thence by cart to Wazirabad, whence they go by rail to Bombay, and so to Europe! In sight of this fact, the result of private energy and industrial perseverance, is it not strange that some of the many fine fancy woods of Pegu and Tenasserim should not ere this have been brought to the notice of European dealers and a trade therein established? Burma, one of the richest areas for its size in the world for the finer sorts of woods, with its matchless sea-board, and intersected by rivers and creeks penetrating the virgin forest, is actually distanced in the race by an inaccessible valley, more than a thousand miles from its only available port!! In the one case, however, the development of the resources of the soil is undertaken by private enterprise, whilst in the other, everything is in the hands of a department, vigilant, no doubt, and inexorable in enforcing its own rules, but which has hitherto done less than might be expected towards the practical development of the magnificent resources it guards.

Kurz remarks: "In the Shan States east of Ava grows another species of *Juglans*, with smaller, almost globose, quite smooth nuts, but nothing is known about the tree itself."

The term Walnut is a corruption of the Anglo-Saxon *wealh-hnut*, or foreign nut, the tree having been introduced into Northern Europe from Italy (Prior).<sup>1</sup>

Regarding the mythological stories and virtues attached to the walnut, De Gubernatis writes: "Il convient de faire une distinction mythologique entre la noix et le noyer: la noix est le plus souvent considérée comme propice, favorable aux mariages, à la génération et symbole d'abondance; le noyer au contraire est craint comme un arbre triste, haï avec prédilection par les sorcières." It was perhaps the estimation in which the walnut was held that led to its finding a place in the renowned (though absurdly simple as it appears to us) prescription of Mithridates—

"Bis denum rutæ foliū, salis et breve granum  
Juglandes que duas, terno cum corpore ficus."

And after relating many customs connected with this fruit, De Gubernatis remarks: "La noix, et sans doute, tout spécialement la noix à trois noëuds, est le *Deus ex*

<sup>1</sup> Popular Names of British Plants, p. 248.

*machina* des contes populaires de cette partie de l'Italie." One or two of these customs may be here noted. In the Landes it is the custom for the young Frenchman who is paying his addresses to a girl, to visit her in company with two friends, and pass the night in eating and drinking and telling entertaining and marvellous stories. Towards day-break, when about to take his departure, his sweetheart, if she wishes to reject his suit, signifies the fact by placing before her lover a dish of walnuts. Again, in Belgium, on the 29th of September, or St. Michel's Day, walnuts are used by girls as a means of discovering the sort of husband they are destined to obtain. A number of walnuts emptied of their contents and then carefully closed are mixed with others which are untampered with, and with the eyes shut, a chance selection is made. A full nut gives promise of a good husband, thanks to St. Michel, who of course regulates a rite performed by his worshippers on his special day. Space, however, does not permit a further enumeration of the curious tales connected with the walnut collected by De Gubernatis.

ENGELHARDTIA, *Leschenault.*

*Flowers* monoecious, sessile or nearly so. *Male perianth* unequally 3-6-cleft on a 3-lobed bract. *Stamens* 5-13, filaments very short. *Female flowers* very numerous, adhering to the base of a 3- or 5-lobed bract. *Perianth* consisting of 4-5 teeth or lobes, superior. *Styles* 2-4, unequal. *Drupe*s small, dry, on the enlarged wing-like 3-lobed bract.

E. SPICATA, Bl.

Chittagong, Pegu. Tenasserim.

Leaflets entire, without net venation, glabrous; base of female bracts hispid.

E. VILLOSA, Kz. Hills east of Toung-ngoo and Tenasserim at 1000 to 3000 feet.

Leaflets serrate, rarely entire, with strong conspicuous net-venation, and pubescent beneath. Base of female bracts glabrous.

ASURALES.

*Flowers* hermaphrodite or diclinous. *Perianth* usually coloured. *Stamens* epigynous in the hermaphrodite flowers. *Ovary* inferior, 1 to many-celled. *Fruit* a capsule or berry.

Order RAFFLESIACEÆ.

*Flowers* dioecious, rarely hermaphrodite. *Perianth* regular, valvate or imbricate. Leafless root-parasites.

To this order belongs the remarkable genus *Rafflesia* (of the *Rhizanthææ* of Lindley), one species of which has been noticed in Burma by the Rev. C. Parish, who has kindly contributed the following note respecting it.

I copy the following from Lindley, *Vegetable Kingdom*, p. 83: "Rhizogens are parasitical plants destitute of true leaves, in room of which they have cellular scales. Their stem is either an amorphous mass, or a ramified mycelium,<sup>1</sup> sometimes, perhaps always, appearing to be lost in the tissue of the plant on which it grows. No instance of green colour is known among them; but they are brown, yellow or purple. They are furnished with true flowers having genuine stamens and carpels, surrounded by a tripartite or quinquelpartite calyx, or absolutely naked.

"Rhizogens all agree in being of a fungus-like consistence, and in their habits of living parasitically on the roots of other plants. They very generally stain water, or spirits, of a deep blood-red colour. Their forms are exceedingly diversified; some have the aspect of a mushroom, or develop a head like a bulrush (*Typha*). Others push forth a thyrsus of flowers, or an elegant panicle; while some have their bloom in a head like that of some Cyueraceous<sup>2</sup> plant."

<sup>1</sup> Mycelium is the name given to fungus-spawn. Soft cottony-threads which penetrate the soil in a ramified manner, from which, as every gardener who grows mushrooms knows, the plant can be produced.

<sup>2</sup> The Thistle-headed division of *Compositæ*—for example, the flower of the Globe Artichoke.

Lindley divides his Rhizogens into three Orders, *Balanophoraceæ*, *Cytinaceæ*, and *Rafflesiaceæ*. Some botanists, however, separate these Orders, by a long distance in their vegetable system. We are concerned here with the last Order only.

#### RAFFLESIACEÆ, *R. Brown*.

The order is thus described in *The Treasury of Botany*: "A small order of parasitical plants. The plants which compose it have no stem, but consist of flowers only, sometimes of gigantic size, surrounded by a few scales, and sessile on the stems or rhizomes of woody or perennial plants. These flowers consist of a campanulate or globular five-cleft perianth, with numerous anthers on a central column. The ovary is inferior, 1-celled, with many-seeded parietal placentæ, and as many styles as placentæ, more or less united within the column, where the flowers are hermaphrodite; or, in the centre of female flowers. The fruit is indehiscent, with numerous seeds, and the embryo undivided, with or without albumen."

#### RAFFLESIA, *R. Brown*.

Of this, the most wonderful plant ever yet discovered, the following account may prove interesting:—

It was discovered by Sir Stamford Raffles and Dr. Arnold in or about the year 1818, in the island of Sumatra (of which island and of Java it is the native), where the former was Governor of Bencoolen. While travelling in the Province, they lighted upon a plant which consisted simply of one huge expanded flower, more than a yard across! Descriptions and drawings of this vegetable prodigy were sent to England, and the plant was named by the celebrated Dr. Brown, in honour of its discoverers, *Rafflesia Arnoldii*.

The unexpanded flower buds of *R. Arnoldii* are roundish, and resemble a close cabbage in shape. The flowers appear to be diœcious, and have a perianth which is tubular below, but whose limb is divided into 5 entire fleshy lobes, which partially overlap one another in the bud, but afterwards spread widely. The perianth is flesh-coloured and mottled, and has a foul odour of tainted meat, by which insects are attracted. Within is a thick fleshy rim or corona, lining the upper part of the tube, and within the corona, in the male flowers, and occupying the centre, is a thick fleshy column, adherent to the perianth tube, having one or more projecting rims surrounding its base, and at the top a wide flat plate, the overhanging margin of which is rolled round like the capital of an Ionic column. On the revolute margin is placed a ring of sessile anthers, each one opening by a single pore.

In the female flowers, the central column is similar, but without anthers. The ovary is adherent to the base of the tube of the perianth, has a single compartment containing numerous ovules, and is surrounded by several styles which are blended with the central column.

Three or four species are known differing greatly in size, but little in essential character. . . . Dr. Arnold describes the first flower seen by him as being more than a yard across, the petals or lobes of the perianth as being a foot long, and varying in thickness from  $\frac{3}{4}$  to  $\frac{1}{2}$  of an inch, and the cup of the flower is calculated to hold twelve pints. The weight of the whole flower was estimated at fifteen pounds.—*Treasury of Botany, Rafflesia*.

I should not have ventured to introduce this long account of a plant, however remarkable, but that I believe the Tenasserim Provinces can claim to possess one species of this extraordinary genus. Many years ago, while crossing the range of mountains which lies to the east of Maulmain, and is visible thence in clear weather, by the Ta-ok Pass, at about an altitude of 3000 feet, I came upon a plant of the kind described. At the foot of a large forest tree—though whether growing on one of its roots or on that of some smaller plant I cannot say—sessile on the ground, was seen one fully expanded flower, and near it two or three unexpanded. Having described the class of plant, it should be needless to say that it consisted absolutely of this flower and nothing else. The expanded flower was campanulate in form,

divided at the edge into 5 segments, which were revolute or turned outwards. The whole interior was a beautiful deep crimson, which made it a striking object, seated as it was close upon the ground. It was about 6 inches in diameter, and of a very thick leathery consistence. I cannot recollect that it had any offensive smell. I gathered it as I would gather a fungus, and though I was most anxious to carry it home, I was quite puzzled what to do with it. I had no spirit, or vessel large enough to put it in, if I had had. To press it was out of the question—for it would have behaved under the process, as many fleshy fungi do, that is to say, it would have deliquesced, or become an offensive putrid mass. Nor was I, unfortunately, provided with drawing materials, beyond a scrap of paper and a bit of pencil, with which I made a hasty and rude outline of it. This sketch, rude though it was, I possessed for several years, and believing that I still possessed it, I have recently searched diligently for it, but in vain. It was the fact of my having it in my possession so long, and seeing it from time to time, that has enabled me to remember it as well as I do. Having, then, made this rude sketch, I put the flower into my vasculum to take its chance, but in two or three days it was a black shapeless mass, and had to be flung away. As far as my memory serves, without the slight additional help the drawing would have furnished, the interior, when looked down upon, was occupied by the large tabular summit of a central fleshy column, in form very like an Agaric, and on the inner and under surface, or where the gills of an Agaric are, were a number of sessile anthers; but as to their number and arrangement I cannot speak farther. It was, I imagine, a male flower of a diœcious species of *Rafflesia*.

The buds were globose, and looked like puff-balls, but what their exterior colour was I forget.

I am sorry to be able to give but such a meagre account of this remarkable flower, but it may suffice to draw the attention of some future botanist towards it.

#### Order ARISTOLOCHIEÆ.

*Flowers* hermaphrodite. *Perianth* regular or not, valvate. *Leaves* alternate, exstipulate.

#### ARISTOLOCHIEÆ.

*Ovary* sesangular. *Ovules* numerous, biseriate.

#### ARISTOLOCHIA,<sup>1</sup> Linnæus.

*A. ACUMINATA*, Lam. (M.).

No other species is mentioned by Mason, but the common Indian species, *A. Indica*, probably occurs as well. Most *Aristolochiææ* contain in their root a volatile oil, a bitter resin, and an acrid extractable substance. Several species were once highly valued in medicine, and are so by natives still, being regarded as excellent in diseases of the womb and kidneys, and as emetic, anthelmintic, and anti-hysterie in their action. Several species have also been held in high esteem as antidotes to snake poison—a fallacious idea, from the extreme rapidity with which that poison acts, and its marvellous subtlety when once introduced into the system; but doubtless the idea of the plant proving of service originated in the fancied resemblance of the leaves to the variegated skin of a snake, or, as it is termed, the ‘doctrine of signatures,’ another instance of which may be quoted in one of the ingredients in a celebrated snake antidote, which came under my observation in Rangoon, which was the woody skeleton of a fruit (*Martynia diandra*) common in hedgerows in Bengal (though indigenous to tropical America), whose oval framework terminates in two bony recurved hooks, bearing a strong resemblance to the divergent fangs of a viperine snake. The ripe fruit is clothed with a green skin

<sup>1</sup> ἀριστος, best; λοχεῖος, pertaining to labour. From the supposed efficacy of the plant in regulating the functions of the womb.

and looks like a sort of plum; but, as the flesh decays, the strong recurved hooks become exposed, and no doubt aid efficaciously in the dispersion of the plant by fixing in any passing animal, or causing them at all events to be torn away if brushed against.

#### BRAGANTIEÆ.

*Ovary* quadrangular. *Orules* numerous, uniseriate.

BRAGANTIA, *Loureiro*.

B. TOMENTOSA, R. Br.

Katchall. Trice Track and Great Nicobar.

Sub-division B. OVARY SUPERIOR.<sup>1</sup> PERIANTH USUALLY DISTINCT.

#### NEPENTHALES.

Scandent shrubs. *Leaves* alternate, terminated by pilchers.

No species of the order *Nepentheæ*, or Pilcher plants, is recorded by Mason, but Mr. Parish met with a species near Mergui.

#### PIPERALES.

*Flowers* hermaphrodite or diclinous, usually in spikes or catkins. *Perianth* rudimentary or none. *Ovary* superior, of 1, single-celled, single-ovuled carpel; or of several, free, 2 or many-celled.

#### Order CHLORANTHACEÆ.

*Flowers* hermaphrodite or diclinous, males spicate, females cymose or panicle. *Ovary* 1-celled, ovule 1, pendulous, orthotropous. *Embryo* small, albuminous. *Leaves* opposite, stipulate. Shrubs.

CHLORANTHUS, *Swartz*.

C. INSIGNIS, Kz.

Martaban.

Described in J.A.S.B. ii. 1873, p. 108.

Many *Chloranthæ* are possessed of aromatic and febrifuge properties, and Blume found the root of *C. officinalis*, which has a smell of camphor and a bitterish aromatic taste, very efficacious in the treatment of the severe intermittent fever of Java.

#### Order SAURUREÆ.

*Flowers* crowded on a spadix, hermaphrodite. *Ovary* superior or inferior, 1-celled, with parietal placentas, or 3 to 5-celled with axile placentas. *Orules* ascending, 2 or many in each cell. *Embryo* antitropous, included on the top of the albumen in the embryonic sac. *Radicl*e superior. Herbs. *Leaves* alternate, exstipulate.

HOULTTUNIA, *Thunberg*.

*Spikes* surrounded by coloured petal-like bracts. *Stamens* 3. *Ovary* 1-celled, with 3 parietal placentas.

H. CORDATA, Thunb.

India. Siam. S. China.

#### Order PIPERACEÆ.

*Flowers* crowded on a spadix, very minute, hermaphrodite or diœious. *Ovary* 1-celled. *Ovule* 1, basilar, orthotropous. *Embryo* albuminous. *Leaves* opposite, alternate, or whorled, exstipulate. Herbs or shrubs.

<sup>1</sup> Inferior in *Cynocrambeæ* and *Gyrocarpeæ*.

CHAVICA, *Miquel*.

*Flowers* dioecious. *Bracts* stipitate, peltate. *Stamens* 2 or 4. *Ovary* sessile, with 3 to 6 sessile stigmas. *Berries* closely packed, often uniting with, or half immersed in the more or less succulent rachis. Shrubs or woody climbers. *Leaves* alternate. *Spikes* solitary, pedunculate, leaf-opposed.

*C. MACROSTACHYA*, Miq.

Katchall (K.).

\**C. (PIPER) BETLE*, L.

India and Burma. Katchall.

Kwōn-ywet. Betel vine.

This plant is cultivated all over India and Burma. It is planted in rows and trained on a lattice work, or on poles, within an inclosure fenced on all sides and at top, by a screen of grass or thatch, or a framework of bamboo, with the double effect of promoting a moist atmosphere within and bleaching the leaves by the exclusion of direct light. The plants are well watered, and a small door admits the proprietor for the purpose of gathering the leaves, which are made up in bundles for the market. The leaf is warm and aromatic in flavour, and the 'pān,' so universally chewed by all classes in India, is a little conical mouthful of an outer wrapper of betel leaf, within which are folded a few chips of areca nut and cardamoms or some spice. Previously to wrapping up these ingredients, the leaf is smeared over with a paste made of fine shell lime, without which alkaline addition the fine red colour imparted to the saliva by chewing would not be developed. The areca nut, even when cut into small chips, is of course hard, and taxes the teeth to chew properly, so old Burmans, who have lost their teeth, carry about a little mortar, in which they bruise the ingredients of their 'betel' before putting it into their mouths. Chewing pān, when not extravagantly indulged in, is a harmless and probably beneficial luxury, and the preparation of the ingredients gives the Burman as much pleasure as the preparation of his favourite pipe does the European smoker.

*C. RIBESIOIDES*, Wall. (M.).

Burma.

Tor-kwōn.

As Kurz does not include this plant, he probably regards it as identical with the last.

\**C. (PIPER) LONGUM*, L. (M.).

*C. Roxburghii*, Miq.

Peik-khyen.

Long pepper is a creeper easily cultivated, and should be trained like hops on poles. It is propagated by cuttings, and as the unripe fruit is the most powerful, it is gathered when the berries are still green and before they ripen and turn red. The root is used as a drug as well as the berries, but its properties are milder.

PIPER, *Linnaeus*.

\**P. NIGRUM*, L. (M.). Occasionally cultivated.

Ngā-yōk-koung.

As in the case of *P. longum*, the berries dried before being perfectly ripe constitute the black pepper of commerce. The white pepper is the same berry allowed to ripen, and then decorticated by maceration in water, the flavour consequently being rendered milder than that of black pepper.

The qualities for which different peppers are valued depend on the presence of an aromatic volatile oil, a resin, and a crystallizable principle, *Piperine*, which is present in all parts of the plant, but more abundantly in the root and fruit. Pepper seems to possess some merit as a febrifuge, and in mild forms of the disease, or in malarious localities, is no doubt of considerable value, from its powerfully stimulant and carminative properties.

## EUPHORBIALES.

*Flowers* hermaphrodite or diclinous. *Perianth* various or none. *Ovary* superior 2 or many-celled. *Ovules* 1 or many in each cell, pendulous, anatropous. *Fruit* usually capsular, 1 or many-celled. *Cells* 1 or many-seeded.

## Order EUPHORBIACEÆ.

*Flowers* unisexual. *Calyx* free, various, usually 5- or 3-lobed or toothed, or wanting, the lobes imbricate or valvate. *Corolla* consisting of several petals, and usually isomerous with the calyx-lobes and alternating with them, or very rarely gamopetalous, hypogynous, or more or less perigynous, or wanting altogether. *Disk* variously shaped, or none. *Stamens* numerous, few or solitary, in the male flowers central or inserted at the bottom or at the middle of the calyx. *Filaments* free or united into 1 or more bundles, erect or variously incurved. *Anthers* free or cohering, variously opening by 1 or 2 slits, rarely by pores. *Ovary-rudiment* in males various or wanting. *Ovary* superior, usually 3 or 1, rarely many-celled, the carpels whorled round a central column, persisting after ripening of the fruit, with 1 or 2 ovules in each, suspended from the summit of the inner angle. *Style* various, usually short and divided into as many entire or repeatedly branched stigmatic lobes as cells to the ovary. *Fruit* various, usually a 3- to many-celled capsule, opening elastically into as many valves, or drupaceous and indehiscent. *Seeds* with or without arillus or strophiole. *Embryo* straight in a fleshy albumen, with flat cotyledons and a superior radicle, or rarely the cotyledons fleshy, and little or no albumen. Trees, shrubs, or herbs erect or climbing, very various in habit, with watery or milky juice. *Leaves* usually alternate, rarely opposite or whorled, simple or divided. *Stipules* usually present. *Flowers* usually minute, forming various inflorescences.

A very large order, more closely allied to *Tiliaceæ* than to any other of apetalous plants. An acrid milky juice is a prevailing character. The seeds of some are purgative and the roots of others emetic. The manchineel (*Hippomane mancinella*) is a famous arrow poison. Euphorbium, a gum resin, is produced by several cactus-like *Euphorbias*. Some of the African species of this genus yield deadly arrow-poison. The Brazilian caoutchouc (*Siphonia elastica*), a tree indigenous in Guayana and Brazil, yields the bottle india-rubber. The seeds of many species yield oil like castor-oil (*Ricinus*). The sweet and bitter 'cassava' is derived from the roots of *Manihot utilisima*, often cultivated by Burmans. 'Turnsole,' a well-known purple and blue dye, comes from *Crotophora tinctoria*. A few yield edible but inferior fruits, like *Cicca disticha*, *Emblea officinalis*, etc. Box-wood (*Buxus sempervirens*) is a very hard and compact wood used in engraving. Several of the Burmese euphorbiaceous trees yield good timber, especially those grown in deciduous forests, while the timber of those peculiar to the tropical forests seems to be of inferior quality or valueless (Kurz).

\* *Ovules* 2 in each cell.

× *Calyx* imbricate in bud.

‡ *Fruit* capsular-dehiscing, dry, or with a sappy epicarp.

† *Capsule* dry.

+ *Stamens* round an ovary-rudiment.

## ACTEPHILA, Blume.

*Styles* free. *Seeds* naked. *Capsule* woody or dry, coriaceous. *Disk* outside the stamens. *Stamens* inserted on a flat 5-lobed receptacle round the base of the ovary-rudiment. *Ovary* 3-celled, the cells 2-ovuled. *Styles* 3, united at the base, the branches 2-cleft. *Capsule* tri-cocous, each coccus bi-valved. Neither arillus nor albumen.

A. JAVANICA, Miq. E.S.

Tree forests of South Andaman and Katchall.

All parts quite glabrous. Leaves acute to cuneate at the base. Capsules smooth.

A. PUBERTIA, Kz. *E.S.* The Andamans. Katchall and Tallanghong.  
Younger branchlets and petioles puberulous. Leaves rounded or cordate at the base. Capsules granular-wrinkled.

+ + Stamens central. No ovary rudiment.

GLOCHIDION, Forster.

Ta-ma-sōk (*generic*, Kurz).

Flowers monœcious. Calyx 5-6-parted. Glands none. Stamens 3-5, rarely more. Anthers sessile on a central column, tipped by the projecting connective. Ovary 3-15-celled, each cell 2-ovuled. Capsules globular, 3-15-celled. Cocci 2-valved, the epicarp usually separating elastically. Seeds paired, with a usually crimson spurious arillus.<sup>1</sup>

\* Stamens 5, rarely 8-4.

† Ovary (and often the capsule) pubescent. Female flowers sessile or nearly so.

G. COCCINEUM, Muell. *E.T.* Pegu. Martaban, and Tenasserim.

Young branchlets, calyx and pedicles puberulous or pubescent. Style-column conical. Capsules 8-12-celled, fleshy coriaceous, white or scarlet.

G. LANCEOLARUM, Dalz. *E.T.* Chittagong and eastern slopes of the Pegu Range.

Calyx, pedicles, and all parts quite glabrous. Style-column cylindrically-conical, at top 6-8-toothed. Capsules glabrous, 6-8-celled.

‡‡ Ovary and capsule glabrous. Female flowers pedicelled.

G. CALOCARPUM, Kz. *E.T.* Beach forests of the Andamans. Kamorta, Katchall. Car and Great Nicobar.

Style-column conical, 4-5-stigmatic at the apex. Capsule 5-4-coccous.

G. MULTIOCLARE, Muell. *E.T.* Bhamo.

Style-column minute, deplanate-conical, with a broad base. Capsule 10-15-celled, fleshy-coriaceous.

G. SUBSCANDENS, Zell. *E.S.* Tenasserim.

Style long, funnel-shaped, clavate. Capsules 4-3 coccous.

\*\* Stamens 3.

× Styles funnel-shaped or tapering at base, the stigmas short or tubercle-like.

G. DALTONI, Kz. Prome and Upper Tenasserim.

Calyx, capsules, and all parts quite glabrous. Flowers, male and female, sessile.

G. NEPALENSE, Kz. Ava (probably).

Young parts, flowers, capsules, and leaves beneath puberulous. Flowers pedicelled.

× × Styles equal. Stigmas linear, spreading. Capsules 3-6-coccous.

G. DASYSTYLUM, Kz. *E.T.* Hills East of Toung-ngoo up to 3500 feet.

Flowers, stigmas and young shoots pubescent. Capsules or capillary peduncles up to ½ inch long, pubescent.

G. LEIOSTYLUM, Kz. *E.S.* Eastern Slope of the Pegu Range and Tenasserim up to 4000 feet.

Like the last, but styles glabrous and capsule barely peduncled.

<sup>1</sup> Kurz remarks, "Genus distinctissimum a cl Muell. Arg. cum *Phyllanthi* genere inapte conjunctum, structurâ florum femineorum et etiam (uti jam beat Roxburghius docuit, arillo spurio facile distinguitur. In sicco hic arillus spurius vel potius tegumentum exterius seminis, ut plurimum pulchre miniatius vel coecineus, more Euphorbiacearum aliarum (e.g. *Cassipou*) membraniformis, indeque ab auctoribus plurimis omnino prætervisus erat."—J.A.S.B. ii. 1873, p. 237.

× × × *Style thick, conical, sometimes minute, or hemispherical.*

‡ ‡ *Ovary and capsule glabrous.*

G. GLAUCIFOLIUM, Muell. *E.T.* Upper Tenasserim.

All parts glabrous. Capsules flat, depressed at top, 3-4-coecous, smooth, almost pruinous, shortly peduncled. Style-column minute.

G. FUGIFOLIUM, Kz. *E.T.* Tree forests of Chittagong, Martaban and Eastern Slopes of the Pegu Range.

All parts glabrous. Capsules sessile, 6-4-coecous, depressed, but not flattened at the top.

G. SPHEROGYNUM, Kz. *E.T.* Tree forests of Eastern Slopes of the Pegu Range and Tenasserim up to 2000 feet.

All parts quite glabrous. Style-column minute, almost spherical and constricted at base. Capsules very shortly peduncled.

‡ ‡ ‡ *Ovary and capsule puberulous or tomentose.*

G. (PHYLLANTHUS) ANDAMANICUM, Kz. *E.T.* Tree Forests of South Andaman.

All parts quite glabrous. Leaves glaucous beneath. Capsules almost sessile, velvety, 6-4-coecous.

G. BANCANUM, Miq. Bamboo Jungles of Middle Andaman.

All softer parts and leaves beneath, shortly tomentose. Capsules peduncled, puberulous, 5-4-coecous.

#### PHYLLANTHUS, *Linnaeus.*

*Flowers* monœcious, rarely diceious. *Calyx* 4-6-parted, the latter in 1 or 2 series, imbricate. *Capsules* usually 3-coecous. *Styles* 2-cleft. *Disk* or hypogynous glands present. *Testa* of seeds dry.

\* *Trees. Capsules more or less woody.*

P. COLUMNARIS, Muell. All over Burma.

Kalong-lek-thai (Kurz).

Young shoots shortly rusty pubescent. Flowers in axillary clusters.

\*\* *Shrubs. Capsules small, crustaceous.*

P. BLEPHOTRYOIDES, Muell. Tenasserim.

Kurz adds from the Nicobars :

P. NIBURI, L. Katchall.

A weed round native huts.

† † *Capsules fleshy coriaceous, or crustaceous with a sappy epicarp.*

+ + *Stamens central, no ovary-rudiment.*

° *Seeds with arillus.*

#### MELANTHESOPSIS, *Mueller Arg.*

*Flowers* monœcious. *Male calyx* high up, gamosepalous, the lobes in two series, and inflexed, imbricate. *Female calyx* usually enlarged under the fruit. *Petals, ovary rudiment, and disk* none. *Stamens* central, united in a column, the cells longitudinally adnate. *Ovary* 3-celled, each cell 2-ovuled. *Style* 2-cleft. *Fruit* a capsular 3-coecous berry, hardly dehiscent.

M. PATENS, Muell. Arg. Pegu and Tenasserim.

Leaves membranous, without mucro.

M. FRUTICOSA, Muell. Arg.

Martabau from 2500 to 4000 feet.

Leaves rigidly coriaceous, mucronate.

°° *Seeds without arillus.*

*SAUROPS, Blume.*

*Flowers* monœcious. *Male calyx* deeply 6-cleft, minute. *Petals* none. *Disk* none, or outside the stamens, 6-lobed. *Stamens* in a short column. *Anthers* opening by 2 slits, the cells adnate, lengthwise. *Ovary-rudiment* none. *Ovary* 3-celled, each cell 2-ovuled. *Styles* 3, very short, 2-cleft. *Capsule* fleshy-coriaceous or crustaceous, 6-valved.

*S. ALBICANS*, Bl.

All over Burma.

Yo-ma-hin-yo (Kurz).

Leaves 2–3 inches long, ovate. Capsules the size of a cherry; pure white.

*S. QUADRANGULARIS*, Muell. Arg.

All over Burma.

Leaves  $\frac{1}{2}$  to 1 inch long, more or less orbicular. Capsule the size of a large pea. Flowers only  $\frac{1}{2}$  a line across. Branchlets compressed, 4-angular.

var. *β puberulus*. All young parts minutely pubescent.

*BREYNIA, Forster.*

*Flowers* unisexual. *Male calyx* turbinate, high up, gamosepalous, 6-lobed, the lobes inflexed and imbricate in 2 rows, almost appendaged on the back. *Petals* and disk none. *Stamens* central, in a column, the anthers longitudinally adnate. *Ovary* 3-celled, each cell 2-ovuled. *Capsules* berry-like, 3-cocecons.

*B. RHAMNOIDES*, Muell. Arg.

Beach forests of Arakan. The Andamans and Nankowry.

Gong-nyin-ya.

All parts glabrous, leaves elliptical,  $\frac{1}{2}$  to 1 inch long, on a slender 1–1 $\frac{1}{2}$  line long petioles. Capsules the size of a pea, fleshy, red, then purplish-black.

*B. RACEMOSA*, Muell. Arg.

Katchall and Great Nicobar.

*B. OBLONGIFOLIA*, Muell. Arg.

Katchall.

var. *foliis majoribus*.

*CICCA, Linnaeus.*

*Flowers* unisexual. *Calyx* 5–6- (rarely 4-partite). *Disk* developed in either sex, gland-like, or in females united and urceolate and annular. *Stamens* 3–5. *Ovary* 3–12-celled, each cell 2-ovuled. *Styles* 3–4, bifid. *Capsule* drupaceous and dehiscent, or berry-like and fleshy. The cocci woody or crustaceous.

\* *Capsules drupaceous, sappy-fleshy, large, cocci woody.*

× *Flowers* usually 6-merous. *Stamens* in a column. *Ovary* and capsule 3-celled; glands in females urceolate-conate. *Drupe* white.

*C. ALBIZZOIDES*, Kz.

Western slopes of the Pegu Range up to 2000 feet.

Shā-mā or Thit-shā (Kurz).

Leaves up to 1 inch long by  $\frac{1}{2}$  an inch broad. Drupe about an inch in diameter.

*C. MACROCARPA*, Kz.

Prome and other parts of the Irrawaddy Valley.

Zi-hpyu (Kurz).

Leaves narrow, linear, bark wrinkled and fissured; styles simply 2-cleft, the lobes broad and short, 3-crenate; capsules about an inch in diameter.

*C. (PHYLLANTHUS) EMBLICA*, L.

All over Burma up to 3000 feet.

Ta-shā-pen (Kurz). Zi-hpyu (Mason).

As the last, but bark smooth, peeling off conchoidally. Styles twice 2-cleft, the end lobes subulate. Drupe only  $\frac{1}{2}$  an inch in diameter.

Wood brown, rather heavy, close-grained, takes a fine polish, weight 45 lbs.<sup>1</sup> Bark

<sup>1</sup> Kurz follows Braudis in giving 35 lbs. as the weight, but this is clearly an error.

and fruits used for tanning (Kurz). I think Kurz mistakes the native name, as in Pegu at least it is known as 'Shā-hpyu' or white Shah. The fruits are eagerly eaten by the Burmese though very anstere, and the wood is reckoned durable especially in water.

× × Flowers 4-merous, stamens free, 4, glands in males and hermaphrodites free and distinct, ovary and drupes usually 4-celled.

C. (PHYLLANTHUS) DISTICHA, L.

Cultivated in Chittagong, Pegu and the Andamans.

Then-bor-zi-lpyu.

Quite glabrous. Flowers red, drupes yellow.

\*\* Capsules berry-like, small, the cocci crustaceous.

+ Stamens 5, all free. Disk annular, 5-gonous. Capsule 3-2-coccous, succulent white.

C. (SECTRINEGA) LECOPYRUS, Muell. Arg. Ava (probably).

Armed with spiny abortive branchlets. Flowering branchlets terete.

C. (SECTRINEGA) OBOVATA, Muell. Arg.

All over Burma. Kamorta. Katchall and Car Nicobar.

Yē-chyn-yā.

Unarmed, flowering branchlets compressed, 4-cornered.

+ + Stamens 2-adelphous the 3 inner ones wholly, the outer only basally united. Glands in females distinct, capsules 12-6-coccous, succulent, purple or purplish-black.

C. (PHYLLANTHUS) RETICULATA, Poir.

Arakan. Pegu and Tenasserim.

Leaves  $\frac{1}{2}$  to 1 inch long. Capsules depressed-globular. Adult branches smooth.

var. *a reticulata*. Young shoots and leaves beneath puberulous.

var. *β glabra*, Thw. All parts glabrous.

C. MICROCARPA, Bth.

Tree forests all over Chittagong, Burma, and the Andamans.

Leaves 1-2 inches long. Capsules globular. Adult branches lenticellate-rough.

var. *a microcarpa*. All parts glabrous.

var. *β pubescens*. Young shoots and often beneath the leaves puberulous.

*Flowers racemose-panicled.*

BISCHOFFIA, Blume.

Flowers dioecious. Calyx deeply 5-partite, the lobes of the male cucullate and imbricate. Petals and disk none. Stamens 5, free, inserted round an Ovary-rudiment. Anthers opening by 2 slits. Ovary (occasionally surrounded by 5 staminodes) 3- or rarely 4-celled, each cell 2-ovuled. Styles basally connate, simple linear. Capsule drupaceous, sappy, with a 3-4-coccous crustaceous putamen.

B. JAVANICA, Bl.

All over Burma up to 2500 feet.

Flowers greenish in axillary, glabrous panicles. Drupes the size of a pea, sappy, bluish-black, smooth.

Wood red, takes a fine polish. Weight 47 lbs. (Gamble).

† † Fruit indehiscent, drupaceous or berry-like.

× × × Flowers in racemes or spikes, the males often amentaceous. Stamens free, round an ovary-rudiment.

° Seeds with an arillus.

BACCATREA, Loureiro.

Flowers dioecious or monoecious. Calyx 4-5-cleft, imbricate. Petals none. Stamens 4-10. Ovary 3- (rarely 2-5-) celled, each cell 2-ovuled. Fruit a spurious berry, covered with an irregularly bursting epicarp. Seeds enveloped in a white sappy and edible arillus.

*B. SAPIDA*, Muell. Arg. *E.T.* Tree forests all over Burma and the Andamans.  
Ka-nā-zo (Kurz).

Male calyx lobes, and bracts of either sex a line long. Female calyx nearly 3 lines long. The fruit is much esteemed by the Burmese.

*B. PARVIFLORA*, Muell. Arg. Tenasserim.

Ka-nā-zo (Kurz).

All the above parts only half the size, the female calyx lobes only a line long.

*B. JAVANICA*, Muell. Nankowry.

*SECURINEGA*, Jussieu.

*S. OBOVATA*, Muell. Arg. Kar Nicobar.

° ° *Seeds without arillus.*

*AXIDESMA*, Burmann.

*Flowers* dioecious. *Calyx-lobes* 3-8. *Petals* none. *Stamens* often as many as the calyx-lobes or more or fewer, and opposite to them round an ovary-rudiment. *Anthers* opening by 2 slits. *Ovary* 1-celled by suppression with 2 ovules. *Style* terminal, or nearly so, 3-parted, the stigmatic lobes rigid and partly 2-lobed. *Fruit* a sappy drupe, indehiscent, containing a long grooved putamen usually 1-seeded. *Seeds* without arillus.

\* *Flowers sessile or nearly so. Stigmas terminal.*

+ *Spike quite glabrous.*

*A. BUNIAS*, Sprengl. *E.T.* Upper Tenasserim.

All parts quite glabrous. The rachis of spike rather strong. Leaves glossy.

+ + *Spike more or less pubescent.*

‡ *Leaves rounded or retuse.*

*A. GHESEMBILLA*, Gaertn. Pegu and Martaban. Kamorta.

Pyi-sin (Kurz).

More or less puberulous. Spikes robust, tomentose.

‡ ‡ *Leaves more or less acuminate.*

+ *Calyx 3-lobed.*

*A. MARTABANICUM*, Presl. Upper Tenasserim.

Young shrubs, and leaves along the nerves pubescent.

+ + *Calyx 4-parted.*

*A. FRUTICULOSUM*, Kz. Tidal forests of Pegu.

Leaves small, 1-2½ inches long, hirsute above, densely pubescent beneath.

*A. VELUTINUM*, Tul. *E.T.* Tree forests, Eastern Slopes of Pegu

Kin-pa-lin (Kurz). Range and Tenasserim.

Leaves 4-5 inches long, like all the softer parts shortly and softly pubescent.

\* \* *Flowers pedicelled.*

× *Stigmas lateral, all parts pubescent, bracts linear-lanceolate.*

*A. VELUTINOSUM*, Bl. *E.T.* Tenasserim.

Flowers minute in densely-bracted pubescent catkins.

× × *Stigmas terminal.*

*A. MENAST*, Muell. Arg. Eastern Slopes of the Pegu Range, Martaban  
Kin-pa-lin. the Andamans and Car Nicobar.

Young parts slightly pubescent. Racemes puberulous. Stamens usually 4.

A. DIANDRUM, Roth.

All over Burma.

Kin-pa-lin (Kurz).

Young parts slightly pilose. Racemes glabrous. Stamens usually 2. Wood heavy, red-brown, close-grained, adapted for cabinet work (Kurz).

Kurz adds from the Nicobars :

A. PUNCTICULATUM, Miq.

Tree forests of Kamorta.

A. PERSIMILIS, Kz.

Tree forests of Kamorta.

## AFOROSA, Blume.

*Flowers* dioecious, in catkins. *Calyx* 3-6-parted. *Petals* and *disk* none. *Stamens* 2 (or rarely 3-5), free, inserted round a minute ovary-rudiment. *Anthers* opening by 2 slits. *Ovary* 2- (rarely 3-) celled, each cell 2-ovuled. *Styles* as many as cells, bifid. *Capsule* fleshy coriaceous, usually 1-seeded, by abortion. *Albumen* copious.

\* *Ovary villous, tomentose or pubescent.*× *Leaves shortly and softly pubescent beneath.*

A. VILLOSA, Baill.

Pegu and Tenasserim.

Ye-mein (Kurz).

Berries densely velvety-tomentose.

Exudes a red resin, and the bark is used for dyeing red (Kurz).

× × *Adult leaves quite glabrous.*

A. MACROPHYLLA, Muell. Arg.

Pegu and Tenasserim.

In-jin or In-kyin (Kurz).

Leaves 1-2 feet long by  $\frac{1}{2}$  to 1 foot broad, deeply cordate at base. Fruits velvety-tomentose.

A. VILLOSULA, Kz. *E.T.* Tree forests of the Eastern slopes of the Pegu Range. Tenasserim and the Andamans.

Leaves 3-5 inches long, not cordate at the base. Style-lobes 2-lobulate.

A. ROXBURGHII, Baill. *E.T.* Tree forests of Chittagong. Pegu and Tenasserim. Style-lobes simple, short.

\*\* *Ovary and leaves quite glabrous.*

A. LANCEOLATA, Thw.

Tenasserim.

Styles minute, tooth-like. Leaves small.

A. MICROSTACHYA, Muell. Arg.

Ava. Chittagong. Tenasserim. Kamorta. Great Nicobar.

Styles long, lacerate-fimbriate. Leaves large, drying yellow.

Kurz adds from the Nicobars :

A. GLABRIFOLIA, Kz.

Kamorta.

*Flowers solitary or clustered in the axils of the leaves.*

## CYCLOSTEMON, Blume.

*Flowers* dioecious. *Calyx* deeply 4-5-partite, imbricate, the 2 outer sepals larger. *Petals* none. *Stamens* 4-10, free, surrounding the disk. *Anthers* opening by 2 slits, the connective not produced. *Ovary* 4-2-celled, each cell 2-ovuled. *Styles* entire, united at the base. *Drupe*s fleshy, indehiscent, containing a 4-2-coecous, almost crustaceous, 4-1-seeded capsule.

\* *Flowers on  $\frac{1}{2}$  inch long petioles. Stigmas sessile, large, obversely broad-triangular.*C. MACROPHYLLUM, Bl. *E.T.*

Tree forests of South Andaman.

Female flowers arising from the stem and branches. Leaves large, laxly veined.

C. (HOPEA) EGLANDULOSUM, Roxb. *E.T.* Tree forests of Arakan.

Female flowers in the axils of the leaves. Leaves small, elegantly net-veined.

\*\* *Flowers on pedicels hardly  $\frac{1}{2}$  a line long. Stigma sessile, minute, 3-angular.*

C. SUBSESSILE, Kz. *E.T.* Tree forests of Arakan, Martaban and Khasya Hills.

Flowers greyish, pubescent. Drupes obsoletely 4-lobed, puberulose.

Kurz adds from the Nieobars :

C. LEIOCARPUM, Kz. Tree forests of Kamorta.

#### HEMICYCLIA, *Wight et Arnott.*

*Flower* dioecious. *Calyx* deeply 4-5-lobed, imbricate. *Petals* none. *Stamens* 8-25, free, inserted round the disk.

*Anthers* opening in 2 slits. *Ovary* 1-celled, 2-ovuled. *Stigmas* sessile or nearly so, almost discoid and turning reniform, 2-lobed, deciduous. *Drupes* glabrous, fleshy, 1-celled and 1-seeded.

H. SUMATRANA, Muell. Arg. *E.T.* Irrawaddy Valley and Martaban.

Putamen of drupe irregular, obliquely truncate on both sides at the apex, slightly keeled.

Wood heavy, close-grained. A fine wood (Kurz).

H. ANDAMANICA, Kz. *E.T.* The Andamans.

Putamen regular, half terete.

#### PETRANJIVA, *Wallich.*

*Flowers* dioecious, apetalous. *Disk* none. *Calyx* in males 2-3 parted, in females 4-6 parted. *Stamens* 3-2 free, or 1-2 adelphous. *Ovary rudiment* none. *Ovary* 3-2-celled, each cell 2-ovuled. *Fruit* an indehiscent drupe containing a bony 1-celled and 1-seeded putamen. *Seeds* albuminous.

P. ROXBURGHII, Wall. *E.T.* Pegu.

Touk-yat (Kurz).

Leaves oblong, somewhat oblique on one side, 2-3 inches long on a slender 2 lines long petiole.

× × *Calyx* valvate in bud. *Fruit* capsular. *Flowers* in axillary clusters.

#### BRIEDELLIA, *Willdenow.*

*Flowers* monœcious, rarely dioecious. *Calyx* deeply 5 partite, the lobes valvate, in females often deciduous. *Petals* 5, alternating with and shorter than the calyx-lobes. *Ducts* developed, in the male simple and adnate to the calyx, in the female double, the outer similar to the male disk, the inner sheathing the ovary. *Ovary* 2 (rarely 3)-celled, each cell 2-ovuled. *Seeds* albuminous.<sup>1</sup>

\* *Erect trees. Ripe fruits globular.*

† *Young branchlets and shoots pubescent or tomentose.*

+ *Flowers sessile.*

B. TOMENTOSA, Bl. *E.T.*

All over Burma up to 2000 feet.  
Kamorta and Katchall.

Leaves small, glaucous, sparingly pubescent beneath. Flowers glaucous.

+ + *Flowers pedicelled.*

B. PUBESCENS, Kz. *E.T.* Tree forests of the Pegu range on its Eastern slopes.

<sup>1</sup> Kurz remarks: "Genus *Briedelia* a *Lebdiopside* differt coccis inter se non connatis, et seminum testa membranacea sicca. Drupa in *Lebdiopside* epicarpio caruoso gaudet, cocci lignosi connati, et semina tegumento exteriori succoso-carnoso circumdata sunt.—"J.A.S.B. ii. 1873, p. 211.

Kyet-ta-yor (Kurz).

Leaves thin-chartaceous, one-coloured, pubescent beneath. Flowers axillary, greyish-tomentose.

B. RETUSA, Spreng.

Ava and Pegu up to 2000 feet.

Tseik-khye. 'Goat's dung.'

Leaves thin-coriaceous, glaucescent, and puberulous beneath, strongly-veined. Flowers glabrous. Drupes purplish-black, the size of a pea, containing a dehiscent 2-coecous putamen. Wood grey, prized for house posts. So named from its drupes, as Sapindus is so called from the dark marks in its wood.

†† *All parts glabrous.*

B. AMENA, Wall.

Ava.

Leaves blunt or rounded. The female flowers crimson, shortly pedicelled.

B. OVATA, Dene. *E.T.*

Tenasserim and the Andamans.

Leaves abruptly acuminate. Bracts of flower-clusters pubescent. Female flowers almost sessile.

\*\* *Shrubs. Ripe fruits elliptical.*

B. STIPULARIS, S.S.

All over Burma.

Sin-ma-no-pyin (Kurz).

Leaves bluntish. Calyx glabrescent, enlarging under the fruit. Female flowers shortly pedicelled, disk smooth.

B. DASYCALYX, Kz.

Ava and Pegu.

Leaves shortly acuminate. Calyx densely pubescent. Flowers sessile. Disk round the fruit, pilose.

Kurz adds from the Nicobars:

B. GLAUCA, Bl.

Kamorta and Katchall.

CLEISTANTHUS, *Hooker, f.*

*Flower* monœcious or diœcious. *Calyx* 5-parted. *Petals* 5, small, alternating with the calyx-lobes. *Disk* explanate, almost entire to 5-parted. *Ovary* 3-celled, each 2-ovuled. *Styles* 3-, more or less 2-cleft. *Seeds* without arillus. Trees with alternate simple leaves.

C. MYRIANTHUS, Kz. *E.T.*

Pegu. Tenasserim and the Andamans.

Capsules stalked. Young parts and leaves beneath tawny, pubescent.

C. STENOPHYLLUS, Kz.

Tenasserim (or the Andamans).

Capsules sessile. All parts glabrous.

\*\* *Ovules solitary in each cell.*

× *Calyx valvate in bud (tips of sepals rarely imbricate).*

+ *Petals present, or if suppressed the hypogynous glands opposite the calyx-segments.*

† *Stamens in bud, inflexed or incurved.*

CROTON, *Linnaeus.*

*Flowers* usually monœcious. *Calyx* 5- (rarely 4-6- or in females up to 12-) partite. *Petals* as many as sepals, in males developed, in females rudimentary. *Glands* of the disk alternating with the petals. *Stamens* usually 10-20. but may be less or more, the filaments inflexed in bud. *Ovary* 3- (rarely 2-4-) celled.

\* *Style simply 2-cleft to the middle or to near the base.*

× *Indument of young shoots silvery or coppery scaly.*

† *Pedicels of female flowers very short and thick, sulcate.*

C. ARGYRATUS, Bl. *E.T.*

Tree forests of Martaban and Tenasserim. Kamorta.

Leaves chartaceous acuminate, densely silvery or coppery-scaly beneath.

*C. ROBUSTUS*, Kz. *E.T.*

Pegu Range and Tenasserim.

Leaves coriaceous, bluntish or retuse, adult almost glabrous, lateral nerves faint.

†† *Pedicels terete and often slender.**C. OBLONGIFOLIUS*, Roxb.

Ava, Arakan, Pegu up to 2000 feet and often cultivated by the Burmese.

Thyt-yin (Kurz).

Adult leaves glabrous, coarsely repand-serrate. Capsule the size of a cherry-stone, smooth, seeds 3 lines long.

*C. JOUFFRA*, Roxb.

Pegu and Martaban.

Adult leaves glabrous. Capsule the size of a pigeon's egg. Scaly stellate-puberulose. Seeds  $\frac{3}{8}$  of an inch long.×× *Indument of young shoots, of sessile and tubercle-stalked stellate hairs.*‡ *Leaves penninerved or indistinctly 3-nerved at base.**C. WALLICHII*, Muell. Arg.

Tree forests of Eastern Slopes of the Pegu Range and Tenasserim.

Young leaves all over pubescent and adult ones, beneath. Capsules the size of a pea, minutely puberulous. Seeds 2 lines long.

†† *Leaves 5-6 nerved at the base.*+ *Capsule obsoletely 3-lobed, or almost terete. Leaves 5-nerved at base.*† *Inflorescences glabrous or nearly so.*\* *C. TIGLIUM*, L.

All over Burma.

Ka-na-kho (Kurz).

Adult parts glabrous. Female pedicels thick, silvery-scaly. Male pedicels slender, glabrous. Capsules almost oblong. Used as a hedge plant, it may be seen in all large towns. Cattle and goats eat its leaves, which render the milk violently purgative to infants fed on it. All the plant possesses medicinal properties. The root is a drastic purgative. The wood is a sudorific or in large doses purgative, the dried leaves the same, whilst the seeds are powerfully poisonous and purgative. Waring, however, give the following directions for preparing a cheap and safe purgative from them: Boil the seeds thrice in milk, drying them after each operation. Then carefully remove the outer shell and the embryo (the last if allowed to remain causing violent tormina and vomiting). To 5j of the seeds thus prepared add 5ij of catechu, adding a few drops of Ol. Menth. Pip. and divide into two grain pills. This formula is recommended by Dr. White, and one recommendation of this safe and efficacious medicine is that 500 doses may be contained in a small box, and purchased for half a rupee. The undue operation of these pills may be checked by a draught of lemon-juice.

†† *Inflorescences stellately-pubescent. Leaves often with a stalked gland on the crenatures along the margin.*

Δ *Capsule the size of a pea or larger.**C. SUBLYRATUS*, Kz.

Coast forests of the Andamans.

Young shoots rusty-scurfy. Basal glands of leaves stalked. Capsule sparingly appressed-stellate-hairy.

*C. FLOCCULOSUS*, Kz.

Irrawaddy Valley.

Young shoots softly floccose-stellate. Basal glands of leaves sessile. Capsules densely and softly stellate-tomentose.

Δ Δ *Capsules the size of a bullet or pigeon's egg.**C. CAUDATUS*, Geisel. *S.S.*

Prome and Pegu.

Young shoots minutely tubercled-stellate hispid. Basal glands of leaves stalked. Capsules minutely tubercled, stellate-rough.

++ *Capsules deeply 3-lobed.*

C. CALOCOCCUS, Kz. S.

Rangoon.

Leaves 3-nerved at the base, pubescent. Capsule the size of a pea, densely tubercled, stellate-hispid.

‡‡ *Stamens in bud erect.*

† *Petals in males as many as calyx segments. Ovary-rudiment none. Stamens central.*

SUMBAVIA, Baillon.

*Flowers monœcious. Calyx in males 5-partite and valvate, in females 6-partite and slightly imbricate. Petals in the males conspicuous, in the females minute, gland-like or obsolete. Stamens central, numerous. Anthers erect, basifixed, 2-rimose, the cells adnate. Ovary 3-celled, each 1-ovuled. Capsule 3-coccous. Seeds arillate.*

S. MACROPHYLLA, Muell. Arg. E.T.

Pegu Range and Tenasserim.

Leaves 2-glanded at base, acuminate, 6-9 inches long, thickened at the apex, on a silvery petiole 1-2 inches long.

‡‡ *Calyx regularly valvate in bud. Male flowers with twice as many petals as sepals in females.*

AGROSTISTACHYS, Dalz.

*Flowers diœcious. Stamens 8-12 in two whorls, the upper whorl 4-6-androus, the lower with as many anthers as petals. Anther-cells unequally 2-valved. Ovary-rudiment none. Ovary 3-celled, each cell 1-ovuled. Capsule 3-coccous, dry.*

A. LONGIFOLIA, Muell. Arg.

Tenasserim (or the Andamans).

All parts glabrous. Flowers in 6-3 or 2-stichously-bracted axillary spikes.

‡‡‡ *Calyx irregularly bursting in 2 or 3 lobes. Petals (at least in the males) more than calyx-segments. Ovary-rudiment none. Stamens central.*

ALEURITES, Forster.

*Flowers monœcious. Petals in both sexes 5. Disk present in both sexes, in males urceolate, or reduced to 5 glands. Stamens numerous, on a conical naked torus. Anther bi-rimose, the connective not produced. Ovary-rudiment none. Ovary 2-5-celled, cells 1-ovuled. Styles as many as cells, deeply 2-cleft. Fruits large, 2-5-coccous. Cocci bony. Seeds spuriously white-arilled. Albumen oily.*

\* A. MOLUCCANA, Willd. E.T.

Cultivated in Pegu and Tenasserim.

Drapes up to 2½ inches in diameter, fleshy, containing 1 or 2 hard irregularly furrowed nuts. Seeds very oily. The fruits exude gum, and the seeds yield half their weight of oil, which is excellent for culinary uses or for burning. The nuts are pleasant and edible, either raw or roasted. The tree is a native of the Moluccas, but introduced into India, Australia and elsewhere.

++ *No petals.*

‡ *Stamens round an ovary-rudiment.*

SYMPHYLLIA, Baillon.

*Flowers monœcious. Calyx 3-5-parted, the males valvate, the females imbricate in bud. Disk none. Stamens free, alternating with the sepals round a columnar Ovary-rudiment. Ovary 3- (rarely 2-) celled, cells 1-ovuled. Shrubs with simple pinninerved leaves.*

S. SILHETANA, Bail. E.S.

Tenasserim.

‡‡ *Ovary-rudiment none. Stamens central and polyadelphous.*

† *Flowers diœcious.*

§ *Capsule drupaceous.*

TREWIA, Linnaeus.

*Calyx 3-4-parted, in bud valvate in males, imbricate in females. Disk none.*

*Stamens* very numerous, free, on a central depressed receptacle. *Ovary* 3-4-celled, or confluent into 2, 1-ovuled. *Seeds* with arillus.

T. NUDIFLORA, L.

Tree forests all over Burma.

Yē-hmyōt (Kurz).

Drupes depressed, globular, the size of a wood-apple (*orange*), almost glabrous, corky-fleshy, containing a 4-2-celled, and seeded bony putamen.

§§ *Capsule* dry.

|| *Seeds* without arillus or spermatophore.

MAILLOTUS, Loureiro.

*Flowers* dioecious, rarely monoecious. *Calyx* 3-5- (rarely 2-)parted, in bud valvate in the males, in the females tubular or flask-like, rupturing longitudinally, or free. *Stamens* numerous, free or cohering at the base, on a central dilated receptacle. *Anthers* 2-rimose. *Ovary* 3- (rarely 5-2-)celled, cells 1-ovuled. *Albumen* copious.

\* *Capsules* unarmed, but variously tomentose.

† *Capsules* 2-coccous, velvety-tomentose.

M. REPANDUS, Muell. Arg. S.S.

All over Burma.

Nā-lyin-bō (Kurz).

Softer parts stellate-pubescent.

†† *Capsule* 3-coccous.

M. DECIPiens, Muell. Arg.

Ovary silky-pubescent.

\* \* *Capsules* armed with lax or crowded prickles.

† *Racemes* or *spikes* collected in terminal panicles.

+ *Leaves* peltate, orbicular-ovate.

M. BARBATUS, Muell. Arg. S.

Upper Tenasserim.

Leaves broad, 3-lobed. *Capsules* short-peduncled, globular, covered with a dense coat of soft short bristles.

M. RICINOIDES, Muell. Arg. E.S.

Upper Tenasserim.

Leaves narrow, not lobed. *Capsules* sessile, densely covered with soft pubescent bristles as long as the capsular diameter.

++ *Leaves* not or indistinctly peltate, shortly tomentose beneath. *Capsule* shortly and laxly muricate.

M. TETRACOCcus, Kz. E.T.

Chittagong.

*Capsules* sessile or nearly so, 4-5-coccous, almost globular, scurfy-whitish tomentose.

M. PANICULATUS, Muell. Arg. E.T. Pegu Range, Eastern Slopes, and Tenasserim.

*Capsules* 3-coccous and 3-lobed, tawny tomentose.

†† *Racemes* terminal or axillary, not paniced. *Capsule* lobed, 3-coccous, shortly and laxly muricate.

+ *Capsules* with hairy indument.

M. ROXBURGHIANUS, Muell. Arg. E.T.

Tree forests of Chittagong and hills East of Toung-ngoo.

Leaves broadly peltate, densely pubescent. *Capsules* peduncled, tomentose and glandular.

++ *Capsules* densely yellowish glandular, otherwise glabrous. *Leaves* narrowed towards the base.

† *Leaves peltate.*

M. ACUMINATA, Muell. Arg. S.E. Tree forests of the Andamans, Katchall and Great Nicobar.  
Young parts and leaves beneath puberulous.

†† *Leaves not peltate.*

M. HELFERI, Muell. Arg. E.T. Tree forests all over Burma, the Andamans, Trice and Track.  
Young parts and leaves beneath puberulous. Petioles long and slender.  
M. MURICATUS, Muell. Arg. E.S. Tree forests of the Andamans, Katchall and Kamorta.  
All parts glabrous. Petioles proportionally short.

ROTTLERA, Roxburgh.

(*Mallotus* in part.)

R. TINCTORIA, Roxb. All over Burma and the Andamans.  
*Mallotus Philippinensis*, Muell. Arg.

Tor-thi-ben.

Leaves beneath glaucescent and crimson-resinous. Capsules densely covered with crimson resinous powder.

The bark is used for tanning, the root as a red dye, and the powder on the capsules as a scarlet dye for silk.

The following remarks on this valuable dye are from a paper by Daniel Hanbury in the *Pharmaceutical Journal* for February, 1858 :—"Its application as a remedial agent having recently attracted attention in this country, in consequence of the favourable reports made by several practitioners in India, who have found it eminently successful in the treatment of *tania*, I think it may be not uninteresting if I briefly recapitulate its history, and quote some of the statements that have appeared regarding its medicinal properties and mode of administration.

"The genus *Rottlera*, so named in honour of the Rev. Dr. Rottler, an eminent Danish missionary and naturalist, was, as at present restricted, founded by Roxburgh in 1798.

"*Rottlera tinctoria*, Roxb., is a tree of from 15 to 20 feet in height; it is common in the hilly districts of India from Burma to the Punjab, and from Ceylon to the hot valleys of the whole of the Himalaya, where it ascends to an elevation of 5000 feet; it is found in the Philippine Islands, in China, and in North-Eastern Australia; it appears also to occur in the South of Arabia and in the Somali country, from which regions the dye obtained from it is carried to Aden for sale.

"The fruit of the tree is tricocous and of the size of a pea, covered on the outer surface with minute, sessile, roundish, semi-transparent glands of a bright red colour. According to Roxburgh the fruit ripens in February and March, at which period it is gathered, and the red, glandular powder is carefully brushed off and preserved for use.

"Before further describing this substance, I may properly advert to the names by which it and the tree affording it, are known to the natives of India; for some information on which part of the subject I am indebted to the kindness of Professor H. H. Wilson, of Oxford.

"The Sanskrit name of *Rottlera tinctoria* is *Punnaga*, a word having several synonyms, among which are *Tunga* and *Kesora*;—hence in Bengali we have *Punnág*, *Kesor* and *Tung*, and in Hindustani *Punnág*.

"The red powder from the capsules is called in Bengali *Kámala*, abbreviated to *Kámal*. The Sanskrit word *Kapila*, signifying *tawny* or *dusky red*, would appear to be also applied to it. In the Tamil language the substance in question is termed *Kapilapodi*, a name compounded of the Sanskrit *Kapila* and the Tamil *Podi*, the latter word meaning the *pollen of a flower*, or *dust in general*.

"*Vasantagandha*, a Sanskrit word meaning *spring-fragrance*, is, according to Roxburgh, a designation in the Telinga or Telugu language of the same red powder.

"The Hindustani name *Kāmālā* has, with slight variations in spelling, been adopted by the Europeans in India, and I shall therefore employ it (omitting the accents indicating the long quantity of the vowels) as the most convenient term by which to designate the red powder derived from the capsules of *Rottlera tinctoria*.

"Kamala, as found in the Indian bazaars, has the aspect of a brick-red powder, possessing from its structure that peculiar mobile character which we notice in Lycopodium and Lupuline. It also agrees with Lycopodium in the difficulty with which it is mixed with water, and in the manner in which it ignites when thrown into the air over the flame of a candle. Examined with a lens, or still better with the compound microscope, it is seen to consist of garnet-red, semi-transparent, roundish granules, of from  $\frac{1}{16}$  to  $\frac{1}{32}$  of an inch in diameter, more or less mixed with minute stellate hairs and the remains of stalks, leaves, etc.: the latter substances however are easily removed by careful sifting, the drug thereby acquiring a brighter red colour and more uniform appearance.

"Kamala has but little smell or taste. It is insoluble in cold water, and nearly so in boiling water. It is soluble in a solution of an alkaline carbonate, and still more so in one of caustic alkali, a deep-red solution being in either case produced. The addition of an acid to these solutions occasions a precipitate of resinous matter.

"Treated with alcohol or ether, Kamala affords a large proportion of soluble matter and a solution of a beautiful deep-red colour. The alcoholic solution upon the addition of water becomes turbid from the precipitation of resin. By repeated digestions in hot alcohol, the whole of the resinous colouring matter of Kamala may be removed, a pale-whitish substance being the only residuum.

"Dr. Thomas Anderson, Regius Professor of Chemistry in the University of Glasgow, who has made Kamala the subject of special investigation, finds that if a concentrated ethereal solution of Kamala be allowed to stand for a couple of days, it solidifies into a mass of granular crystals. If these be drained, pressed in bibulous paper, and purified from adhering resin by repeated solution and crystallization in ether, the crystalline substance is obtained in a state of purity. It then consists of yellow crystals having the form of minute plates and a fine satiny lustre. This substance has been named by Dr. Anderson *Rottlerine*.

"Dr. Anderson states that Rottlerine is insoluble in water, sparingly soluble in cold alcohol, more so in boiling. In ether, it is readily soluble. It dissolves in an alkaline solution with a dark-red colour. Its alcoholic solution is not precipitated by acetate of lead.

"A concentrated alcoholic solution of Kamala deposits upon cooling a pale flocculent matter, sometimes in such abundance as completely to fill the fluid. This substance is soluble in boiling alcohol, but sparingly in cold; hardly soluble in ether, and insoluble in water. It appears to have no crystalline structure. It gives no precipitate with the salts of lead or silver, and does not appear to form a compound with any other substance. In drying it shrinks much, resembling hydrate of alumina coloured with oxide of iron. The quantity obtained was, however, too minute for a full investigation of its properties.

"Kamala is used throughout India as a dye for silk, its colour being extracted by boiling it in a solution of carbonate of soda. I have a specimen of silk dyed with it, which is of a rich orange-brown. The root of the tree is said to be also used in dyeing.

"It is however in its character of an anthelmintic that Kamala appears most to deserve the attention of the medical man and pharmacist.

"Dr. C. Mackinnon, Superintending Surgeon, Bengal Medical Establishment, in introducing to notice the new remedy, states:—

"My attention was first called to it by a gunner of the brigade, affected with tapeworm, in whom both turpentine and kousso had failed to expel the worm. He stated that a companion of his affected with tapeworm, had taken the remedy with success. I immediately sent for some, and, without any previous preparation of the patient, gave him 3 drachms. He was a large powerful man, and this producing no effect, in 4 hours afterwards the same dose was repeated. It now operated very freely and frequently, and with the fourth stool a large tapeworm, 6 yards long, was passed.

‘The result was so satisfactory, that I have continued to employ the remedy whenever a case presented itself; and I have now given it in 16 different cases, and in all without a failure. As far as my experience goes, I have found it a better and more certain remedy than either turpentine or koussou, and much less disagreeable to take than either of these remedies.

‘In none of my cases subsequent to the first, did I ever exceed for a single dose 3 drachms. This usually purges from five to seven times, and the worm is usually expelled dead in the fourth or fifth stool.

‘In two of the latter cases in which I administered it in Hospital, both patients recently recovered from fever, and still weak, the dose of 3 drachms purged very violently – from a dozen to 14 times. In three subsequent cases I reduced the dose to  $1\frac{1}{2}$  drachms, and no action on the bowels succeeding it, I gave in six hours afterwards half an ounce of castor-oil. This acted four or five times, and in each case the worm was passed dead.

‘In almost every case the long slender neck of the worm appeared in the motion.

‘To a native child of five years of age, I gave a dose of 40 grains, and a tapeworm was duly expelled. The drug usually purges speedily. In about half the cases, some degree of nausea and slight griping were experienced; in the remaining half, no inconvenience whatever was sustained, some of the patients declaring it to be the easiest purge they had ever taken in their lives.

“Dr. Mackinnon gives the following summary as the result of his experience :

1. That *Kamala* is a safe and efficient remedy for tapeworm, and more certain than either turpentine or koussou.

2. That to a strong European 3 drachms may be safely given as a dose.

3. That to a person of feeble habit or to a female,  $1\frac{1}{2}$  drachms, followed, if necessary, by half an ounce of castor-oil, is a sufficient dose.

“Since the paper from which the foregoing are extracts, was published, Dr. Mackinnon has stated that in subsequent more extensive trials of *Kamala*, during which he has administered it to nearly 50 patients, in two instances only was no worm expelled.

“Dr. Anderson, Assistant Surgeon, 43rd Regt. Light Infantry, states that the occurrence of tapeworm is very common among the Europeans serving in the Punjab, and that it is also prevalent among the Mussulman population of that province.

“‘The vermifuge properties of *Kamala*,’ writes Dr. Anderson,

‘are as well marked as those of any of the best reputed anthelmintics, not excepting the Abyssinian remedy *Koussou*. The only objection to it is, that when the powder is used, considerable nausea occasionally follows, but certainly not more than what is produced by the sickening preparation of pomegranate root and other anthelmintics.

‘After three drachms of the powder have been administered, the worm is usually expelled in the third or fourth stool. It is generally passed entire, and almost always dead, and in all the cases I have examined (about 15), I was able to detect the head. In only two cases do I know of the worm being passed alive. The advantage of the tincture over the powder consists in its action being more certain and milder, and in its being rarely accompanied by nausea and griping. In two or three cases, only two or three stools followed the dose usually given, and the worm was expelled in the second stool; in one patient, only one stool was caused by the medicine, and in it, the worm came away dead.’

“Dr. Anderson alludes to 95 cases of tapeworm in which *Kamala* was prescribed, and of this number he was aware of only two in which no worm was expelled. Of these 95 cases, 86 were European soldiers, 8 were Mussulman natives, and one was a Hindu of the lowest class. All these persons were in the habit of indulging freely and constantly in animal food, and among this class tapeworm is common; those, on the other hand, whose animal diet is less copious are less liable to tænia, while among several native regiments, Hindu Sepoys and servants, says Dr. Anderson, whose food is entirely vegetable, the parasite is unknown.

“Dr. C. A. Gordon’s experience of the efficacy of *Kamala* corresponds entirely with that of Drs. Mackinnon and Anderson. He observes,

‘With *Kamala* there is no unpleasant effect. It is not even necessary to take a dose of purging medicine as a preparative; and beyond a trifling amount of nausea and griping in some instances, no unpleasant effects are experienced; while by far the greater number of persons to whom it is administered suffer no inconvenience whatever beyond what they would from a dose of ordinary purging medicine.’

“The observations of Dr. Gordon relative to the occurrence of tænia are confirmatory of those of Dr. Anderson, and are to the effect that the free use of animal food of very indifferently quality among the British troops in the N.W. Provinces, must be regarded as the cause of the prevalence of the malady. In the case of soldiers

stationed at Peshawur, tapeworm is so common, that it is believed that every third man suffers from it during the two years that the regiment usually remains there. To give Dr. Gordon's own words :

'Those who have escaped the misfortune of having had to pass some years in India, can form no idea of the vast herds of lean, half-starved pigs that roam over the fields and waste grounds in the vicinity of villages ; neither can they have any conception of the nature of the food on which these pigs subsist.'

"After some revolting details as to the habits of swine in India, Dr. Gordon continues ;

'Pigs, however, are not the only animals that live in this filthy manner in India. Cattle and sheep, that are so particular in their food in Britain, acquire degenerate<sup>1</sup> tastes in India ; and it is needless to enter into similar particulars regarding ducks, fowls, turkeys, and pigeons, all of which are more or less used as food by our countrymen there.'

"The dose of Kamala may be stated as from  $\frac{1}{2}$  a drachm to 3 drachms suspended in water : a single dose is frequently found sufficient, and in general it is not necessary to give any other medicine before or after. In some cases, however, where but a small dose of Kamala has been administered, castor-oil has been afterwards given with good effect. Dr. Gordon has prescribed Kamala in the dose of 1 drachm, repeated at intervals of three hours.

"Kamala may also be given in the form of Tincture : the formula for which, recommended by Dr. Anderson, is as follows :

℞      Kamalæ, ʒvj.  
         Spiritus rectificati, fʒxvj.  
Macerate per bidnum et cola.

"An ethereal tincture may be prepared of the same strength, but it is said to offer no particular advantage over the alcoholic.

"The dose of *Tinctura Kamalæ* is from ʒj to ʒiv, diluted with some aromatic water."

#### ALCHORNEA, *Sw.*

*Flowers* usually dioecious. *Calyx* in males 4- (rarely 3-2-)parted valvate in bud, in females imbricate, and 6-5- (rarely 4-)parted. *Disk* in males none, in females sometimes developed. *Stamens* numerous, or 8-4, usually in 2 alternate rows, the filaments only basally connate. *Anthems* 2-rimose, the cells free from the base to the middle. *Ovary-rudiment* none. *Ovary* 3- (rarely 2-)celled, cells 1-ovuled. *Capsule* 3-1-coccous, dry.

A. RUGOSA, Muell. Arg.    *E.S.*

Upper Tenasserim and tree forests of the Andamans.

Leaves short-petioled, capsules glabrous.

A. TILLEFOLIA, Muell. Arg.    *E.S.*

Tenasserim (or the Andamans).

Leaves long-petioled. Capsule lenticellate-muricate, shortly tomentose.

A. JAVENSIS, Muell.

Katchall and Car Nicobar.

#### MACARANGA, *Thouars.*

*Flowers* dioecious. *Calyx* in males, valvate, in females, imbricate in bud. *Disk* none. *Stamens* usually fewer than 15 (rarely 1-3 only), inserted on a central receptacle. *Anthems* almost peltately dorsifixed, 3-1-celled, connective incomplete, shorter than the cells. *Ovary-rudiment* none. *Ovary* 6-2-celled, each cell 1-ovuled. *Capsule* dry, 6-2-coccous. *Seeds* albuminous.

\* *Leaves* ample, broadly peltate at base. *Capsules* unarmed.

× *Female flowers* and capsules pedicelled. *Inflorescence* a panicle.

M. DENTICULATA, Muell. Arg.    *E.T.*

Tree forests of Arakan,

Toung-hpet-wun (Kurz).

Pegu and Tenasserim.

Bracts minute, broad, acute, shorter than the flower capsules. Capsules usually 2-coccous.

<sup>1</sup> *i.e.* Onthophagous.

Wood red-brown, adapted for cabinet work. Exudes a red resin (Kurz).

*M. INDICA*, Wight. *E.T.* Tree forests of the Andamans.

Bracts linear in males, with a gland, terminating in a subulate appendage; in females the gland is often wanting. Capsules 1-coccous. Exudes a red resin.

× × *Male flowers in panicles. Females in simple spikes, sessile.*

*M. TANARIUS*, Muell. Arg. Tree forests of the Andamans. Kamorta.  
*M. molliuscula*, Kz. Katchall and Nankowry.

Bracts leafy, toothed, acuminate, 2-4 lines long, without glands, larger in females. Capsules 2-3-coccous, subulate, prickly. Exudes a reddish resin.

\*\* *Leaves not peltate.*

× *Male flowers in bractless panicles, females in a long-peduncled bracted head.*

*M. MEMBRANACEA*, Kz. Ava and Martaban, at 4000 to 6000 feet.

Branchlets glabrous, leaves minutely pubescent. Bracts lacerate-toothed. Styles  $\frac{1}{2}$  an inch long. Capsules 2-coccous, red glandular, and laxly subulate-muricate.

*M. ANDAMANICA*, Kz. *E.T.* Tree forests of the Andamans.

Leaves glabrous. Bracts entire. Styles an inch long. Ovary almost glabrous.

× × *Male flowers in leafy but small-bracted panicles. Females unknown.*

*M. MINUTIFLORA*, Muell. Arg. *S.* Tenasserim.

Branchlets and leaves densely puberulous. Flowers diandrous. Panicles lax and slender, large.

*M. POPULIFOLIA*, Muell. Arg. *E.T.* Tree forests of the Andamans.

Leaves glabrous, opaquely glaucescent beneath. Flowers monandrous. Panicles dense, crowded, small.

Kurz also gives *M. GIGANTEA*, Muell. Arg., from Kamorta.

#### CLEIDION, *Blume.*

*Flowers* diœcious. *Calyx* 3-5-partite, valvate in males, imbricate in females. *Disk* none, or only in the females. *Stamens* numerous, free, clustered on the central receptacle. *Anthers* peltately attached, 4-celled, the connective usually produced. *Ovary-rudiment* none. *Ovary* 2-3-celled, each cell 1-ovuled. *Styles* as many as ovary-cells, filiform, 2-cleft, minutely papillose on the inner face. *Capsule* 2-3-coccous.

*C. JAVANICUM*, Bl. *E.T.* Tree forests of Chittagong, Tenasserim, and the Andamans.

Male flowers slenderly pedicelled. Petiole 2-3 inches long.

*C. NITIDUM*, Thw. *E.T.* Tree forests of South Andaman.

Male flowers sessile. Petiole 2-4 lines long.

#### BLUMEODENDRON, *Kurz.*

*Flowers* diœcious. *Calyx* of males valvate, 3-partite. *Disk* in males gland-like. *Stamens* numerous, free, on an elevated receptacle. *Ovary-rudiment* none. *Ovary* 3-celled, cells 1-ovuled. *Capsule* large, fibrous-woody, 3-2-coccous. *Seeds* large, enveloped in a spurious thick arillus. *Albumen* soapy.

*B. (MALLOTUS) TOKBRAI*, Muell. Arg. *E.T.* Tree forests of the Andamans.

Leaves 3-nerved at base, 4-6 inches long, glabrous, entire, shortly acuminate. Seeds purple.

#### CELODISCUS, *Baillon.*

*Flowers* diœcious. *Calyx* valvate, 4-5-partite in males, in females 3-5-cleft. *Stamens* numerous, on a concave receptacle or round a central disk, free or variously polyadelphous. *Anthers* 2-rimose, the connective not produced. *Ovary-rudiment*

none. *Ovary* 5-3-celled, cells 1-ovuled. *Styles* as many as ovary-cells, simple papillose. *Capsule* dry, 5-2-coccous.

\* *Flowers in elongate racemes or spikes.*

C. ERIOCARPOIDES, Kz. *E.S.* Upper Tenasserim.

Flowers sessile, in elongate spikes.

C. LONGIPES, Kz. Ava and Pegu.

Flowers on long pedicels, in racemes.

\*\* *Flowers sessile in clusters, or dense short spikes.*

† *Leaves pubescent on both sides.*

C. LAPPACEUS, Kz. *E.S.* Ava.

Capsules the size of a cherry, densely and softly muricate, the soft prickles 3 lines long.

†† *Leaves almost glabrous.*

C. GLABRISCULUS, Kz. Pegu Range and Martaban.

Petiole 1-3 inches long.

C. HIRSCUTUS, Kz. The Pegu Range.

Petioles 4-12 inches long.

Kurz remarks: "*Calodiscus* melius species omnes *Malloti* includit, quæ alabastro apiculato et seminibus carunculatis gaudent."—J.A.S.B. ii. 1873, p. 244.

#### HYMENOCARDIA, *Endlicher.*

*Flowers* dioecious, the males in catkin-like spikes. *Calyx* 5-parted, rarely 5-7-toothed, persistent, valvate in bud. *Disk* none. *Stamens* numerous, or 5, filaments basally united round an ovary-rudiment. *Anthers* ovoid, 2-rimose. *Ovary* 2-celled, compressed, cells 1-ovuled. *Styles* 2, long, simple, papillose. *Capsule* samaroid, compressed, reniform-cordate, 2-celled. *Seeds* compressed, without arillus, testa thin. *Albumen* scanty.

II. WALLICHII, Tul. Swamp forests of Pegu and Tenasserim.

Ye-chin (Kurz).

Leaves 1-2½ inches long. Male spikes up to ½ inch long. Ovary much compressed, the long styles crimson, papillose.

II. Plicata, Kz. Swamp forests of Pegu and Tenasserim.

Ye-chin (Kurz).

Leaves 3-5 inches long. Male racemes up to 6 inches long. Ovary 2-merous, compressed, densely gland-dotted, transversely wrinkled. The 2 styles short and large.

#### CLAYOXYLON, *A. Jussieu.*

*Flowers* usually dioecious. *Calyx* valvate in bud, in males 3- (rarely 4-)parted, in the females 3-2-parted. *Disk glands* free, or united in a disk. *Stamens* 6 to very numerous, free, on a central receptacle. *Anthers* erect, 2-rimose. *Ovary-rudiment* none. *Ovary* 3-2 or 4-celled, cells 1-ovuled. *Styles* as many as ovary-cells, simple, short, papillose-stigmatic, rarely almost smooth. *Capsule* 3- (rarely 2-4-)coccous. *Seed* with arillus. Arillus white or scarlet.

C. LONGIFOLIUM, Baill. *E.S.* Tree forests of eastern slopes of the Pegu Range, the Andamans, Kamorta and Katchall.

Capsules greyish, puberulous, contracted on a short stalk. Peduncle 1-2 lines long.

C. LONGIPETIOLATUM, Kz. *E.S.* Tree forests of Pegu and Martaban.

Capsule densely covered with soft hirsute prickles. Leaves penninerved, scabrous, but not hairy.

C. LEUCOCARPUM, Kz.

Tree forests of the Pegu Range.

Capsules white, the size of a small cherry, 3- (rarely 2-4-)coccous, crowned with thick papillose-fringed styles. Leaves ample, 3, (almost 5-)nerved at base, strongly veined, hispid above, pubescent beneath.

C. MOLLE, Endl.

Kamorta, Katchall and Nankowry.

ACALYPHA, *Linnaeus*.

*Flowers* monœcious or polygamous. *Calyx* in males 4-parted and valvate in bud, in the females 3-5-parted, slightly imbricate. *Disk* none. *Stamens* 8, free, on a cushion-like receptacle. *Anthers* 2-rimose, the cells almost serpentine, free, suspended from the apex. *Ovary-rudiment* none. *Ovary* 3-celled, cells 1-ovuled. *Styles* 3, free, or shortly connate at the base. *Capsule* dry, 3-celled and 3-coccous. *Seeds* albuminous.

A. FRUTICOSA, Forsk.

Khakyen Hills and Pegu up to 2000 feet.

A branched shrub 4-8 feet high. All softer parts greyish-puberulous. Flowers minute, greenish, sessile.

TRAGIA, *Plumier*.

*Flowers* usually monœcious. *Calyx* in males 5-3-parted, valvate, in females 6-5- (rarely 8-3-)parted, and imbricate in bud, usually enlarged in fruit, involuere-like, and stingingly hispid. *Stamens* 1-40 free, or the inner ones connate round a minute ovary-rudiment. *Anthers* 2-rimose, dorsifixed, the connective not produced. *Ovary* 3- (rarely 5-)celled, cells 1-ovuled. *Styles* 2-5, connate below, papillose on the inner face. *Capsules* dry, 1-3- (rarely 5-)celled. *Seeds* without spermatophore, or arillus.

T. INVOLUCRATA, Jacq. E.S.

Margins of forests in lower Pegu.

Bet-yā.

Leaves pubescent. Calyx lobes pinnatifid. Seeds glabrous.

T. BURMANICA, Kz. C.S.

Tree forests East of Toung-ngoo.

Leaves large, almost glabrous. Female calyx lobes entire. Seeds tomentose.

CNESMONE, *Blume*.

*Flowers* monœcious. *Calyx* 3-cleft, males valvate, females imbricate in bud. *Disk* none. *Stamens* 3, free round an ovary-rudiment, alternating with the calyx-segments. *Anthers* 2-rimose, the connective long exerted. *Ovary* 3-celled, cells 1-ovuled. *Styles* thick, connate below, simple, trigonous, erect, forming a head larger than the ovary. *Capsule* dry, 3-coccous. *Seeds* almost globular, with a jagged arillus.

C. JAVANICA, Bl. E.S.

Tree forests of Rangoon.

All parts stingingly pubescent. The cocci the size of a small pea, covered with stiff fragile hairs.

DALECHAMPIA, *Plumier*.

*Flowers* of both sexes included in a 2-leaved compressed involuere. *Disk* none, or rudimentary in females. *Stamens* numerous, the filaments united in a column. *Anthers* 2-rimose, longitudinally adnate. *Ovary-rudiment* none. *Ovary* 3-4-celled, cells 1-ovuled. *Capsule* 3-4-coccous, dry.

D. SCANDENS, L. E.S.

Southern portion of the Pegu Range.

Douk-ya mā.

Leaves 3-lobed and 5-nerved at the deeply-cordate base.

††† *Ovary-rudiment* none. *Stamens* central, polyadelphous.

RICINUS, *Linnaeus*.

*Flower* monœcious. *Calyx* 5-parted, both sexes valvate in bud. *Disk* wanting. *Stamens* very numerous, united into many botryomorph bundles. *Ovary* 3-celled, cells 1-ovuled. *Capsules* dry, 3-coccous. *Albumen* copious.

\* *R. communis*, L. *E.S.*

Cultivated and half wild all over Burma.

Kyet hsu.

Kamorta, Katchall and Great Nicobar.

Palma-Christi or Castor-oil Plant.

Capsules cehinate, rarely unarmed. 3- rarely 4-coceons. Berries variegated, in shape resembling a dog tick after a full meal, whence the generic name. The seeds are acrid and, according to Waring, 20 have caused death. The oil simply expressed without heat is most esteemed for medicine, being one of the best and safest purgatives known, and is the only fixed oil soluble in alcohol. The nauseous flavour may be disguised by an equal bulk of syrup of lemon, or the juice of a lemon in mucilage and 5 ss. T. cardom. co. Balfour says the native Hakeems prepare a tasteless oil as follows: The berries are boiled for two hours in water, then dried for three days in the sun, and deprived of their shells, then pounded and boiled again in fresh water, till the whole of the oil has risen to the surface. By this plan 13 lbs. of seeds should yield one quart of tasteless oil. It is a method deserving attention, considering the hateful odour of the oil usually given to children, and the difficulties which therefore attend its administration.

Dr. Mason says that prior to the advent of the missionaries the Karens were ignorant of the medicinal properties of the plant, but cultivated it "to obtain the seeds to mix with their dyes and fix their colours." No particulars of the process are given, nor are the dyes mentioned which are so fixed by castor-oil seeds, nor am I aware that the plant is put to such a use in any part of India.

#### HOMONOTA, *Loureiro*.

*Flowers* dioecious. *Calyx* of males 3-parted and valvate, of females 5-parted and imbricate in bud. *Disk* none. *Stamens* central, very numerous, and united into many botryomorph bundles. *Anthers* 1-celled, adnate, almost globular. *Ovary* 3- (rarely 4-)celled, cells 1-ovuled. *Capsule* dry, 3-4 coccous. *Seeds* smooth, with a spurious arillus.

H. RIPARIA, Lour. *E.S.*

Ava, Chittagong, and all over Burma.

<sup>1</sup> Mo-ma-kha (Kurz).

Leaves linear. Flowers sessile in axillary pubescent spikes.

× × *Calyx imbricate in bud or wanting.*

+++ *Petals present, or if suppressed, the hypogynous glands opposite the calyx-segments.*

† *Fruit dry, capsular.*

§ *Flowers in panicles.*

#### MANIHOT, *Plumier*.

*Flowers* dioecious. *Calyx* imbricate in both sexes, in females deciduous. *Petals* none. *Disk* urceolate. *Stamens* 10, free, in 2 series. *Ovary* usually surrounded by 10 staminodes, 3-celled, cells 1-ovuled. *Capsules* 3-coceous. *Cocci* 2-valved.

\* *M. UTILISSIMA*, Pohl. *E.S.*

Generally cultivated in Burma and Nicobars.

Pooloo-pinnan-myook (Kurz).

Root tuberous up to 3 feet in length.

This plant is the Manihot, or Cassava, the roots of which are poisonous eaten raw, but when grated, and deprived of the acrid sap by pressure, furnish a wholesome food. The expressed juice throws down a deposit, which when washed and dried constitutes Tapioca.

#### JATROPHA, *Linnaus*.

*Flowers* usually monoecious. *Calyx* 5-parted in both sexes, imbricate in bud. *Stamens* 30-10 in 6-2 whorls, central, filaments connate at the base. *Anthers*

<sup>1</sup> This name is undoubtedly applied to the Willow in Pegu.—W.T.

2-rimose, the cells free below. *Ovary-rudiment* none. *Ovary* surrounded by 8 or 10 stamiuodes, usually 3-celled, cells 1-ovuled. *Capsule* dry, 2-4 coccous.

\**J. CURCAS*, L.

Cultivated as a hedge plant.

Thyi-u-bor kyet-hsu.

Leaves angular-lobed, the lobes and stipules entire.

*J. GLANDULIFERA*, Roxb.

Ava. Chittagong and Pegu, round villages, and along rivers.

Leaves palmately lobed, the lobes glandular-toothed. Stipules glandular-bristly.

\**J. MULTIFIDA*, L.

Cultivated round monasteries.

Leaves digitately multifid, the lobes entire or lobed, the stipules long, hair-like, lacerate without glands.

#### OSTODES, *Blume*.

*Flowers* dioecious. *Calyx* 5-parted in both sexes, imbricate in bud. *Petals* imbricate. *Hypogynous glands* alternating with the petals. *Petals* numerous, free, on a central convex receptacle. *Anthers* 2-rimose. *Ovary-rudiment* none. *Ovary* usually 3-celled, cells 1-ovuled. *Seeds* without arillus.

*O. PANICULATA*, Bl. *E.T.*

Tree forests East of Toung-ngoo at 2000 to 3000 feet.

Leaves not distichous. Flowers panieled.

*O. HELFERI*, Muell. Arg.

Upper Tenasserim.

Leaves distichous. Flowers in axillary clusters.

#### § § *Flowers in umbel-like racemes.*

##### CODLEUM, *Rumphius*.

*Flowers* monœcious. *Calyx* 5- (rarely 3-)parted, imbricate in bud in both sexes. *Disk* developed outside the stamens. *Petals* alternating with the sepals, rarely absent or rudimentary in the females. *Stamens* free, inserted on the raised central receptacle. *Anthers* 2-rimose. *Ovary-rudiment* none. *Ovary* 3-4-celled, cells 1-ovuled. *Styles* 3-4-terete, basally connate, simple or 2-cleft. *Capsules* dry, 3-4 coccous.

\**C. VARIEGATUM*, Bl. *E.S.*

Cultivated all over Burma.

Flowers in elongate racemes. Ovary glabrous. Style simple.

*C. ANDAMANICUM*, Kz. *E.S.*

Tree forests of the Andamans.

Racemes corymbose, glabrous. Ovary hirsute. Styles 2-cleft.

*C. LUTESCENS*, Kz.

Bamboo Jungles of Middle Andamans.

Umbels from a pubescent-bracted head, on a pubescent axillary peduncle.

##### TRIGONOSTEMON, *Blume*.

*Flowers* monœcious. *Calyx* 5-toothed or parted, imbricate in bud. *Stamens* in 1 or more whorls on a central receptacle, not elevated. *Anthers* 2-rimose. *Ovary-rudiment* none. *Ovary* 3-celled, cells 1-ovuled. *Styles* 3, basally connate, or twice dichotomously branched. *Capsules* dry, 3-coccous. *Arillus* none.

\* *Leaves very shortly and thickly-petioled.*

*T. LONGIFOLIUM*, Baill. *E.T.*

Tenasserim.

Flowers small on short hirsute pedicels, forming a raceme in the axils of the leaves.

\*\* *Leaves on long and slender petioles.*

*T. HETERANTHUM*, Wight.

Tenasserim.

Female calyx-lobes deeply glandular-fringed. Ovary glabrous.

T. LETUM, Baill. *E.S.*

Upper Tenasserim.

Female calyx-lobes minutely ciliate, not glandular. Ovary appressed-pubescent.

†† *Fruit a drupe, indehiscent.*§ *Flowers in racemes.*

GALEARIA, Zollinger and Morison.

*Flowers* dioecious. *Calyx* 5-parted, the lobes imbricate in bud. *Petals* induplicate or cochleate. *Disk* none in male flowers. *Stamens* 10, in 2 series, surrounding the ovary-rudiment. *Ovary* 2-3-celled, cells 1-ovuled. *Styles* 2-3, 2-parted. *Drupe* indehiscent, containing a single 1-seeded stone. *Albumen* copious.

G. WALLICHII, Kz. *E.T.*

Tree forests of Tenasserim.

Leaves 4-6 inches long, oblong, acute at the base, entire, on a rusty puberulous petiole 2-3 lines long. *Calyx* net-veined on both sides. *Drupe*s the size of a prune, blue and pruinous, broader than long, the stone unequally wrinkled.

§§ *Flowers clustered.*

MICRODESMS, Planch.

*Flowers* dioecious. *Calyx* 5-parted and imbricate in bud in both sexes. *Petals* present. *Disk* none. *Stamens* 5, or if 10, inserted in 2 series round an ovary-rudiment. *Anthers* 2-rimose. *Ovary* 2-3-celled, cells 1-ovuled. *Styles* 2-3, 2-parted, lacerate-papillose.

M. CASEARLEFOLIA, Planch. *E.T.*

Upper Tenasserim.

*Flowers* minute, on slender pubescent pedicels, forming clusters in the axils of the leaves.

†† *Petals none.*+ *Flowers not inclosed in an involucre.*§ *Flowers clustered, or the clusters arranged in racemes.*

CHLETOCARPUS, Thwaites.

*Flowers* dioecious. *Calyx* in both sexes decussately 4-parted, imbricate in bud. *Hypogynous glands* opposite the sepals. *Stamens* 8-10, the filaments basally connate in a column, pilose. *Anthers* 2-rimose, basifix. *Ovary-rudiment* 2-3-cleft. *Ovary* 3-celled, cells 1-ovuled. *Styles* 3, deeply 2-cleft, basally connate, papillose. *Capsule* dry, 3-coccous.

C. CASTANEOCARPUS, Thw.

All over Burma and the Andamans.

Seeds glossy black, with a fleshy 2-lobed crimson spermatophore.

Kurz also records:

CNEILOSA MONTANA, Bl.

Nankowry.

GELONIUM, Roxburgh.

*Flowers* usually dioecious. *Calyx* imbricate in bud. *Disk* in males sometimes wanting, in females urceolate. *Stamens* from 6-60, free, occupying the central elevated disk. *Anthers* 2-rimose, longitudinally adnate. *Ovary-rudiment* none. *Ovary* 3-2- (rarely 4-) celled, cells 1-ovuled. *Stigmas* as many as ovary-cells, sessile, 3-2-cleft. *Capsule* fleshy, coriaceous, 3-2- (rarely 4-) coccous. *Seeds* enveloped in a white arillus.

G. MULTIFLORUM, A. Juss. *E.T.*

Tree forests all over Burma.

Se-than-pya (Kurz).

Stigmas large, 2-cleft. Capsules the size of a cherry.

G. BIFARIUM, Roxb. *E.T.*

Bamboo jungles of Middle Andaman and Car Nicobar.

Stigmas minute, sessile. Capsules usually didymous, the size of a pea.

G. CANCEROLATUM, Willd.

Katchall and Car Nicobar.

BALIOSPERMUM, *Blume*.

*Flowers* monœcious. *Calyx* 5-parted, imbricate in bud. *Petals* none. *Disk* in females urceolate, in the males gland-like and usually free. *Stamens* 15 or more, free or connate by pairs, on an elevated central receptacle. *Anthers* 2-rimose, longitudinally adnate. *Ovary-rudiment* none. *Ovary* 3-4-celled, cells 1-ovuled. *Styles* 3-4, half 2-cleft.

× *Calyx* not accrescent in fruit.

B. MONTANUM, Muell. Arg. All over Burma up to 3000 feet.

Disk in both sexes annular. Ovary densely hirsute. Leaves sinuately lobed, glabrous, at least above.

B. REIDIROIDES, Kz. Siam.

Ovary densely hirsute. Leaves entire, pubescent.

§§ *Flowers* in racemes or spikes, sometimes amentaceous.

CORUMBUM, *Reinwardt*.

*Flowers* usually diœcious. *Calyx* 2-3-parted, imbricate. *Petals* or disk none. *Stamens* 2-3, free, or shortly connate. *Anthers* 2-rimose, longitudinally adnate. *Ovary-rudiment* none. *Ovary* 2-3- (rarely 4-)celled, cells 1-ovuled. *Styles* as many as ovary-cells, simple or shortly connate. *Capsule* drupaceous or berry-like, 2-4-coccous. *Seeds* with a spurious arillus.

+ *Petioles* bearing a gland on each side of the apex.

\* C. (EXCÆCARIA) SETIFERA, Muell. Arg. Occasionally cultivated.

Chinese Tallow-tree.

Leaves entire. Capsules 3-4-coccous. Seeds enveloped in a white soapy substance.

C. (EXCÆCARIA) INSIGNE, Muell. Arg. Tree forests of Chittagong and the Pegu range.

Leaves serrulate. Drupes berry-like, sessile.

× × *Petioles* without glands.

C. (EXCÆCARIA) BACCATUM, Muell. Arg. Tree forests all over Burma.

Le-lun-pen (Kurz).

Leaves entire, more or less glaucous beneath.

EXCÆCARIA, *Linnaeus*.<sup>1</sup>

*Flowers* usually monœcious. *Calyx* 3-2-merous, lobes connate or free, or much reduced in the males, imbricate in bud. *Petals* or disk none. *Stamens* 3-2, central. *Anthers* 2-rimose, cells longitudinally adnate. *Ovary-rudiment* none. *Ovary* 3-2- (rarely 4-)celled, cells 1-ovuled. *Styles* 2-4, simple, basally connate, stigmatic on their inner face. *Capsule* fleshy or almost dry, 3-2-coccous. *Seeds* without spermatophore or arillus.

\* *Male flowers* pedicelled. *Capsules* woody, large.

E. INDICA, Muell. Arg. E.T. Tidal forests of Upper Tenasserim.

All parts glabrous. Leaves crenate-serrate.

\*\* *Male flowers* sessile or nearly so. *Capsules* crustaceous. *Valves* opening elastically, and twisting; all parts glabrous.

× *Leaves* repand-toothed or serrate.

E. AGALLOCHA, L. Tidal forests of Burma, the Andamans, and Kamorta.

Ta-yan or Ka-yan.

Leaves alternate. Capsules as large as a pea.

The juice of the whole tree is very poisonous.

<sup>1</sup> From excæco "to blind"; from its acrid juice, if introduced into the eye.

*E. OPPOSITIFOLIA*, Jack. *E.T.* Upper Tenasserim. Great Nicobar.  
Leaves opposite. Capsules the size of a cherry.

× × *Leaves entire.*

*E. HOLOPHYLLA*, Kz. *E.T.* Tree forests of Martaban and Upper Tenasserim.  
Leaves quite entire, alternate. Females and fruit unknown.

*E. (ACTEPHILA) RECTINERVIS*, Kz. Katchall and Tillangchong.

++ *Flowers clustered, inclosed in a calyx-like bell-shaped or slipper-shaped involucre.*

*EUPHORBIA, Linnaeus.*

*Flowers* monœcious, several together in cup-shaped involucre, which are 4-5-toothed, with alternating horizontal glands, sometimes expanded into a leafy coloured appendage. *Male flowers* pedicelled, without calyx, supported by ciliate-jagged bractlets, or surrounding the solitary central female flower. *Female calyx* 3-6-lobed or wanting. *Ovary* 3-celled, cells 1-ovuled. *Capsules* 3-coecous, dry.

Herbs, shrubs or trees, often cactus-like, abounding in milky juice.

\* *Flowers in dichotomous cymes (rarely solitary) above the scars of the fallen leaves, or supra-axillary. Floral leaves absent.*

† *Unarmed.*

*E. SESSIFLORA.* Pegu.

A fleshy undershrub a foot high, with a tuberculous root and terete stem, all parts glabrous. Leaves at the end of stem, sessile, 1½-3 inches long. Stipules minute, gland-like. Flower-heads sessile. Styles simple, very short, crimson.

*E. EPIPHYLLOIDES*, Kz. Car and Great Nicobar. Escape Bay, South Andaman.

A leaf-shedding tree, fleshy, unarmed, all parts glabrous. Branches thick-winged, terete, narrowed at the joints. Flower-heads in dichotomous cymes from the sinuses of the crenatures on which the leaf-scars rest. Capsules deeply 3-lobed, glabrous.

† † *Armed with paired, short, stipulary thorns.*

† *Styles 2-cleft.*

\* *E. ANTIQUORUM*, L. *T.* All over Burma and the Andamans  
Shā-soung-pya-that (Kurz). up to 2000 feet.

Branches angular, 3- (occasionally 4-5-)winged, wings fleshy, sinuately-repand. Cultivated for hedges.

† † *Styles simply thickened at base.*

\* *E. NERIIFOLIA*, L. *T.* All about Burmese villages, and  
Shā-soung (Kurz). probably wild also.

Fleshy, thorns solitary or paired, rising from thick saw-like protuberances, placed in sinuate-repand longitudinal rows.

*E. NIVCLIA*, Ham. *T.* The Pegu range, along streams.

Shā-soung (Kurz).

Branches terete, short, fleshy-tubercled.

× *Cymes sessile, clustered, terminal, or in the forks of the branch-whorls. Floral leaves none.*

\* *E. TIRUCALLI*, L. *E.T.* Cultivated round monasteries in France.

Shā-soung-lek-hnyo (Kurz).

Branches terete, elongate. Leaves very small, linear.

× × *Cymes several, terminal, with white or crimson floral leaves.*

*E. PLEURRIMA*, Willd. *S.* Cultivated round villages and monasteries.

Unarmed. Leaves herbaceous, long-petioled.

Kurz adds from the Nicobars :

*E. PARVIFLORA*, L.

Kamorta.

var. *linearifolia*.

*E. ATOTA*, Forst.

Katchall. Great and Car Nicobar.

*E. PILULIFERA*, L.

Katchall and Kamorta.

Many *Euphorbias* (e.g. *antiquorum*, *neriifolia*, *nirulia*, *tirucalli*, etc.) yield a milky juice of a very acrid quality, termed on drying, *Euphorbium*. As a purgative it is uncertain or violent in its action, but Waring suggests that it may be usefully employed as a substitute in India for *Savine*, which soon spoils in a hot climate. The strength recommended is gr. xx. to 3j of lard, or goat's fat mixed with oil if for Hindu or Mahomedan patients. Great caution must be employed in reducing the *Euphorbium* to powder, as the smallest particle entering the eye or mucous passages would cause violent inflammation. The *Euphorbia* make good hedges, as they are not eaten by cattle and are easily propagated.

#### PEDILANTHES, Necker.

*Involute* either oblique and slipper-shaped, the inner side produced into a lip-like appendage, or urceolate, and on the back furnished with a peltate concave appendage.

\* *P. TITHYMALOIDES*, Poit. *E.S.* Cultivated in villages and hedges in Prome. Flower-heads crimson, slipper-shaped.

#### AMENTALES.

*Flowers* diclinous in catkins, cones or heads. *Perianth* none, or calyciform or of 1 or more bristles, bracts, bractioles or scales. *Ovary* superior, 1- or 2-celled. *Seeds* exalbuminous. *Leaves* alternate, simple.

#### Order SALICINEÆ.

*Flowers* dioecious in catkins, sessile or shortly pedicelled, supported by a membranous persistent or deciduous bract. *Perianth* none, the torus swelling to become a gland or obliquely truncate ring or cup. *Males*: *Stamens* 2 or more, exerted from the centre of the torus. *Filaments* filiform, free, or monadelphous. *Anthers* 2-celled, basifixid, the cells opening by longitudinal slits. *Ovary*-rudiment none. *Females*: *Ovary* free, sessile, or shortly stalked, consisting of 2 connate carpels, 1-celled, with numerous ascending ovules along the short linear parietal placentas. *Styles* 2, usually connate, with an entire or 2-cleft stigma. *Capsule* 1-celled, many-seeded, 2-valved, the valves opening at the apex, and turning more or less revolute at the ripening of the fruit. *Seeds* erect, minute, the funicle dissolved into a woolly tuft surrounding the whole membranous testa. *Albumen* none. *Embryo* straight, the cotyledons elliptical, plano-convex. *Stipules* scale-like and deciduous or leafy, and often persistent.

#### *SALIX*, Linnæus.

*S. TETRASPERMA*, Roxb. *E.T.*

Streams all over Burma.

Mo-ma-khā.

There is only one species of willow in Burma, but that is widely spread. The wood is soft, light, and porous. The bark is used for tanning according to Kurz, but little use seems to be made of the tree, probably because for basket work bamboos are handier.

\* *S. BABYLONICA*, L. (M.).

Cultivated.

De Gubernatis has the following remarks on the willow : " Une légende chrétienne nous apprend que le saule pleureur replie ses branches vers la terre depuis qu'il a servi à cacher la Vierge et l'enfant Jésus dans leur fuite en Égypte. Dans une autre légende, ce saule pleure depuis le jour que les verges ont frappé Jésus."—*Mythologie des Plantes*, ii. p. 341.

One is not, of course, under the necessity of believing such a legend as the above or any similar legend, Christian or Pagan, to appreciate the sweetness and beauty of the idea often enshrined therein. The lines of Juvenal on this subject are worth considering—

“Esse aliquid Manes et subterranea regna,  
Et contum et Stygio ranas in gurgite nigras,  
Atque unâ transire vadum tot millia cymbâ,  
Nec pueri credunt, nisi qui nondum ære lavantur.  
Sed tu vera puta.”—*Satire* ii. l. 149.

Now are we to suppose that Juvenal wished his readers to retrograde in intelligence and believe such fables as that of Chiron and his boat, or the black frogs swimming in the rivers of hell (prototypes of the worm which dieth not), which even children had ceased to believe in, and with which may be classed such legends as that of the weeping willow and innumerable others of the same sort? Hardly; but rather the intention is to argue that our emancipation from the fetters of a more superstitious and credulous age should not be followed by a laxity of life, which would have been condemned by our less gifted ancestors, and that, from self-respect, we should not allow it to be possible for the lives of us, who do not believe these fables, to be unfavourably contrasted with theirs who did; else, where, indeed, is our boasted enlightenment, and what is the advantage of our mental superiority, if its only result to ourselves is moral degradation!

#### Order CASUARINEÆ.

*Flowers* monœcious in catkins. *Male catkins* terete, elongate or short, the flowers 2-bracteoid, sessile, in the axil of the toothed sheaths. *Perianth* 2-partite, the segments decussate with the bractlets, and cohering at their tips, deciduous. *Stamen* 1. *Filament* exerted and thickened at the base. *Anthers* 2-celled, the cells opening longitudinally. *Female catkins* usually axillary, globular or ellipsoid, the flowers arranged in several longitudinal rows, 1-bracted, and supported by 2 lateral bractlets, both (bracts and bractlets) persistent. *Perianth* none. *Ovary* with a single ovule suspended from the summit of the cell. *Style* terminal, with 2 filiform stigmas. Ripe cones woody, indurated. *Achene* inclosed by the enlarged bractlets, which at length open valvately, compressed membranous winged at the apex, containing a solitary pendulous seed. *Testa* connate with the endocarp. *Albumen* none. *Embryo* straight, with large flat cotyledons, the radicle minute, superior. Trees, rarely shrubs, with numerous horse-tail-like jointed branchlets, toothed at their joints, but without leaves. *Flowers* in terminal and lateral catkins, monœcious, but the males and females not appearing at the same time on the same tree.

A family consisting only of a single genus, of which most of the species are Australian. The timber is hard and heavy, and of the colour of raw beef, whence it is called beef-wood in Australia.

#### CASUARINA, *Linnaeus*.

Characters those of this order.

C. EQUISETIFOLIA, Forst.

Sandy shores of Arakan and Tenasserim,

Pallen (Theobald). (Tin-yu, Kurz.)

Kamorta, Ketchall, and Car Nicobar.

There is but one species in Burma, and this is seldom or never felled, though the wood is hard and durable. Weight 61 lbs. Kurz says its “texture” is like ‘toon’ (Thit-kado 34 lbs.), which is true to the extent to which chalk resembles cheese in texture, but no farther. Kurz is also, in my opinion, in error regarding its vernacular name, as I have commonly found it called ‘Pallen.’ In appearance the wood is more comparable with ‘pyngado’ or ‘jio,’ though coarser than either. It is a wood highly deserving of trial as a sleeper wood. Dr. Mason recommends it as an ornamental tree for a park, and it certainly makes a handsome avenue tree, but it is an unpleasant neighbour near a house, from the melancholy ‘soughing’ the wind makes through

its branches. The *Casuarina muricata*, Mason says, was the wood of which the Tahitians in former times made their carved war-clubs, and fishing hooks from its roots. 'Pallen' is the name I have always heard it called by, 'Tin yu' being the name of the Pine.

#### Order AMENTACEÆ.

*Flowers* small, unisexual, in cylindrical oblong or globular catkins, usually covered with densely packed scale-like bracts, rarely with loose or with minute deciduous scales. *Stamens* 2 or more (rarely united into 1), under each scale usually accompanied by 2 or more smaller scales, either distinct or forming sometimes an irregular or oblique perianth of 5 or 6 segments, or rarely entirely deficient. *Female catkins* either like the males with 1, 2, or 3 flowers under each scale, or reduced to a sessile bud, with 2 or 3 flowers in the centre surrounded by the lower empty scales of the catkin. Under each scale are usually 2 or 3 inner scales. *Perianth* none or closely combined with the ovary, with a minute free border entire or toothed. *Ovary* 1- or many-celled, with 2 or more styles always resulting in a 1-celled fruit, either drupaceous or dry, and if dry, free and exserted, or in various ways inclosed in the involucre. The catkin-scales, or the inner-scales, or both, usually persisting and sometimes enlarged in an involucre, either more or less inclosing the fruit or forming a cup under the fruit. *Albumen* none. Trees or shrubs with simple alternate leaves. *Stipules* more or less persistent.

Not a very large order, but very important to the forester. It includes the oak, hazel-nut, alder, birch, beech, and chestnut. The timber of many is valuable, and the European and American oak-timber is too well known to require special reference. Several Indian oaks yield timber probably not much inferior to the European. The bark is often astringent and bitter, and that of oaks is good for tanning, while that of the birches contains a balsamic oil and a peculiar resinous substance called betuline or birch-camphor. Cork comes from *Q. suber*. Galls are found chiefly on *Quercus infectoria*, but inferior ones are found also on some Indian oaks. Wax is obtained from the berries of *Myrica cerifera* and some other American species. The fruit of *Myrica nagi* is edible.

\* *Ovary 1-celled with a solitary erect ovule.*

#### MYRICA, Linnaus.

*Catkins* axillary. *Male flowers* with 2-16 stamens under each scale. *Filaments* basally connate. *Anthers* 2-celled. *Female flowers* with 2-4 bractlets. *Ovary* terminated by 2 lateral, filiform, sessile, stigmas, 1-celled. *Fruit* drupaceous, resinous, with a papillose or wrinkled pericarp, inclosing a bony 1-seeded nut. *Albumen* none.

M. NAGI, Thbg. E.T.

Martaban at 4000 to 6000 feet.

*M. sapida*, Wall.

Drupes the size of a small cherry, papillose, crimson, fleshy, resinous, with occasionally short brown hairs intermixed.

\*\* *Ovary 2-celled, each cell 1-ovuled. Nuts small, often winged, 1-celled, combined with the scales in a sort of cone.*

#### BETULA, Tournef.

*Scales* of the male catkins stalked, those of the female deciduous. *Female catkins* cylindrical, compact. *Nuts* not connate with the involucre. *Anther* cells distinct.

B. ACUMINATA, Wall.

Martaban at 5000 and 6000 feet.

*B. cylindrostachya*, Wall.

Female and male catkins elongate, 1-2 inches long, the former on a short pubescent peduncle. Flowers hairy. Wings broader than the nut, and broader than the membranous bract.

#### ALNUS, Tournef.

*Anther* cells connate. *Scales* of female catkin persistent.

A. NEPALENSIS, Don.

Khakyen Hills.

Leaves oblong, 3-4 inches long, minutely serrate, glabrous, slightly glaucescent beneath. Catkins sessile, in short racemes, the males slender, 1-2½ inches long, the females very short and small.

CARPINUS, *Tournef.*

*Scales* of the catkins sessile. *Female catkins* loose, spike-like, bracts solitary, each in a 3-lobed leafy involucre.

C. VIMINEA, Wall.

Hills east of Toung-ngoo at 5000 to 6000 feet.

Male flowers 6-12, stamens in the axil of ovate, acute bracts. Filaments slender, not exerted. Female flowers by pairs in the axil of caducous bracts. Ovary many-nerved, unequally lobed at the apex, 2-celled, with 2 placentas and 2 pendulous ovules from one of them, the other being sterile. Nuts woody, 1-celled and 1-seeded, 2 lines long, acute, 7-8 nerved, resinous dotted. Albumen none.

\*\*\* *Ovary* 3-9-celled, with 2 suspended ovules in each cell; most of the ovules abortive. *Nuts* solitary or several, rather large, inclosed in the enlarged wingless, dry, spiny, scaly, or smooth involucre, or the thin involucre reduced to a cup.

CASTANEA, *Tournef.*

Male flowers clustered and surrounded by bracts forming catkins. Perianth 5-6-lobed. Stamens 10-15, usually twice as many as perianth lobes. Filaments slender. Anthers minute, 2-celled. Female flowers by 3-1 within a scaly involucre. Perianth 6-parted, the lobes blunt, in 2 rows. Ovary 3-6-celled. Styles 3 (rarely more), linear. Nuts 3-1, inclosed in a globular, echinate involucre. Trees quite of the habit of oaks.

\* *Fruits* armed with simple or compound sharp spines.

† *Leaves* sharply serrate.

C. INDICA, Roxb.

Chittagong.

All softer parts and leaves beneath tawny tomentose.

†† *Leaves* entire, or remotely serrate towards the apex.

‡ *Fruits* more than an inch in diameter; spines long and crowded.

× *Young* shoots pubescent.

C. DIVERSIFOLIA, Kz.

Hills East of Toung-ngoo at 3500 to 5000 feet.

Kyan-zā (Kuruz).

Spines of involucre straight and slender, glabrous. Spikes robust, tomentose.

C. ROXBURGHII, Ldl. *E.T.*

Chittagong.

Spines of involucre curved and strong, tawny pubescent.

×× *Quite* glabrous.

C. ARGENTEA, Bl. *E.T.*

Tree forests of Rangoon and Tenasserim. var. β Hills East of Toung-ngoo at 6000 to 7000 feet.

Leaves beneath silvery. Male spikes robust and densely tomentose. Spines of fruit simple and free.

var. *α* *argentea*.

var. β *tungurru*, Bl. Lower and stunted. Spines longer and more slender.

C. JAVANICA, Bl. *E.T.*

Tree forests of Pegu and Tenasserim. var. β Upper Tenasserim.

Leaves beneath, tawny, somewhat metallic. Male spikes very slender, greyish-pubescent. Spines of fruit clustered or basally connate.

var. *α* *Javanica*, Bl.

var. β *Falconeri*, Hance. Spines of less pubescent involucre less crowded, higher up, connate, and somewhat compressed.

Wood brown, heavy, close-grained, strong.

†† Fruit less than an inch thick, usually the size of a cherry, the spines often recurved and distant.

C. TRIBULOIDES, Sm. *E.T.*

var. *a* Khakyen Hills and Upper  
Tenasserim at 2500 to 4000 feet.

Kyan-za (Kurz), *i.e.* Rhinoceros food.

Wet-thit-khyā (Mason).

Leaves entire or remotely serrate towards apex, glabrous, or minutely brownish-tomentose beneath.

var. *a ferox*, Roxb. (*Quercus*). Leaves larger, entire, glabrous.

var. *β armata*, Roxb. (*Quercus*). Leaves smaller, serrate towards apex, often thinly tomentose beneath.

\*\* Fruits armed with very short pointed or blunt cones, or deciduous tubercles, and becoming unarmed and zonate.

† Fruiting involucre of a very thick coriaceous texture.

C. RHAMNIFOLIA, Kz. *E.T.*

Tree forests of Eastern Slopes of the Pegu  
Range and Southern Tenasserim.

Fruits armed with short cones. Leaves uniform green.

C. INERMIS, Ldl. *E.T.*

Hills East of Toung-ngoo at 4000 to 5000 feet.

Adult fruits unarmed, zonate, grey. Leaves silvery or coppery beneath.

†† Fruiting involucre of a thin texture.

C. (*QUERCUS*) LANCEFOLIA, Roxb. *E.T.* Chittagong.

Fruits blackish, smooth, with 4 or 5 scarred annular rings. Leaves silvery or coppery beneath.

Wood light-coloured, durable (Kurz).

Mason also gives *C. Martabanica*, Wall., which is probably one of the above species.

#### QUERCUS, *Linnaeus*.

Nuts solitary, resting on a scaled or lamellate-annular cup, exserted, or at least with the apex exposed.

\* The cup beset with more or less crowded imbricate scales, the scales sometimes becoming obsolete as the fruit ripens, and showing as concentric zones.

× Scales linear or subulate, spreading. Cup velvety.

Q. FENESTRATA, Roxb. *E.T.*

Hills of Upper Tenasserim.

Thit-kyā (Kurz). (Generic.)

Leaves almost glabrous, cup almost wholly inclosing the nut.

Q. ACUMINATA, Roxb.

Chittagong.

As the last, but the nut far exserted.

Q. LAPPACEA, Roxb. *E.T.*

Tenasserim.

Leaves pubescent beneath. Nut exserted.

×× Scales broad and short, appressed to the cup.

† Fruiting peduncle several inches long. Fruits numerous, and more or less spicate. Cups velvety. Nut exserted.

Q. AMBERSTIANA, Wall. *E.T.*

Upper Tenasserim.

Cup an inch in diameter, the borders often reflexed, greyish velvety, indistinctly scaly. Leaves acuminate at the base, slenderly petioled, the nerves prominent.

Q. FALCONERI, Kz. *E.T.*

Upper Tenasserim.

Similar to the last, but the cup rusty velvety, distinctly appressed-scaly. Leaves rounded at the base, very thick-petioled, the nerves immersed above, resembling the leaves of *Goniothalamus sesquipedalis*.

*Q. POLYSTACHYA*, Wall. Ava Hills.

Cup about  $\frac{1}{2}$  an inch in diameter. Leaves opaque and glaucous.

*Q. BANCANA*, Scheff. Hills East of Toun-goo at 3000 to 5000 feet.

As the last, but the leaves not reticulated and veined.

*Q. THOMSONI*, Miq. *E.T.* Chittagong.

Cup 5-8 lines in diameter. Leaves glaucous beneath.

*Q. SPICATA*, Sm. *E.T.* Chittagong and Tenasserim.

Leaves glossy, one-coloured. Cup as the last. Flowers in densely whitish tomentose appressed oblong clusters.

†† *Leaves pubescent beneath.*

*Q. LINDLEYANA*, Wall. *E.T.* Ava Hills.

Cups usually connate, thickened zonate, about  $\frac{1}{2}$  an inch in diameter or less. Leaves coarsely and obsoletely repand towards the apex.

†† *Fruiting peduncle short, 1 or rarely up to 2 inches long. Cup wrinkled-rough, but glabrous, brown.*

*Q. EUMORPHA*, Kz. *E.T.* Nat-toung in Martaban at over 6000 feet.

Cup obsoletely scaly-zonate, 7-8 lines in diameter, almost resinous. Leaves smooth, repand-serrate at apex.

\*\* *The cup consisting of lamellate, entire, crenate, concentric rings. Fruiting peduncle 1-2 inches long, usually few-fruited. Leaves repand-serrate towards the apex.*

‡ *Nuts depressed, hardly exserted.*

*Q. VELUTINA*, Ldl Eastern Slopes of the Pegu Range and Tenasserim.

Cup an inch in diameter, softly tawny or fulvous villous. Petioles usually tawny or fulvous pubescent, or villous, the nerves curved.

†† *Nuts ovoid, exserted.*

*Q. SEMISERRATA*, Roxb. *E.T.* Eng forests of Ava, Pegu and Tenasserim.

Cup about an inch in diameter, softly tawny-villous, petioles smooth. Leaves somewhat glaucous beneath, the nerves rather straight.

*Q. BRANDISIANA*, Kz. *E.T.* Eng forests of Martaban at 1000 to 4000 feet.

Cup  $\frac{1}{2}$  an inch across, greyish velvety. Petioles slender, glabrous. Leaves somewhat rugate, glaucous beneath.

*Q. MESPILIFOLIA*, Wall. *E.T.* Ava, Promo, and the Arakan Range at 4000 to 5000 feet.

Cup more than an inch wide and deep, greyish velvety. Leaves smooth, one-coloured.

I distrust the vernacular name of *Quercus* given by Kurz, as I have always found *Gyndi* to be the term used in Pegu. Mason gives the following names for oaks in Sgau-karen, Thae-ghau, Thae-wā, Thae-ti, Thae-lae-nau, and Thae-lae-ka-sen.

Of the oak, as a tree regarded mythologically, De Gubernatis thus writes: "Le chêne mériterait à lui seul tout un livre explicatif, tellement son rôle mythologique, et légendaire est important dans la tradition Européenne. Il résume en effet, tous les attributs mythologiques qui appartiennent, dans les légendes orientales, à l'*agrattha*, au *cédre*, au *palmier*, au *cyprès*, au *pin*. Le plus vaste, le plus fort, et, comme on l'a dit, le plus utile des arbres, est devenu en Europe le roi de la végétation. La place d'honneur que l'aigle et le lion ont occupée parmi les animaux revient, parmi les végétaux, au chêne."—*Mythologie des Plantes*, vol. ii. p. 61.

The interesting mass of legends, however, connected with the oak have rather a European than Asiatic interest, and those who would know more thereof can

consult the above work, and I allude to them mainly to suggest the inquiry, whether or not in parts of the East where the oak flourishes, similar legends are associated with it as in Europe. Such is not improbably the case, but I am unable to quote any—and, indeed, with the exception of any myths they may come across regarding the Deluge, which may help to steady on its legs that somewhat, historically speaking, discredited story, our missionaries, who should be best qualified to contribute to our knowledge of the Folk-lore of the peoples among whom they labour, are certainly not generally very keen in investigating in a scientific and philosophic spirit the legends and tales which are all too probably fast vanishing from the memory of man.

Bunyan's immortal parable of the man raking for trash, has a wider application than to the mere miser, or the spiritually indifferent, and should touch all who waste the opportunities they enjoy of adding something to the sum of human knowledge.

#### URTICALES.

*Flowers* diclinous (in *Ulmaceæ* hermaphrodite). *Perianth* usually regular, rarely none. *Stamens* opposite the perianth lobes or sepals. *Ovary* superior, 1-celled (in *Ulmaceæ* 2-celled). *Stigmas* 1 or 2. *Ovule* solitary, the micropyle always superior. *Fruit* an achene or samara.

#### Order CANNABINEÆ.<sup>1</sup>

*Flowers* diclinous. *Perianth* male, sepals 5, free, imbricate; female various. *Stamens* 4, opposite the sepals. *Filaments* short. *Styles* 2. *Ovule* pendulous, campylotropous. *Embryo* hooked or coiled. *Albumen* none. *Leaves* stipulate. Herbs with watery juice.

This small order embraces two genera only, *Cannabis* and *Humulus*, both possessed of narcotic properties. The latter has been lately introduced into Kashmir for use in brewing, with good prospect of success, whilst the latter is in universal demand for its fibre, which is the strongest of any in general use, though the native country of the plant is not known.

#### CANNABIS, *Linnaeus*.

\* C. SATIVA, L.

Ben (Mason).

This is a hardy plant growing in profusion over the whole of India and a large portion of Europe, Asia and Africa, and seeming to thrive best where the seasons are extreme. The plant yields various products, fibre, seed and charas. According to experiments made by Dr. Royle, *Cannabis* fibre from Kangra was the strongest out of seven Indian fibres, the Rheca grass of Assam coming second and breaking with from 320 to 340 pounds, whilst *Cannabis* fibre supported over 400 pounds. How much depends, however, on the quality as regards preparation and probable freshness, may be judged from Petersburg Hemp (*Cannabis*) also breaking with only 160 pounds; other Hemp from the Deyrah Dun stood fourth in strength and twelfth in elasticity, and considering that this plant flourishes as an actual weed in Burma, it seems likely some day to become of importance as a fibre producer, of no small value. Next to the fibre the seeds are of value, as they are oily and albuminous and quite devoid of narcotic properties, as is the case likewise with the Poppy, whose seeds yield a bland oil fit for culinary purposes. In warm countries, as along the Nepal Hills, and no doubt Burma also, the *Cannabis* develops strong narcotic properties and exudes from its leaves a viscid resin called charas (charrus), which is collected by men clad in leather breeches (or in Nipal without any breeches), brushing through and against the standing plants, whereby the resin becomes transferred to their clothes or skin and is thence scraped off with a knife, and this constitutes the charas or waxy

<sup>1</sup> The arrangement of the species of *Urticales* is that of Kurz, but the orders are those adopted by Sir J. Hooker, in appendix in Maout and Decaisne's work.

charas of the bazaar and the basis of the native confection known as 'Majun.' As a narcotic Hemp is consumed in three different forms. The most expensive and most harmful form is the confection prepared with 'charas,' sugar, and other ingredients, forming a sort of 'charas' toffy. The dried leaves are also rubbed up with water and made into a beverage called 'Subzi' from its greenish colour, but the commonest form used is that of 'Bang,' the dried stalk and leaves of the plant which has flowered, which is smoked just as tobacco is. The narcotic effects of this herb are very pleasant but if largely indulged in, the results are deleterious in the extreme, and the sufferer lapses into a condition analogous to delirium tremens, not unfrequently accompanied by symptoms of homicidal desire or mania, often productive of serious consequences. A blister on the nape of the neck, with salines and antimonials, are, however, all that are required to restore the patient to his right mind. As a medicine the preparations of hemp are of great value, especially in the treatment of that terrible disease Tetanus, over which it possesses a greater power than any other drug, and even when it fails to cure, never fails to give relief.

#### Order URTICÆÆ.

*Flowers* diclinous or polygamous. *Perianth* various, imbricate or valvate, rarely none. *Stamens* usually equal to the perianth-lobes. *Filaments* uncoiling elastically. *Style* simple or multifid. *Ovule* erect, orthotropous. *Embryo* straight, albuminous. Herbs, rarely trees. *Juice* limpid. *Leaves* stipulate.

\* *Style* 1, simple. *Ovule* solitary, erect. *Seeds* albuminous, save in *Elatostemma*.

† *Perianth* free, the female 4, rarely 2-parted. Often stinging.

#### URTICÆÆ.

LAPORTEA, Gaudichaud.

(*Juice* limpid.)

*Flowers* diœcious or monœcious. *Male perianth* 4-5-partite. *Stamens* 5. *Ovary-rudiment* present. *Female perianth* 4-partite, in fruit herbaceous. *Stigma* sessile, linear, elongate (rarely short), villous, persistent. *Achene* discoid, smooth. Stinging herbs, shrubs or trees.

L. CRENULATA, Gaud. E.S.

Hpet-yā-gyī (Kurz).

Bark smooth, with stinging hairs. T. F. of Chittagong, Pegu and Tenasserim.

Flowers minute, green.

This plant at some seasons, says Sir J. Hooker, emits when bruised so irritating a vapour as to cause a running from the nose and eyes for some hours, and its sting is said to produce fever.

ELATOSTEMMA, Forster.

*Albumen* none.

E. NOVARÆ, Kz.†<sup>1</sup>

Nankowry.

Near *E. lineolatum*, but differs by its nigrescent leaves, different nervation, and smaller flowers and flower-clusters.

E. INTEGRIFOLIUM, Wedd. ‡

Katchall.

E. MEMBRANIFOLIUM, Kz.

Tenasserim.

"*E. lineolata*, Wight, arete affine, absentia striolarum autem tute distinguendum," Kurz.—J.A.S.B. ii. 1873, p. 104.

<sup>1</sup> The species marked ‡ are intercalated in the present list from Kurz's list of Nicobar plants by the Editor, and are not therefore assigned to the same place in the series that Kurz would probably have placed them in.

E. BULBIFERUM, Kz.

Arakan. Tenasserim.

E. (PROCRIS) GIBBOSUM, Wall.

"In vicinitate *E. cernuti* ponendum an potius generi *Pellionie* adscribendum?" Kurz (*l.c. supra*).

PELLIONIA, *Gaudichaud.*

*Flowers* dioecious in axillary cymes or clusters, without any dilated or succulent receptacle. *Male flowers*: *Perianth-segments* 5, or sometimes 4, broad, imbricate in bud. *Stamens* as many, the filaments inflected in the bud. *Female flowers*: *Perianth-segments* 4 or 5, narrow and unequal. *Sterile stamens* usually as many. *Ovary* 1-celled, with 1 erect ovule. *Stigma* sessile, small, tufted. *Nut* seed-like, surrounded by the persistent perianth. *Albumen* little or none. *Herbs*. *Leaves* distichous, alternate or unequally opposite, usually very oblique.

PELLIONIA PROCRIDIFOLIA, Kz. ‡

Katchall.

Very near *P. frutescens*, which has, however, serrate leaves.

‡‡ *Female perianth* tubular, very short, or wanting. *Leaves* opposite or alternate, not stinging.

BOEHMERIA, *Jacq.*

*Male perianth* 4- (rarely 3-5-)parted, valvate in bud. *Stamens* as many as perianth-segments. *Female perianth* tubular, free, or nearly adhering to the ovary. *Ovule* single, erect. *Stigma* filiform, continuous with the ovary, usually one side papillose, persistent. *Achene* conform with the ovary, pericarp crustaceous, thin, or nut-like. *Albumen* present.

× *Flowers* in sessile heads, axillary or above the leaf-scars.

|| *Leaves* glabrous above.

B. MALABARICA, Wedd.

Tree forests all over Burma up to 2000 feet.

Monœcious. *Leaves* 4-8 inches long, on a variable (2 lines to 3 inches) petiole, membranous, crenulate-serrate. *Flowers* minute, greenish-white, in dense clusters.

||| *Leaves* sparingly hairy.

B. HELFERI, Bl.

Tenasserim.

Monœcious. *Leaves* cordate-ovate. *Flower-bracts* numerous, large, scarious, brown. *Perianth* 2-toothed. *Ovary* and style solitary.

B. DIDYMOGYNE, Wedd.

Maulmain.

As the last, but usually ovary and styles 2.

B. DIFFUSA, Wedd.

All over Burma to 3000 feet.

*Leaves* oblong, lanceolate, flower-bracts minute. *Perianth* 2-4-toothed at the somewhat hairy apex. *Stigmas* twice as long as the perianth.

×× *Flower heads* globular, sessile, forming spikes in the axils of the leaves, the spikes sometimes collected in a raceme or panicle.

B. MACROPHYLLA, Don.

Ava Hills.

*Leaves* lanceolate, pustulate-rugose above, the pustules terminating in a perforated gland.

B. CORDATA, Poir. (not Lour.).

Ava and Chittagong.

*Leaves* broadly ovate, smooth or rugate, without glands, coarsely serrate, hairy on both sides.

B. HAMILTONIANA.

Tree forest of Eastern Slopes of the Pegu Range and hills East of Toung-ngoo.

All adult parts glabrous. *Leaves* glabrous, serrate or entire, usually 2-glanded at the base of the mid-rib.

The "liber" of many species of *Boehmeria* yield strong cordage.

Mason enumerates also *Urtica heterophylla*, Rox., which he calls Bet-ya, and *Boehmeria interrupta*, Willd., Kyd-bet-ya, both common nettles, and *Boehmeria nivea*, L., the nettle hemp or celebrated China or Rheea grass, with the vernacular name Gwōn.

To raise the *Boehmeria nivea* (the celebrated Rheea grass of Assam) from seed, a sandy soil is chosen, which is carefully dug up, raked, and smoothed, and watered, and divided into plots a foot wide and four feet long. Over six of such beds, a pint of seed mixed with four pints of earth is sown broad-cast, and the ground sown is kept covered with a neat screen till the plants are an inch or two high. The young plants are now transplanted to a stiffer soil and well manured, and kept free from weeds by hoe dressing. As a rule, however, the plant is best grown and propagated from shoots or layers. To cut and prepare the Rheea the following plan is adopted, a modification of which will serve for all similar fibre plants:—The Rheea plant is known to be fit for cutting when the stems assume a brown colour for about six inches from the root. Grasping the top of the stalk with the left hand, the leaves are to be stripped off with the right, and the stalk cut through just above the hairy reticulate root, which being earthed up with manure will yield another crop. To strip the fibre, grasp the stem with both hands near the middle, and then with the forefinger and thumb of both hands give a wrench to break the central stem, and then pass down the fingers of each hand in opposite directions, thereby stripping the fibre as they go. If this can be done on the field, the refuse stems, burnt and mixed with dry cow-dung, make a capital manure for the following crop. The strips of fibre are now to be tied up by their smaller ends into convenient bundles and steeped in *clear water* for a few hours, and when dried are then fit for cleaning and hackling. Fibre thus prepared would command, according to quality, from £60 to £120 a ton in England.

VILLEBRUNNEA SYLVATICA, Bl. ‡

Tree forests of Kamorta.

PICTURUS VELUTINUS, Wedd. ‡

Trice, Track and Nankowry.

GONOSTEGIA HIRTA, Miq. ‡

Kamorta.

#### POZZOLZIA, Gaudichaud.

*Flowers* usually monœcious. *Male perianth* 4-5- (rarely 3-)lobed. *Stamens* as many as perianth lobes. *Ovary-rudiment* present. *Female perianth* tubular, 2-4-toothed at the contracted mouth. *Achene* almost conform with the ovary, and surrounded by the almost unchanged perianth, or its enlarged wings.

P. VIMINEA, Wedd. *E.S.*

Chittagong.

The leaves serrate, chartaceous.

P. INDICA, Gaud.

Kamorta.

‡‡ *Female perianth* free, in fruit fleshy or succulent.

#### SARCOCHLAMYS, Gaudichaud.

*Fruiting perianth* ventricose, laterally contracted at the mouth. *Stigma* capitate, persistent in fruit. *Stamens* 5. *Flowers* spicate, dioecious, small, subtended by short-toothed bractlets, clustered, the male in lax, the female in close spikes, solitary or by twos in the leaf axils.

S. PULCHERRIMA, Gaud. *E.T.*

Chittagong. Pegu and Upper Tenasserim.

Sap-shā-pen (Kurz).

The 'liber' yields a good cordage (Kurz).

#### OREOCNIDE, Miquel.

*Flowers* dioecious. *Male perianth* 4-partite, valvate in bud. *Stamens* 4. *Ovary-rudiment* present. *Female perianth* adnate to the ovary. The limb minute, toothed, or almost entire. *Fruit* dry, on a fleshy cup. *Stigma* almost peltate with long-fringed borders, persistent in fruit.

O. (URTICA) ACUMINATA, Roxb.

Chittagong. Ava Hills.

Leaves penninerved, entire.

This, observes Kurz, is the ban-rheea of the Assamese, which yields the fibre of China-grass-cloth.

*O. SYLVATICA*, Miq.

Martaban at 2000 feet.

Leaves penninerved, crenate-serrate.

*MOROCARPUS*, Siebold and Zuccarini.

*Flowers* monœcious and diœcious. *Male perianth* 4-partite, rarely 2-partite. *Stamens* as many as perianth lobes. *Ovary-rudiment* present. *Female perianth* ventricose-tubular, 4-toothed at the contracted mouth, adnate to the ovary. *Fruit* berry-like. *Stigma* penicellate-capitate, persistent in fruit.

*M. (DEBREGEASIA) LONGIFOLIA*, Wedd. var. *a* Ava and Pegu. var. *β* Chittagong.

Pwôt-shor-pen (Kurz).

Branchlets pubescent. Leaves lanceolate. var. *β latifolius*. Leaves ovate.

*M. WALLICHIANUS*, Miq.

The Pegu Range at 1000 to 2000 feet.

Branchlets robust and smooth. Leaves ovate.

The 'liber' of both species yields good cordage.

*MAOUTIA*, Wedd.

*Flowers* monœcious or diœcious. *Perianth* in males 5-parted, in females none. *Stamens* 5. *Ovary* with a solitary, nearly erect ovule. *Achene* ovate, compressed and sometimes bluntly 3-gonous. *Albumen* thin. Shrubs with alternate serrulate leaves.

*M. PUTA*, Wedd.

Martaban at 2500 to 5000 feet.

Leaves 4-6 inches long, ovate, acuminate, coarsely serrate, membranous, very rough above, beneath white-tomentose. Kurz describes this shrub as yielding a strong fibre resembling the *rheea*.

*CONOCEPHALUS*, Blume.

*Flowers* diœcious. *Male perianth* turbinate, tubular, 4- (rarely 2-)cleft. *Stamens* as many as perianth lobes, filaments complanate. *Anthers* short, 2-celled, cells opening longitudinally. *Ovary-rudiment* present. *Female perianth* tubular, 4-cleft. *Ovary* free, with a solitary ovule. *Style* terminal, very short. *Stigmas* 1-sided or capitate, oblique. *Fruit* covered by the persistent perianth, chartaceous, dehiscing longitudinally into 2 valves. Scandent shrubs, with alternate, long-petioled, simple leaves.

*C. SUAVEOLENS*, Bl. *E.S.S.* Tree forests of Chittagong, Pegu and Tenasserim.

Flowers small, yellow, fragrant, in dense globular heads.

The last thirteen genera form the sub-order of *Urticææ*, or nettle tribe, some of which are remarkable for their stinging powers, and others for the excellence and tenacity of their fibre. Foremost among the stinging nettles is *Laportea crenulata*, of Northern India and Burma, which at certain seasons is so acrid that the effluvium from its bruised leaves and stalks will cause a copious discharge of water and mucus from the mouth, nose, and eyes, the effect lasting some hours, whilst the pain caused by its stinging hairs induces fever. In spite, however, of the stinging powers of the full-grown plant, many nettles when young make a wholesome vegetable when boiled like spinach, and an infusion of nettles is considered a wholesome drink in early spring. The great value, however, of plants of this tribe lies in the strength of their fibre, and the word itself is derived<sup>1</sup> from the root 'ne' (Nere, *reca*, to spin), as the Germanic nations, and the Scotch down to the seventeenth century, used its fibres for weaving cloth from, till its use became superseded by flax and hemp.

#### Order MOREÆ.

*Flowers* declinous, minute, often on an open or closed receptacle. *Perianth* tubular or 3- or 4-partite, or none. *Stamens* as in *Urticææ*, but filaments sometimes

<sup>1</sup> Popular Names of British Plants, by R. C. A. Prior, p. 167.

straight. *Styles* 1 or 2. *Ovule* various. *Embryo* straight or curved, albuminous or not. *Trees* or shrubs. *Juice* milky (generally). *Leaves* alternate. *Stipules* large, fugacious.

\*\* *Style usually simple. Pericarp inclosed in the fleshy or dry perianth, indehiscent or rarely 2 valved. Leaves alternate or distichous.*

† *Filaments straight in bud, never inflected.*

× *Female flowers numerous in heads or on a fleshy receptacle, the males in separate inflorescences.*

ARTOCARPUS, *Linnaeus*.

*Flowers* monœcious, the sexes crowded on separate receptacles. *Stamen* 1, exerted, filament complanate. *Female perianth* tubular, entire, the perianths of the surrounding flowers more or less connate. *Ovary* free, 1- rarely 2-3-celled, the cells 1-ovuled. *Style* terminal or excentric, simple. *Fruit* a compound fleshy syncarp, made up of enlarged perianths, each inclosing a solitary pendulous seed with a chartaceous indehiscent pericarp. *Albumen* none. *Trees* abounding in milky juice, with alternating, entire or lobed leaves.

\* *Syncarp prickly-echinate.*

× *Prickles of syncarp bristly-setose.*

A. CALOPHYLLA, Kz. *E.T.* Upper Tenasserim.

Leaves bristly-scabrous above, softly pubescent beneath.

A. RIGIDA, Bl. *E.T.* Tenasserim.

*A. echinata*, Roxb.

Leaves glabrous above, pubescent along the nerves beneath.

× × *Prickles of syncarp smooth.*

A. RUFESCENS, Miq. *E.T.* Tenasserim (probably).

Leaves minutely pubescent above, tomentose beneath.

\*\* *Syncarp tubercled.*

A. CHAPLASHA, Roxb. Tree forests all over Burma, the Andamans  
Toung-peing-nai (Kurz). Toung-ben (W.T.). and Nankowry.

Leaves scabrous, pubescent, especially beneath. Syncarp as large as the fist, globular, pendulous on a slender peduncle. This tree, says Kurz, yields a tenacious milky caoutchouk, and he describes the wood as heavy, 30 lbs. (!), and soon attacked by insects. Now a wood of 30 lbs. cannot be called heavy. The wood, though rather coarse in grain, is excellent for furniture. It weighs 34 lbs. (selected sample), and is *not* particularly attacked by insects, certainly not so much as some woods in constant use. It works well, and looks well, and, though probably not lasting if exposed to the weather, is excellent for indoor work, and obtainable of very large scantling. For boats and wheels it is of course inferior.

\* A. INTEGRIFOLIA, Willd. *E.T.* Cultivated all over Burma and wild  
Peing-nai. The Jack tree. in Kamorta.

All parts quite glabrous. Syncarp clavate to oblong, 1-1½ feet long.

A tree, which, when in full fruit, is a fine object, and yielding a pleasant shade with its dense foliage. The fruit is said, in favourable situations, to attain to 60 lbs. weight, and those which, in old trees, grow from a part of the stem covered by the earth (which cracks over them), are esteemed the finest. The odour of the fully ripe fruit can only be designated as a stench; but before becoming ripe the fruit is not unpleasant, and the odour of the tree in blossom is very pleasant, and resembles fresh apples. The kernels, when roasted, are equal to chestnuts. Birdlime is manufactured from the juice which flows from incisions, and a yellow but fugitive dye is manufactured by boiling the wood. The timber is excellent for furniture, though brittle.

Freshly cut it is yellow, but seasons to brown, and ranges between 42-52 lbs. It is too valuable a fruit tree, however, to be cut for timber, and it is hardly superior to selected plants of the last.

\*\*\* *Syncarp smooth, usually velvety or tomentose.*

A. GOMEZIANA, Wall. E.T.

Tenasserim.

All parts quite glabrous.

\*A. LAKOCHIA, Roxb.

Tree forests of Pegu, and cultivated all over Burma.

Myouk-lök.

Shoots densely rusty-pubescent. Leaves shortly scabrously pubescent. Syncarp of an irregular globular shape, the size of the fist, smooth, velvety, puberulous, when fully ripe yellow, edible.

Kurz adds from the Nicobars:

\*A. INCISA, L.

Cultivated on Car Nicobar.

A. POMIFORMIS, T. et B.

Kamorta and Katchall.

A. PEDUNCULARIS, Kz.

Kamorta.

#### CUDRANIA, *Trécul.*

*Flowers* dioecious, packed into globular heads, subtended by 2-4 bracts alternating with the perianth lobes. *Perianth* 4-parted. *Stamens* 4. *Ovary* free, with a single pendulous ovule. *Style* simple, with a rudimentary tooth-like branch at the base. *Stigma* filiform, puberulous. *Fruit* a syncarp, enveloping crustaceous nuts.

× *Leaves* 1½-3 inches long, glabrous.

C. AMBOINENSIS, Rumph. S.S.

Chittagong.

*Cudranus Rumphii*, Thw.

Young branches pubescent. Leaves blunt, the nerves thin but prominent. Syncarp the size of a small cherry. Perianth fleshy, connate, glaucous green.

× × *Leaves* 4-6 inches long, acuminate, the nerves prominent.

C. FRUTICOSA, Wight. S.S.

Ava. Chittagong. Upper Tenasserim.

A scandent shrub armed with curved sharp spines. All parts quite glabrous. Syncarp as the last, but larger. Seeds as big as a small pea.

C. PUBESCENS, Tréc.

Eastern Slopes of the Pegu Range and Martaban up to 3000 feet.

Doung-kyet-tek (Kurz).

Leaves pubescent. Syncarp as the last, but larger, wrinkled.

× × *Female flowers* numerous along with the males, arranged within a hollow, or on an explanate fleshy receptacle.

#### FICUS, *Linnaeus.*

(NIOUNG, *generic.*)

*Receptacle* closed or perforated at the bracted apex. *Achenes* minute, somewhat crustaceous. Trees or shrubs often scandent and epiphytical. *Juice* milky. The receptacles are what are commonly understood as figs.

A. *Receptacles* by pairs, or solitary from the axils of the leaves, or from above the leaf-scars, never from the stem or root-shoots.

\* *Leaves* thick-coriaceous to almost chartaceous, glabrous, or rarely puberulous beneath. *Receptacles* usually smooth, not hispid within, the mouth closed by 3-4 closely appressed bracts. *Male flowers* monandrous. *Stigma* filiform-elongate, rarely 2-cleft. Trees or arborescent stem-climbing.

§ *Petioles* usually thick and short, not jointed and thickened at the insertion of the blade.

<sup>+</sup> Leaves firmly coriaceous, 4-10 inches long, rarely shorter, the petiole strong and thick, and usually short in comparison with the blade. Receptacle sessile, the size of a cherry.

× Leaves 3-5-pinnerved, shortly pubescent or while young villous beneath or on both sides. Receptacles puberulous or tomentose, more or less glabrescent.

\*F. BENGALENSIS, L.

Cultivated in Chittagong and Pegu.

F. indica, Roxb.

Pyu-moung (Kurz).

Leaves shortly pubescent beneath; blunt or apiculate. Young shoots and stipules puberulous.

F. MYSTRENSIS, Roth. E.T.

Ava and forests East of Toung-ngoo.

Leaves glabrous, shortly acuminate. Young receptacles floccose. Stipules rusty villous-pubescent.

F. PILOSA, Rwdt. E.T.

Upper Tenasserim.

Young leaves and receptacles covered with a floccose rusty-coloured down. Stipules rusty villous-pubescent.

× × Leaves quite glabrous.

F. ONTSTA, Wall.

Tenasserim.

Branchlets roughish, from rusty-coloured asperities. Leaves penninerved, shortly acuminate. Bracts deciduous.

F. LACCIFERA, Roxb.

Eastern Slope of the Pegu Range, Tenasserim and the Andamans.

Leaves triplinerved, blunt-apiculate. Bracts glaucous, persistent.

Yields a good caoutchouk, equal to that of *F. elastica* (Kurz).

F. ALTISSIMA, Bl. E.T.

Upper Tenasserim.

Differs from the last in the young shoots, stipules and bracts being puberulous and the last falling off in bud.

F. INDICA, L. E.T.

All over Burma. Kamorta and Katchall.

Leaves triplinerved, acuminate. Bracts glabrous, persistent.

F. OBTUSIFOLIA, Roxb. E.T.

Chittagong. Ava. Tenasserim.

Nyoung-kyap.

Leaves very thick-coriaceous, rounded at base, the lateral nerves very thin and inconspicuous; petiole short.

Yields a good quantity of caoutchouk (Kurz).

<sup>††</sup> Leaves as in former, but receptacles on a peduncle from the size of a cherry to that of a plum.

F. ANNULATA, Bl. E.T.

Tree forests of Eastern Slopes of the Pegu Range and Tenasserim.

Leaves penninerved, pale beneath, peduncles very short and thick, villous-pubescent.

F. THOMSONI, Miq.

Upper Tenasserim.

Leaves penninerved, acuminate, peduncles 3-5 lines long, glabrous.

<sup>†††</sup> Leaves large coriaceous, the lateral nerves all thin and parallel, very closely set.

F. ELASTICA, Bl. E.T.

Upper Burma, especially the Hookhoom Valley.

Petiole short and thick. Stipules red, up to 6 inches long.

This yields the caoutchouk of commerce.

<sup>††††</sup> Leaves rather small, 2-3 inches long, thin coriaceous, nerves thin, crowded, and parallel, with net-venation between.

× Receptacles sessile or shortly peduncled, the size of a pea or less.

*F. RETUSA*, L. *E.T.* All over Burma, the Andamans, and Nicobars.

Nyoung-op (Kurz).

Leaves surrounded at the base, blunt.

var. *a retusa*. Receptacles the size of a pea, greenish-yellow.

var. *β macrocarpa*. Receptacles twice the usual size, orange-coloured.

*F. AFFINIS*, Wall. *E.T.* The Pegu Range and Andamans.

Leaves long, but bluntish-acuminate. Nerves and net-venation prominent on both sides. Receptacles wholly peduncled, the size of a pepper-kernel.

*F. RHODODENDRIFOLIA*, Miq. *E.T.* Tree forests of the Pegu Range and the Andamans.

As the last, but receptacles sessile, as large as a pea.

*F. EUPHYLLA*, Kz. *E.T.* Khakyen Hills.

Very close to the last, but has smaller and more acute bracts.

× × *Receptacles the size of a cherry or plum, all parts glabrous.*

*F. NUDA*, Miq. *E.T.* var. *β* in the Eastern Slopes of the Pegu Range, and Tenasserim.

Receptacles contracted on a slender stalk.

Nerves distant, inconspicuous, almost immersed.

var. *a nuda*. Receptacles the size of a pea, subsessile.

var. *β macrocarpa*. Receptacles the size of a cherry, peduncled.

*F. BENJAMINA*, L. *E.T.* var. *a* the Andamans. var. *β* all over Burma.

Receptacles sessile, or tapering on a very thick base. Nerves crowded and with the transverse venation prominent on both sides.

var. *a Benjaminia*. Receptacles globular,  $\frac{1}{3}$  inch in diameter.

var. *β comosa*, Roxb. Receptacles  $\frac{1}{2}$  inch or more in diameter.

§ § *Petioles slender, jointed, and thickened at the insertion of the blade. Leaves chartaceous or thin coriaceous.*

× *Receptacle sessile or nearly so, the size and shape of a pea. Leaves elliptical.*

† *Receptacle glabrous.*

*F. INFECTORIA*, Willd. Hills East of Toung-ngoo up to 3000 feet. Katchall.

Nyoung-chin.

Leaves penninerved, the nerves and venation prominent on both sides. Petiole 1-2 inches long.

*F. GENICULATA*, Kz. Pegu and Tenasserim.

Nyoung-tha-bye (Kurz), meaning the '*Eugenia-fig*.'

Leaves coriaceous, often rigid, penninerved. Nerves rather obsolete. Petiole as long as the blade or longer.

var. *a geniculata*. Leaves obsolete, veined. Receptacles sessile.

var. *β abnormalis*. Leaves prominently net-veined. Receptacles peduncled.

† † *Receptacles villous-tomentose.*

*F. INSIGNIS*, Kz. Prome.

Foliage as in the last.

× × *Receptacles glabrous, the size of a small cherry. Leaves cordate. Petiole very long and slender.*

*F. RUMPHII*, Bl. Chittagong, Ava, Tenasserim, Katchall, and Great Nicobar.

*F. cordifolia*, Roxb.

Niung-hpyu (Kurz). Niung-gyat (Mason).

Leaves opaque, white-dotted on the upper side.

F. CALONEURA, Kz.

Burma.

Like the last, but leaves not white-dotted.

F. RELIGIOSA, L.

Pegu Range, along streams, and cultivated.

Nioung-ben (Nioung-bor-di, Mason).

Leaves glossy, not white-dotted, abruptly and long-caudate-acuminate.

\*\* *Leaves membranous to chartaceous, rarely rigidly coriaceous, glabrous, or usually somewhat hairy. Receptacle various, usually furnished round the mouth with more than 3 scales. Male flowers with 2-6 (rarely 1) stamens.*

△ *Receptacles not stalked and not tapering at base.*

† *Receptacles globular to turbinate, sessile, pubescent.*

F. TRILOBA, Ham. E.T.

Martaban at 3000 to 5000 feet.

Tawny-hispid. Leaves at base 5-7-nerved, usually lobed. Receptacle bracts 3-4 lines long.

F. HIRTA, Vhl. E.T.

Martaban at 3000 to 4000 feet.

Tawny-hispid. Leaves at base usually 3-nerved, often lobed. Receptacle bracts about a line long.

F. CHRYSOCARPA, Rwdt. E.T.

Hills East of Toung-ngoo at 4000 feet. Kamorta.

Tawny-tomentose and pubescent. Leaves simple, entire, and 3-nerved at base.

†† *Receptacles globular to turbinate, shortly, or very shortly peduncled. Young shoots pubescent, adult leaves glabrescent.*

× *Receptacles the size of a cherry, pubescent.*

F. FRUTIGERA, Wall.

Martaban at 4000 feet.

Leaves glabrous. Petioles  $\frac{1}{4}$  to  $\frac{1}{2}$  inch long. Peduncles less than a line long.

F. LEPIDOSA, Wall. E.T.

Southern spurs of Pegu Range.

Leaves slightly pubescent beneath. Petioles 1-1 $\frac{1}{2}$  inch long. Peduncles 2-3 lines long.<sup>1</sup>

× × *Receptacles the size of a pea, glabrous.*

F. LAMPONGA, Miq. S.

Upper Tenasserim.

Leaves thin membranous, glabrous, or pubescent on the nerves beneath.

var. *α lamponga*. Petiole and nervation pubescent.

var. *β chartacea*. Petioles and leaves glabrous.

△ △ *Receptacles stipitate, i.e. contracted at base or tapering on a stalk.*

† *Stipitate receptacles sessile. Leaves glabrous.*

× *Leaves rigid and thin-coriaceous, yellow and brown variegated beneath.*

F. EXCELSA, Vhl. E.T.

Chittagong. Eastern Slopes of the Pegu Range and the Andamans.

Nyong-tha-byee (Kurz).

Receptacles glabrous or somewhat scabrous, leaves apiculate.

× × *Leaves thin, rigid-chartaceous, prominently net-veined on both sides.*

F. RADICANS, Roxb.

Upper Tenasserim.

Receptacles hispid scabrous. Leaves long-caudate-acuminate.

× × × *Leaves long-acuminate, thick membranous, venation not prominent above.*

F. SCUTELLATA, Bl. E.S.S.

Martaban and Eastern Slopes of the Pegu Range.

Leaves entire; receptacles with a few peripheral scales. Peduncles scaled.

<sup>1</sup> "F. chrysocarpa Rwdt. affinis, errore quoddam el Miquel in Annalis suis me hanc speciem cum F. diversifolia identicam declarasse putavit."—Kurz, J.A.S.B. ii. 1873, p. 107.

F. UNIGLANDULOSA, Wall. *E.S.* Along streams in the Pegu Range.  
 Leaves crenate-serrate towards the apex. Receptacles and peduncles not scaled.  
 †† *Receptacles abruptly stalked. Leaves not tessellate-net-veined beneath. Glabrous trees.*

§ *Receptacles the size of a pea, smooth. Petiole  $\frac{1}{4}$ – $\frac{1}{2}$  inch long.*

F. VASCULOSA, Wall. *E.T.* Tenasserim.

Leaves rigidly chartaceous, blunt-acuminate, vividly green.

F. NERVOSA, Heyne. *E.T.* All over Burma.

Nyoung-peing-nai (Kurz), *i.e.* The 'Jack-tree fig.'

Leaves thin, but rigidly chartaceous, sharply acuminate, brownish beneath.

§§ *Receptacles the size of a prune, long peduncled, puberulous.*

F. CALLOSA, Willd. *E.T.* Eastern Slopes of the Pegu Range.  
 Tenasserim. The Andamans.

Leaves large, glaucous-green, apex rounded. Petiole 1–2 inches long.

×× *Glabrous climbers. Receptacles shortly and abruptly peduncled. Leaves rigidly coriaceous.*

F. RAMENTACEA, Roxb. *E.S.* Chittagong and Eastern Slopes of the Pegu Range.

Leaves not tessellate-net-veined beneath. Receptacles smooth, the size of a cherry.

§ *Leaves tessellate-net-veined beneath. Flowers not mixed with bristles.*

|| *Receptacles as large as a pigeon's egg or larger.*

F. POMIFERA, Kz. *E.S.S.* Upper Tenasserim.

Glabrous. Leaves blunt. Receptacle smooth, apple-shaped.

||| *Receptacles the size of a pea or larger.*

F. SCANDENS, Roxb. *E.S.S.* Pegu Range, Tenasserim, and the Andamans.  
 Receptacles scabrous.

××× *Puberulous low shrubs. Receptacle abruptly stalked.*

F. SCABRELLA, Roxb. Chittagong.

Leaves serrate. Receptacle the size of a cherry, white-tubercled.

F. ANASTOMOZANS, Wall. Upper Tenasserim.

Leaves coarse, sinuate, and almost lobed. Receptacles the size of a pepper-kernel, scabrous-pubescent.

×××× *Shrubs. Receptacles pear-shaped. Peduncle long.*

§ *Low creeping shrub. Leaves serrate.*

F. HETEROPHYLLA, L. Along streams all over Burma.

Leaves various. Cordate to palmately lobed or undivided, scabrous, pubescent beneath.

§§ *Erect shrubs. Leaves entire.*

F. ISCHNOPODA, Miq. Rocky streams in the Pegu Range.

Leaves and receptacles glabrous.

F. SUBPYRIFORMIS, Miq. Hills East of Toung-ngoo.

Leaves pubescent beneath. Receptacles pubescent.

B. *Receptacles arising in clusters or by pairs in racemes or spikes from tubercle-like or reduced leafless racemose branchlets, or from bracted shoots from the roots or stems, pyriform or turbinate, often peripherally scaled. Mouth strongly umbilicate by numerous bracts. Male flowers often monandrous. Stigma usually thickened and papillose.*

+ *Leaves entire.*

† *Leaves lanceolate penninerved. Receptacle the size of a pea.*

F. RIBES, Rwdt. *E.T.* Southern Tenasserim.

†† *Leaves lanceolate to linear penninerved. Receptacles the size of a cherry or larger.*

F. PYRRHOCARPA, Kz. *E.S.* Rocky streams in the Pegu Range and Martaban.  
Receptacles ribbed, and with peduncle rusty-hirsute. Leaves thinly pubescent beneath.

F. LANCEOLATA, Roxb. *E.S.* Chittagong.

Ye-tha-hpan (Kurz).

Glabrous, receptacles ribbed, smooth pustulate.

††† *Leaves broadly oblong, 3-nerved at base. Receptacles the size of a prune to that of an apple.*

F. GLOMERATA, Willd. *E.T.* All over Burma.

Ye-tha-hpan (Kurz).

Receptacles on long glabrous peduncles.

F. CHITTAGONIA, Miq. *E.T.* Chittagong and Pegu.

Tha-hpan-ben (Kurz).

Receptacles on very short pubescent peduncles.

†††† *As above, but leaves penninerved, glabrous.*

F. FISTULOSA, Rwdt. *E.T.* Eastern Slopes of the Pegu Range and Tenasserim.  
Leaves thick-membranous, acute at base. Receptacles long-peduncled, roughish, brown.

F. MACROPODA, Kz. *E.T.* Tree forests of South Andaman. Nankowry,  
Great and Car Nicobar.

Leaves thin chartaceous, rounded at the narrow base. Receptacles long-peduncled, smooth.

++ *Leaves pubescent beneath only, or glabrous, crenate-serrate, rounded or caudate at base.*

† *Leaves glabrous, 3-5-nerved at base. Receptacle very large.*

F. REGIA, Miq. *E.T.* Tree forests of Upper Tenasserim.

Receptacles shortly and densely pubescent, indistinctly ribbed.

†† *Leaves pubescent beneath, 3-5-nerved at base. Receptacles very large.*

F. ROXBURGHII, Wall. *E.T.* Tree forests of Martaban and Chittagong.

Sin-tha-hpan (Kurz).

Peduncles and receptacles densely hispid-tomentose.

+++ *Leaves on both sides pubescent, serrate. Receptacles usually more scaly round their circumference.*

† *Leaves not oblique. Receptacles pyriform, rising from radical shoots and the leaf axils simultaneously. Bark grey.*

F. HISPIDA, L. f. *E.T.* All over Burma and the Andamans up to 1000 feet.  
Ka-dot (Kurz). Katchall. Kanorta and Car Nicobar.

Leaves usually opposite. Peduncles and receptacles greyish-pubescent.

†† *Leaves oblique. Base on one side produced in a half-cordate lobe. Receptacle scaly, pubescent. Bark red-brown.*

F. CUSIA, Buch. *E.T.* var. *a* all over Burma.

Ye-kha-ong (Kurz).

Receptacles pyriform, peduncled.

var. *a cunia*. Receptacles pyriform, stalked.

var. *β conglomerata*, Roxb. Receptacles more globular, sessile.

Kurz adds from the Nicobars:

F. GIBBOSA, Bl.

Tree forests of Kamorta and Car Nicobar.

F. PEDUNCULATA, Rwdt.

Nankowry.

Mason gives the following vernacular names for several species of figs: Yae-kha-ong, Yae-tha-hpan, Pa-niung, Yuae-tia-thue, Neoung-tha-byë, Nioung-jeing-në, Bet-ka-lat, Kha-ung-sung-ku, Lonk-let, Sa-kha-ung, Thab-bu, Thap-pän; and in Sgau-Karen, We-tha-kan-tho, We-tha-kau-hsü, We-tha-ku-pan, We-tha-ku-pan-thö, We-tha-ku-pan-hsü, We-ta-en-na-tho, We-ta-en-na-hsü, We-hti, We-tha-dwi-tho, We-khai-hsü, We-kle-thn-mu.

From the earliest times, down to the present, the fig-tree has ever held a distinguished place among those trees associated with *Phallic symbolism* and the worship of the reproductive force of nature. A familiar example may be quoted in the traditional use of the fig-leaves as a covering for our first parents, and the connection thereby indicated between the fig and the ideas covertly represented by the serpent and the mythical apple or forbidden fruit (call it what you may), for I presume there are few people now-a-days who have enjoyed anything approaching to a liberal education, who are so unenlightened or credulous, as to regard the account of Adam's fall in a literal and material sense, and not as an allegorical and covert presentment of the course and development of human passion and frailty. No greater mistake can be made than when we attribute indelicacy or profanity to certain acts or things, which to the eyes of men in an earlier and ruder stage of society appeared neither indelicate nor profane, however much they may be judged to be so by ourselves. To judge justly of either actions or persons, we must emancipate ourselves as much as possible from our prejudices and present surroundings and view matters as they appeared to those of old time. In our day, for example, if one man wishes to pledge himself to another, he grasps his hand; but in Abraham's time it was not the hand, but quite another part of the person<sup>1</sup> (the 'thigh' as it is euphemistically called), which was grasped when a solemn pact or engagement was made; and yet we may be sure that all notions of indelicacy were as absent in the one case as they are in the other, and this peculiar mode of attestation simply added the sanctity of an oath to the obligation about to be incurred.

This may appear to many too much of a truism to require comment, but so far from this being universally accepted and acted on, there are, I fear, too many among us who would rather the multitude remained in ignorance of the meaning of a good deal they read in their Bibles, or entirely mis-interpreted the same, than unsettle their minds by letting them comprehend the truth; such, for example, as the real meaning of the allegory of the Serpent in Genesis. These few remarks are, however, made simply in explanation of the light wherein I view a subject rather difficult, I confess, to deal with, and need not therefore be prolonged. Speaking of the famous *Ficus ruminalis*<sup>2</sup> of Rome, beneath which it was believed Romulus and Remus were nurtured, De Gubernatis remarks, "La figue dans le monde végétal, . . . est un symbol de la génération et de la fécondité, et elle préside tout naturellement à la fondation d'une grand ville et d'un grand peuple." And again, "C'est sous un figuier qu'Adam se cache après avoir mangé le fruit défendu; la figue et la pomme d'Adam cachent le même fruit mythologique." And again "Nous avons eu déjà plusieurs fois l'occasion de noter que les animaux et les arbres phalliques sont devenus des arbres sinistres, funéraires, diaboliques; nous avons tâché même de prouver comment l'arbre d'Adam a pu se transformer en arbre de la croix, en arbre maudit, en arbre de Judas."

In connection with this subject it may be remarked that the wood of the fig-tree

<sup>1</sup> Genesis xxiv. 2.

<sup>2</sup> For much curious information touching the extremely ancient symbolical sense attaching to 'figs' and 'fig-leaves,' consult 'Ancient Faiths embodied in Ancient Names,' by Thomas Inman, under the heads 'Apple,' 'Fig,' 'Paranomasias,' 'Rimmon,' and *Mythologie des Plantes*, ii. p. 137. The subject is a deep one, but inadmissible in a work of general reading, in spite of the laudable proverb 'to the pure all things are.'

was that commonly selected for making the images of Priapus, which the Romans placed in their gardens to frighten birds and thieves, as is so humorously alluded to by Horace when relating the discomfiture of Canidia and her accomplice Sagana—

“Olim truncus eram ficulnus, inutile lignum :  
Cum faber, incertus scammum faceretne Priapum,  
Maluit esse deum. Deus inde ego furum avinque  
Maxima formido.”—Satires, Lib. I. 8.

A double entendre attaching to the word *figus* was well known to the Romans, and is embodied in the 66th epigram of Martial, Lib. i. ‘*de genere et declinatione figus*,’ and Lib. vi. epig. 49, and xii. 33, which I need not more particularly quote. That the fig held a high place among fruits in the estimation of the Greeks in the time of Homer may be inferred from its being one of the fruits which adorned the garden of Alcinous, and it was also a favourite in Ithaca, for whilst Laertes only gave his little son 10 apple-trees<sup>1</sup> and 13 pears, he gave him no less than 40 fig-trees and 50 vines.

#### DORSTENIA, *Plumier*.

*Flowers* monœcious, numerous, sessile, males and females mixed, on a peltate receptacle. *Perianths* tubular, united, 2-4-toothed. *Stamens* 2, filaments basally confluent with the perianth. *Ovary* immersed in the spongy-fleshy receptacle, sometimes stalked. *Style* lateral 2-cleft, or simple and short. Seeds on ripening, elastically ejected from the pericarp.

D. GRIFFITHIANA, Kz. E.S.

Tenasserim.

Flowers immersed in the cavities of the fleshy receptacle. Fruit compound, dimorphous, velvety.

× × × *Male and female flowers separate, the latter solitary within a many-bracted involucre.*

#### ANTIARIS, *Leschenault*.

*Flowers* monœcious. *Males* densely packed within a many-bracted involucre, opening at length into an open convex receptacle. *Perianth* 4- (rarely 3-)cleft. *Female flowers* solitary without perianth. *Fruit* a drupe, the pericarp formed of the enlarged fleshy involucre. *Albumen* none. Trees or shrubs with entire distichous leaves abounding in milky juice.

A. TOXICARIA, Lesch. E.T.

Eastern Slopes of the Pegu Range. Tenasserim.

*A. innocua*, Bl.

*A. succidora*, Dalz.

Himi-a-sait (Kurz).

Drupes pear-shaped, thick-peduncled, scarlet.

This is the renowned ‘Upas-tree’ of Java. It exudes a poisonous white resin, used to poison arrows with. The inner bark or liber removed entire is used for sacks in some parts of India. For this, a branch is selected of the required diameter and sawn off. It is now steeped in water and the ‘liber’ loosened by beating with clubs, and when quite detached from the wood, it is turned back and stript off like a glove, a thin disk alone being retained and sawn off, to serve as a bottom for the sack, or the end is sewn together. In the Wynaad these sacks are in common use among the Cooroombars to hold rice.

† † *Filaments inflexed in bud.*

× *Flowers in dense heads or spikes.*

#### BROUSSONETIA, *Ventenat*.

*Flowers* diœcious, males in dense bracted elongate spikes, females in globular

<sup>1</sup> Ὀρχνας μοι δῶκας τρισκαίδεκα καὶ δέκα μηλείας,  
συκέας τεσσαράκοντ’· ὄρχους δέ μοι ᾧδ’ ὀνόμηνας  
δῶσειν πεντήκοντα.”—Od. xxiv. 342.

heads. *Perianth* in males 4-parted, valvate in bud. *Stamens* 4. *Filaments* long, exerted. Female perianth urecolate or bell-shaped, 4-3-toothed, persistent. *Ovary* stalked, with a single pendulous ovule. *Style* lateral, filiform persistent. *Berry* club-shaped, with a sappy pericarp, inclosing the seed at its thickened upper end. Juice milky.

B. PAPYRIFERA, Vent.

Ava and Martaban Hills.

Ma-laing (Kurz).

Drupe sappy, glossy-red.

Dr. Mason says this is the tree from which the Burmese make the coarse paper, of which their folding books are composed, called *parra-beike*, and Kurz adds that it is also used in China and Japan in the manufacture of paper.

Morus, *Linnaeus*.

*Flowers* monœcious or diœcious, in dense spikes. *Male perianth* 4- (rarely 5-) parted, the segments in 2 series, imbricate in bud. *Stamens* 4 (rarely 5). *Female perianth* 4-parted, the outer segments larger. *Ovary* 2-celled, cells 1-ovuled. *Stigmas* 2, elongate-filiform. *Achenes* usually covered by the fleshy perianth, and hence berry-like.

M. LEVIGATA, Wall.

Tree forests of Martaban and Tenasserim.

Ma-lein-pen (Kurz).

Male and female spikes 4-5 inches long.

M. INDICA.

Cultivated as food for silkworms.

Male spikes about  $\frac{1}{2}$  an inch long.

× × *Female flowers solitary or in poor racemes.*

BALANOSTREBLUS, Kurz.

*Flowers* monœcious, females racemose, males in catkins. *Perianth* entire, connate with the ovary, free upwards, but entirely inclosing the ovary, perforate at the apex. *Seed* inclosed in the fleshy perianth, and drupaceous. Milky trees, with alternate spiny-toothed leaves.

B. ILICIFOLIA, Kz.

Ava and Chittagong.

Drupe the size of a pea, red, tubercled-wrinkled, glabrous.

STREBLUS, Loureiro.

*Flowers* monœcious or diœcious, the males in heads, the females solitary. *Perianth* 4-parted, in fruit enlarged, fleshy. *Ovary* with a single ovule attached near the apex. *Style* somewhat excentric. *Stigmas* 2, filiform. *Albumen* none. Milky trees or shrubs, with simple serrulate leaves.

\* *Male flowers in spikes or short-peduncled heads, the heads sometimes androgynous. Female flowers solitary, peduncled. Perianth segments broad, enlarging and turning fleshy, entirely inclosing the achene.*

S. ASPERA, Lour. E.T.

All over Burma, the Andamans, Katchall, and Car Nicobar.

Op-nai (Kurz).

All parts scabrously pubescent, fruiting perianth fleshy, scabrous. Male flowers in heads.

S. MITIS, Kz. E.T.

Khakyon Hills.

All parts glabrous. Male flowers in dense spikes.

\*\* *Male flowers in short-peduncled small racemes, the female in very loose racemes, perianth-segments narrow, embracing only the base of the achene.*

S. (DIPLOCOS) ZEYLANICA, Bur. E.T.

Burma.

*Taxotrophis Zeylanica*, Thw.

All parts glabrous. Fruiting perianth-segments smooth.

\*\*\* *Male flowers in sessile bracted-involucered clusters. Female solitary, on slender peduncles. Perianth-segments leafy, much longer than the achene, and involucre-like.*

S. TAXOIDES, Kz. E.T.

var.  $\alpha$  Coasts of the Andamans.

All parts glabrous.

var.  $\beta$  Swampy forests in Pegu.

var.  $\alpha$  *taxoides*. Leaves 2-4 inches long.

var.  $\beta$  *microphylla*, Kz. Leaves 1-1½ inch long.

The last nine genera form a very natural Order, *Moreæ*, divisible into two Tribes, *Artocarpieæ* and *Morieæ*, both of considerable value for the food and other products they yield. The figs, for example, yield not only edible and wholesome fruit, but caoutchouk as well, especially *F. elastica* and *F. lacifera*, and the leaves afford good forage for domestic animals, goats and elephants especially, devouring many species with avidity, especially *F. religiosa*, or the Pipal of India. Several species of *Morus* are also valuable for their fruit and as forage for cattle and for feeding silkworms, for which purpose *M. alba* is chiefly selected.

### Order CELTIDEÆ.

*Flowers polygamous. Perianth 5-partite, persistent, imbricate. Stamens usually equal to the perianth-lobes. Filaments uncoiling elastically. Styles 2. Ovule basilar, campylotropous. Embryo curved. Albumen scanty or none. Trees. Juice watery. Leaves alternate. Stipules fugacious.*

MALAISIA, *Loureiro*.

*Flowers dioecious. The males in one-sided dense spikes, the females packed in globular receptacles. Male perianth 3-4-cleft. Stamens as many as perianth-segments, incurved in bud. Filaments filiform, elastically reflexed with opening of the flower. Female perianth urceolate, with an apical opening. Ovary sessile. Style short. Stigmas 2, elongate. Achenes berry-like, enveloped by the enlarged perianth. Unarmed scandent shrubs.*

M. TORTUOSA, Blanco.

Tree forests of the Eastern Slopes of the Pegu Range and Tenasserim.

Stem terete, grey, glabrous. Leaves rounded at base, acuminate, 4-5 inches long, glabrous, or the nerves beneath puberulous, repand-toothed.

\*\*\* *Style simple or 2. Ovule solitary, suspended, no albumen. Leaves alternate. Fruit a drupe or samara.*

† *Anthers introrse. Filaments inflexed in bud. Fruit a drupe.*

SEONIA, *Planch.*

(Including *Gironmiera*.)

*Flowers dioecious or polygamous. Perianth 4-5-parted, imbricate in bud, persistent. Stamens 4-5, opposite the perianth-segments. Filaments incurved.*

\* *Female flowers in cymes or spikes.*

S. ORIENTALIS, *Planch.* E.T.

var.  $\alpha$  Chittagong. var.  $\beta$  All over Burma.

Sap-shā-pen (Kurz).

Leaves oblique, ovate at the base, semicordate, 5 inches long, acute, serrulate, chartaceous, retrorsely-scabrous from stiff appressed bristles. Beneath silvery pubescent, 5-7-nerved at the base, and penninerved upwards. Flowers sessile, forming villous cymes in the leaf-axils.

var.  $\alpha$  *Wightii*, *Planch.* Branchlets pubescent. Leaves less rough.

var.  $\beta$  *Amboinensis*, Bl. Branchlets villous. Leaves very scabrous.

S. TIMORENSIS, Bl. E.T.

Tenasserim.

Leaves 2-3 inches long, serrulate, glabrous, 3-nerved at base, upwards penninerved.

*S. NERVOSA*, Planch. *E.T.*

Leaves pubescent beneath, unequal at the base, rigid-chartaceous, entire, wrinkled above and pubescent along the midrib. Stigmatic styles sessile. Drupes sessile, the size of a pea, ovate, compressed, hispid, pericarp dry, crowned by long sessile stigmatic styles or their bases.

var. *a nervosa*, Planch. Leaves more pubescent. Stigmas united at base into a style.

var. *β subaqualis*, Planch. Leaves less pubescent. Styles almost sessile.

\*\* *Female flowers usually solitary, on an axillary peduncle.*

*S. LUCIDA*, Kz. *E.T.*

Tree forests of South Andaman.

Leaves 5-8 inches long, almost polished. Drupes the size of a small cherry, glabrous.

*S. (GALUMPITA) CUSPIDATA*, Bl. *E.T.*

Tree forests of Eastern Slopes of the Pegu Range.

Leaves 3-4 inches long, opaque on both sides, serrulate. Drupes the size of a small cherry, glabrous.

*SOLENOSTIGMA*, Endlicher.

*Flowers* polygamous. *Perianth* 5-parted, deciduous. *Stamens* 5. *Stigma* 2-lobed at the apex, persistent. *Fruit* a drupe. Evergreen trees, with 3-nerved entire leaves.

*S. WIGNII*, Planch.

Tree forests of the Andamans.

Glabrous. Leaves oblong to lanceolate, chartaceous, 4-6 inches long, the 2 lateral nerves excurrent to the very point, thinly but prominently net-veined. Flowers yellowish, sub-sessile. Drupes glabrous, the size of a pea, terminated by the dilated short styles.

*CELTIS*, Tournef.

*Flowers* polygamous, dimorphous, the hermaphrodites only fertile. *Male perianth* 4-5-parted, the segments concave, imbricate in bud. *Stamens* as many as segments, hypogynous. *Filaments* usually spreading elastically. *Ovary* rudimentary, surrounded by the villous disk. *Hermaphrodite perianth* deciduous. *Stamens* as in males. *Ovary* on a villous disk. *Stigmas* 2, sessile, or connate at the base, deciduous, filiform. Trees or shrubs, with 3-nerved leaves.

\* *Fruiting peduncles solitary, or by 2-3 from the leaf-axils, simple.*

*C. MOLLIS*, Wall.

Ava.

Leaves tomentose, entire. Fruiting peduncles solitary.

*C. HAMILTONII*, Planch.

Tenasserim, along streams.

Leaves glabrous, serrate, green on both sides, fruiting peduncles solitary in the leaf-axils.

*C. TETRANDBA*, Roxb.

Ava Hills.

As the last, but the leaves larger, brownish beneath, and the crenatures more rounded.

\*\* *Fruiting peduncles branched.*

*C. CINNAMOMEA*, Ldl. *E.T.*

Chittagong and Eastern Slopes of the Pegu Range.

Leaves glabrous, remote-serrulate. Fruiting peduncles forming a torus.

*TREMA*, Loureiro.

*Flowers* diœcious or polygamous. *Perianth* 4-5-parted, imbricate in bud, persistent. *Males*: *Stamens* 4-5, opposite perianth-segments. *Filaments* incurved. *Females*: *Ovary* 1-celled, with a single ovule attached to the summit of the wall. *Stigmas* 2, free or basally united. *Drupe* fleshy, containing a hard putamen.

*T. ORIENTALIS*, Bl.

Kamorta (K.).

var. *T. (Sponia) velutina*, Planch.

GIRONNIERA, Gaudichaud.

*Flowers* small, dioecious, in axillary cymes or branched racemes. *Perianth* of 4 or 5 segments, imbricate in bud. *Stamens* 4 or 5. *Filaments* slightly incurved. *Ovary* with 1 pendulous ovule. *Styles* 2, long and filiform. *Drupe* slightly compressed. *Leaves* alternate.

G. SUBEQUALIS, Planch.

Kamorta (K.).

Order ULMACEÆ.

*Flowers* hermaphrodite. *Perianth* campanulate, persistent, quadri- to octofid. *Stamens* opposite the perianth-lobes. *Anthers* extrorse. *Ovary* 1- or 2-celled. *Styles* 2. *Orules* 1 in each cell, pendulous. *Embryo* straight. *Albumen* none. *Trees*. *Juice* watery. *Leaves* alternate. *Stipules* fugacious.

ULMUS, Tournef.

*Flowers* hermaphrodite, or polygamous, cymose. *Perianth* bell-shaped, 3-8-parted, marcescent or deciduous. *Stamens* as many as, or more than, the perianth-segments. *Filaments* erect. *Anthers* small. *Fruit* a winged samara, 1- or occasionally 2-celled, with the second cell empty, and smaller. *Seed* ovate, anatropous, or nearly so. *Albumen* none.

U. INTEGRIFOLIA, Roxb.

Pegu Range and Hills East of Toung-ngoo.

Myouk-seit (Kurz).

*Leaves* entire. *Perianth-segments* deciduous.

U. LANCEIFOLIA, Roxb.

The Pegu Range.

Tha-leh.

*Leaves* serrulate. *Perianth* bell-shaped, marcescent-persistent.

HELICIA, Loureiro.

*Flowers* hermaphrodite. *Perianth* regular, the segments revolute when separating. *Anthers* on short filaments, inserted a little below the blade, the connective produced into a short appendage. Hypogynous glands equal, distinct, or united in a ring or cup round the ovary. *Ovary* with 2 ascending ovules laterally attached near the base, sessile with a long straight style, slightly thickened at the end, the stigma terminal. *Flowers* by pairs. *Bracts* very deciduous.

\* *Inflorescence* axillary or lateral. *Leaves* more or less acuminate, apiculate, or bluntish.

‡ *Racemes* glabrous or nearly so.

H. COCHINCHINENSIS, Lour. E.T.

Martaban at 5000 to 7000 feet.

*Leaves* serrate or entire, acuminate at the base and almost decurrent on the  $\frac{1}{2}$  to  $\frac{2}{3}$  inch long petiole. *Scales* distinct, smooth.

H. ROBUSTA, Wall. E.T.

Martaban and Tenasserim from 2000 to 4000 feet.

*Leaves* serrate on 2-3 lines long petioles. *Scales* united in a 4-toothed cup.

‡‡ *Racemes* rusty-tomentose or villous.

+ *Young branchlets* rusty-villous. *Leaves* serrate.

H. PYRRHOBOTRYA, Kz.

Martaban at 4000 feet.

*Ovary* smooth, scales not known.

H. EXCELSA, Bl. E.T.

Chittagong and Tenasserim.

*Ovary* rusty-hirsute, scales smooth, distinct.

++ *Young branchlets* glabrous. *Leaves* entire.

H. SALICIFOLIA, Presl.

Tenasserim.

*Ovary* rusty-hirsute, scales puberulous, distinct.

\*\* *Inflorescence terminal, glabrous.*

H. TERMINALIS, Kz.

Khakyeen Hills.

Leaves entire, retuse.

#### DAPHNALES.

*Flowers* usually hermaphrodite. *Perianth* green or coloured, regular or irregular, often tubular. *Ovary* 1- rarely 2-celled, superior. *Stigma* 1. *Ovule* usually solitary, pendulous or sub-erect. *Albumen* none, rarely scanty. *Embryo* straight.

#### Order ELÆAGNEÆ.

*Flowers* regular, hermaphrodite, sometimes unisexual by abortion, rarely diœcious. *Perianth* inferior, usually forming a 2-4-lobed bell, narrowed or contracted into a shorter or longer tube. *Disk* filling the perianth-tube, and variously prominent along its margin, rarely consisting of 8 glands. *Stamens* rarely free, usually adnate to the perianth, as many, or twice as many, as perianth-lobes. *Anthers* 2-celled, the cells dehiscing longitudinally by a double slit. *Ovary* free, inclosed in the perianth-tube, which enlarges in fruit, 1-celled with a solitary erect ovule. *Style* simple, elongate. *Fruit* inclosed in the dry or more usually fleshy or sappy enlarged perianth-tube, drupaceous, the spurious pericarp horny or chartaceous, smooth or woolly or sealy within. *Embryo* erect, surrounded with a very thin albumen with an inferior radicle, the cotyledons narrow. Shrubs or trees, often scandent, sometimes spiny, all parts more or less covered with minute silvery or coppery scales. *Stipules* none. *Leaves* simple, alternate, or rarely opposite. *Flowers* solitary or clustered, sessile or pedicelled, axillary.

#### ELÆAGNUS, *Linnaeus.*

*Flowers* hermaphrodite or male by abortion. *Perianth* 4- rarely 5-8-lobed, the limb valvate, and at the base contracted into a tube. *Disk* glandular. *Stamens* usually 4. *Ovary* 1-celled, with a single erect ovule. *Style* simple, subulate, somewhat recurved and stigmatic along the one side of the apex. *Fruit* a drupe, the putamen bony, and 1-seeded.

E. ARBOREA, Roxb. *E.T.*

Tree forests of Ava. Pegu. Tenasserim.

Mên-gu.

Kamorta and Nankowry.

Drupes 1½ inch long, the putamen sulcate, with rounded ribs.

E. CONFERTA, Roxb. *E.S.S.*

Chittagong.

Drupes 4-6 lines long, the putamen slightly sulcate ribbed.

Mason remarks: "This sour red plum, which grows on a magnificent creeper, makes excellent tarts and jellies, and is a great favourite with the natives. It grows wild in many of our jungles, but is nowhere very abundant. It is often seen in cultivation among the Burmese, and I have met with it in some of the Red Karen villages."

#### Order THYMELÆACEÆ.

*Flowers* usually hermaphrodite, rarely unisexual. *Perianth* tubular, funnel- or bell-shaped, naked at the throat, or furnished with scales or glands, 4-5-lobed, imbricate, or rarely valvate. *Hypogynous glands* minute, 4-8, somewhat fleshy, or filiform, inserted around the ovary, either free or united in an entire or toothed ring or cup, rarely wanting. *Fertile stamens* usually as many, or twice as many, as perianth-lobes, rarely only 2, inserted on the throat or tube in a single or double series, and opposite to the lobes, or the lower ones alternating with them. *Anthers* 2-celled, the cells dehiscing usually inwardly by 2 longitudinal slits. *Ovary* free, 1- or rarely 2-celled, with 1 (or rarely 2 or 3 pendulous) ovule. *Fruit* indehiscent and nut-like, drupaceous or berry-like, or rarely a 2-valved capsule. *Seed* pendulous, the pericarp thin or crustaceous, rarely fibrous-woody. *Albumen* none, or rarely

present. *Embryo* straight, with a superior radicle, cotyledons fleshy, plano-convex. Shrubs or trees, rarely herbs. *Leaves* simple, opposite or alternate. *Stipules* none. *Flowers* often in heads, umbels, clusters, racemes or spikes, often silky outside.

An order characterized by the peculiar loose bark of a caustic nature, which acts upon the skin as a vesicatory. The fruits of many are poisonous. Paper is made from the inner bark of several species of *Daphnē*. Eagle-wood, containing a fragrant resin of a dark colour, comes from *Aquilaria agallochum*.

DAPHNĒ, *Linnaeus*.

*Flowers* hermaphrodite. *Perianth* tubular or funnel-shaped, deciduous, 4-lobed. *Hypogynous disk* obsolete or none. *Anthers* inserted in 2 superposed rows of 4 each, nearly sessile. *Ovary* 1-celled, with a single ovule. *Drupe* fleshy succulent (rarely coriaceous), 1-seeded, with crustaceous testa.

D. PENDULA, Sm. *E.S.* Hills East of Toung-ngoo at 5000 to 6000 feet.

All parts glabrous. Leaves usually acuminate at both ends, membranous, 4-6 inches long, glaucous beneath. Flowers yellow, 6 lines long, tubular, sessile, densely pubescent outside.

LINOSTOMA, *Wallich*.

*Flowers* hermaphrodite. *Perianth* bell-shaped, 5-lobed, of a thin texture, furnished at the throat with 10 free or 5 bifid glabrous scales. *Stamens* 10, alternating with the perianth scales. *Hypogynous scales* none. *Ovary* sessile, 1-celled, with a solitary pendulous ovule. *Style* capillary with a capitate stigma. *Nut* dry. *Seeds* solitary, with a thin crustaceous pericarp. *Albumen* none.

\* *Glabrous shrubs. Perianth-scales 10, free.*

L. PAUCIFLORUM, Griff. *E.S.* Hills East of Toung-ngoo at 3000 to 4000 feet. Leaves obovate, blunt, or rounded with a mucro.

L. DECANDRUM, Wall. *E.S.* Chittagong. Tenasserim. Leaves ovate-lanceolate, acuminate.

\*\* *Tomentose shrubs. Perianth-scales 5, bifid.*

L. SCANDENS, Wall. *E.S.* Tenasserim.

Floral leaves coriaceous, petioles inserted with a broad base to a knob on the peduncle and reflexed.

L. SIAMENSIS, Kz. The Eng forests of Prome.

Floral leaves thin chartaceous, the petioles thin, and not thickened at their insertion with the peduncle.

Kurz adds, from the Nicobars:

GONYSTYLES MIQUELIANUS, T. et B. Kamorta.

AQUILARIA, *Lamarck*.

*Perianth* coriaceous, bell-shaped, 5-cleft, scales at the throat 10, exserted, pilose, forming a 10-lobed crown. *Stamens* 10, adnate to the perianth-tube. *Hypogynous scales* or ring none. *Ovary* sessile, if solitary 2-celled, if not 1-celled. *Capsule* woody, with a thin coriaceous pericarp sessile, 2-valved, with median placentas. *Seeds* 2, or solitary by abortion. *Albumen* none.

A. AGALLOCHA, Roxb. *E.T.* Hills East of Toung-ngoo.

A-kyau (Mason). Lign-aloes.

Capsules wrinkled, softly and densely tomentose.

Wood light, close-grained, and takes a good polish. Furnishes the commercial Eagle-wood, called by the Malays *Kayu-garu*. Lign-aloes is used for burning as a perfume. The finest appears to be resinous portions, only found in old and decayed trees. Mason has some pertinent remarks on this plant: "The fragrant substance

called lign-aloes is offered for sale in all the Bazaars on the coast, and is the produce of a tree that grows on the Mergui Islands. It is imported into Mergui by the Selungs, who, as they profit from the trade, endeavour to keep all in ignorance of the tree from which they obtain it.

"Gesenius says the Hebrew and Greek names are 'derived from the Indian name of the tree, *agil*, Sanskrit *agaru* and *aguru*.' Had he read Pali, he would have been able to approach the word nearer than he has done through the Sanscrit, for there, besides *agaru*, the Sanskrit word, we have *agalu* and *aggalu*, which comes sufficiently near the 'Indian name *agil*,' and the Greek *agallochon*, but it would take a pretty thorough etymologist to get *aloë*, the New Testament word, out of any of them. There is, however, another Sanscrit and Pali word, with which Gesenius does not appear to have met, *lauha*. This is manifestly the parent of *aloë*, and by transposition, not uncommon in Hebrew, of the Hebrew name also. Although rendered '*aloes*' in the English version, no two plants are more dissimilar than this and the common aloes"—that is lign-aloes and socotrine, or bitter-aloes.

A. MALACCENSIS, Lamk. *E.T.*

Tenassorim.

Capsules smooth and glabrous.

### LAURALES.

*Flowers* usually unisexual. *Perianth* green or coloured usually regular. *Ovary* superior (inferior in *Gyrocarpeæ*) 1-celled. *Stigma* 1. *Ovule* solitary. *Embryo* straight, albuminous or not.

### Order LAURINEÆ.

*Perianth* regular, the tube very short, or none at the time of flowering, sometimes enlarged over or under the fruit, or rarely adnate to the ovary and fruit, segments 6 or rarely fewer, imbricate. *Stamens* nominally twice as many as perianth-segments, but sometimes reduced to 3, or irregularly increased in number, all fertile or a certain number reduced to staminodes, or sessile, or stalked glands. *Anthers* adnate with 2 collateral or superposed pairs of cells, each cell opening in a valve from the base upwards, or (in *Hernandia*) from the inner to the outer side. *Ovary* free or (in *Hernandia*) adnate, 1-celled with a solitary ovule suspended from the apex of the cavity, from a funicle adnate to its side, or rarely with a second abortive ovule. *Style* simple, often very short. *Stigma* capitate or dilated, entire or lobed. *Fruit* a berry or drupe, rarely dry or nearly so, the perianth is entirely deciduous or the tube enlarged and dry, or fleshy, supporting or inclosing the fruit. *Seed* pendulous, without albumen. *Embryo* with thick fleshy cotyledons filling the seed and inclosing the plumule and short superior radicle. *Trees* or shrubs, rarely leafless twiners. *Leaves* usually alternate simple. *Stipules* none. *Flowers* usually small, the inflorescence various.

### Sub-order LAURINEÆ verae.

\* *Anther-cell opening by upward-turning valves.*

+ *Flowers in naked inflorescences, not surrounded by a proper involucre or imbricate bracts.*

× *Anthers 4-celled, fruit superior, free, not inclosed in the pericarp.*

### CINNAMOMUM, Burmann.

*Flowers* hermaphrodite. *Perianth-segments* breaking off at their middle, leaving a persistent 6-lobed cup or disk under the fruit. *Ovary* inserted in the centre of the funnel-shaped perianth receptacle, 1-celled, with a solitary pendulous ovule. *Trees* or shrubs usually aromatic.

\* *Leaves 3-5-nerved.*

× *Perianth-segments deciduous along a horizontal line above their base or at their middle.*

‡ *Nuts dry, glabrous.*

C. ZEYLANICUM, Breyh. E.T. Tenasserim.

Loo-leng-kyaw (Kurz).

This tree yields the true cinnamon of commerce, the liber yields the oil of cinnamon, the leaves oil of cloves, the fruit a peculiar terebinthaceous ethereal oil, and the root camphor.

C. INERS, Rwdt. Tree forests of Tenasserim.

Loo-leng-kyaw (Kurz).

Kurz says he does not know wherein this species differs from the last.

‡‡ *Nuts drupaceous, more or less sappy.*

C. OBTUSIFOLIUM, N.E. E.T. Tree forests all over Burma, the Andamans, Kamorta and Nankowry.

All parts glabrous. Drupes succulent, oblong,  $\frac{1}{2}$  of an inch long. The bark of the roots is a substitute for genuine cinnamon.

C. CASSIA, Bl. E.T. Khakyen Hills.

All parts glabrous. Drupes sappy, the size of a pea.

C. SULPHURATUM, N.E. E.T. Southern Tenasserim.

Leaves puberulous beneath.

× × *Perianth-segments entirely persistent, glabrous, leaves caudate, fuscous in drying.*

C. CAUDATUM, N.E. E.T. Khakyen Hills.

Drupes  $\frac{1}{2}$ -1 inch long, glossy, black.

\* \* *Leaves penninerved.*

C. INUNCTUM, Meissn. Southern Tenasserim.

Drupes ovate.

C. PARTHENOXYLON, Meissn. Southern Tenasserim.

Drupes globular.

This tree yields the so-called Martaban camphor-wood (Kurz).

PHÆBE, Nees von Essenbeck.

*Flowers* almost as in *Cinnamomum*, the receptacle shortly funnel-shaped, persistent, along with the often indurated perianth supporting the fruit. Trees or shrubs, with alternating or almost whorled penninerved or triplinerved leaves.

\* *Inflorescence and all parts quite glabrous.*

P. LANCEOLATA, N.E. E.T. Tenasserim up to 3000 feet.

Flowers small, white or slender glabrous pedicels.

\* \* *Inflorescence and younger parts more or less tomentose.*

P. PUBESCENS, N.E. E.T. All over Burma, especially along streams.

Panicle slender. Pedicel as long or longer than the perianth. Fruits oval, the size of a small pea, black, glossy.

P. VILLOSA, Wight. E.T. Chittagong.

Panicle stout. Pedicels rather thick, shorter than the perianth. Fruits globular, the size of a pepper kernel, black, smooth.

MACHILUS, *Rumphius*.

*Perianth* wholly persistent, not indurating; the segments in fruit reflexed or spreading. *Pedice* usually not thickened. *Stamens* 12, as in *Cinnamomum*.

\* *Leaves coriaceous, glaucous beneath.*

‡ *Leaves bluntish, acuminate, with the margins not reflexed.*

M. INDICA, Lour. *E.T.*

Martaban at from 3000 to 7000 feet.

*M. odoratissima*, N.E.

*Perianth*-segments about  $2\frac{1}{2}$  lines long. Leaves from 4 to 7 inches long.

M. RIMOSA, Bl.

Tenasserim.

*Perianth*-segments hardly a line long. Leaves  $2-3\frac{1}{2}$  inches long.

‡‡ *Leaves blunt, oval, with reflexed margins.*

M. FRUTICOSA, Kz.

Upper Tenasserim at 4000 feet.

Leaves ovate, a little decurrent on the strong, broad, glabrous petiole.

\*\* *Leaves acuminate, hardly chartaceous, one-coloured.*

M. TAVOYANA, Meissn.

Tenasserim.

ALSEODAPHNE, *Nees von Essenberg*.

*Flowers* as in *Cinnamomum*. *Perianth* nearly wholly deciduous, the fruit large, resting on the thickened, often fleshy pedicel.

A. GRANDIS, N.E. *E.T.*

Arakan. Pegu and Tenasserim.

Fruits oval, 1-2 inches long, fleshy, smooth, bluish-black and pruinose.

×× *Anthers 2-celled.*

† *Fruit superior, quite free, not adnate.*

BEILSCHMIEDIA, *Nees von Essenberg*.

*Perianth* wholly deciduous, the segments nearly equal (or the outer lobes minute). *Ovary* 1- (or imperfectly 2-)celled. *Berry* resting on a thickened, often fleshy pedicel.

B. ROXBURGHIANA, N.E.

Pegu, Martaban up to 2000 feet, and the Andamans.

Shaw-htoo-pen (Kurz).

Petiole  $\frac{1}{2}$  to 1 inch long, glabrous. *Perianth*-segments about  $1\frac{1}{2}$  lines long. Fruits oblong.

B. GLOBULARIA, Kz.

Hills East of Tonng-ngoo from 3000 to 4000 feet.

As the last, but the fruits spherical.

B. MACROPHYLLA, Meissn.

Southern Tenasserim.

Petiole  $1\frac{1}{2}$  to 3 lines long, thick, tomentose. *Perianth*-segments about a line long.

‡‡ *Fruit wholly inclosed in the enlarged perianth, but rarely adnate to it; only the apex sometimes exerted.*

CRYPTOCARYA, *R. Brown*.

*Flowers* hermaphrodite in racemes or panicles. *Fertile stamens* 9, free. *Fruit* free, not adnate to the perianth. *Fructing perianth-tube* globular, having the appearance of an inferior fruit.

C. FERREA, Bl.

Tenasserim. Kamorta.

Inflorescence and all softer parts minutely ochre-puberulous. Adult leaves glabrous.

C. GRIFFITHIANA, Wight.

Southern Tenasserim.

All parts more or less covered with a rusty velvety tomentum. Leaves pubescent beneath.

EUDIANDRA, *R. Brown.*

*Flowers* hermaphrodite. *Fertile stamens* only 3, free, the 6 outer stamens reduced to glands or to a glandular ring. *Fruit* inclosed in the truncate perianth-tube. *Flowers* in panicles.

*E. CANDOLLEANA*, Meissn.

Tenasserim.

Leaves alternating, penninerved, chartaceous,  $3\frac{1}{2}$  to 8 inches long, on a strong 4-10 lines long pedicel. *Flowers* unknown. Berry naked, ovate-globular, smooth, 9 lines long.

++ *Flowers* either surrounded by a 4-6-leaved involucre, or covered by several rows of imbricate bracts, and while in bud entirely inclosed by them.

‡ *Flowers* in umbels, subtended by a 4-6-leaved involucre.

× *Anthers* 4-locellate.

TETRANTHERA, *Jacq.*

*Perianth* 6-cleft or truncate. *Fertile stamens* 9-12, rarely 15-30, the inner 3-6 bearing glands at base. *Fruit* resting on a large and thick cup, or half immersed in the same.

\* *Perianth-tube* slightly enlarged under the fruit, flat or slightly concave.

‡ *Limb* of *perianth* wanting or truncate, or very imperfect, and its lobes transmuted into stamens. *Stamens* 15-30.

*T. TOMENTOSA*, Roxb.

Ava.

Tomentose-pubescent, umbels solitary in the axils of the leaves.

*T. LAURIFOLIA*, *Jacq. E.T.*

Ong-tong (*generic*, Kurz).

Almost glabrous or slightly pubescent. Umbels clustered or in short racemes.

‡‡ *Perianth-limb* developed, 6-cleft. *Stamens* 9-12.

× *Leaves* coriaceous.

+ *Umbels* peduncled.

*T. RANGOONENSIS*, Meissn.

Pegu.

Leaves oblong-lanceolate, very acuminate, glabrous.

++ *Umbels* sessile, or the peduncles very much reduced.

*T. LONGIFOLIA*, Nees.

Upper Tenasserim.

Leaves oblong or oval, acute, densely fulvous-pubescent beneath.

*T. GRANDIS*, Wall. *E.T.* All over Pegu. Martaban and Upper Tenasserim.

Leaves broadly oval, rounded, or subretuse at apex, puberulous beneath. Wood yellow, with a beautiful lustre. A fine fancy wood (Kurz).

×× *Leaves* chartaceous or membranous.

‡ *Branchlets* tomentose, umbels sessile or fascicled.

*T. MONOPETALA*, Roxb.

All over Burma.

Leaves oval, blunt, petiole  $\frac{1}{2}$  to 1 inch long. *Stamens* 9-12. Berries ovoid, black, the size of a small cherry.

*T. AMARA*, N.E. *E.T.*

The Pegu Range. Tenasserim and the Andamans.

Leaves alternate, lanceolate acute, petiole less than  $\frac{1}{2}$  an inch.

var. *T. Andamania*, Kz.

Andamans and Car Nicobar.

Leaves much larger. Umbels numerous, with thin stalks up to 4 lines long.

*T. LANCEIFOLIA*, Roxb. *S.*

Tenasserim.

Like the last, but a shrub, with opposite leaves.

T. GLAUCA, Wall. *E.T.* Tree forests of Ava and Chittagong.  
Leaves lanceolate to linear appressed silky-puberulous beneath.

++ *Branchlets glabrous, or nearly so. Leaves glabrous.*

T. LEIANTHA, Kz. *E.T.* Tree forests of the Andamans.

Leaves obovate, long-petioled. Umbels sessile.

T. POLYANTHA, Wall. Khakyen Hills.

Leaves lanceolate, glaucous beneath. Umbels peduncled.

\*\* *Perianth-tube enlarged to a large fleshy cup, tapering on a thick stalk.*

† *Umbel solitary, clustered, or forming a reduced corymb in the axils of the leaves.*

× *Leaves not glaucous beneath.*

T. MARTABANICA, Kz. *E.T.* Martaban and Tenasserim at 4000 to 6000 feet.

Leaves shortly tomentose beneath and prominently net-veined.

× × *Leaves more or less glaucous beneath.*

T. NUCULANEA, Kz. *E.S.* Tree forests of Upper Tenasserim.

Branchlets tomentose. Leaves puberulous beneath, thick, chartaceous.

T. MYRISTICIFOLIA, Wall. *E.T.* Lower Pegu and Tenasserim.

Quite glabrous, leaves rigidly coriaceous.

var. *a myristicifolia*. Cup-stalk variable, not exceeding  $\frac{1}{2}$  an inch in length.

var. *β longipes*. Cup-stalk 1 to  $1\frac{1}{2}$  inch in length. Fruit twice the size of the last.

†† *Umbels dispersed in axillary racemes.*

† *Inflorescences and all parts quite glabrous.*

T. NITIDA, Roxb. *E.T.* Tree forests of the Southern Pegu Range and Martaban.

Leaves uniformly green. Branchlets sharply angular.

†† *Inflorescence puberulous to tomentose.*

T. PANAMONJA, Nees. *E.T.* Tenasserim.

Leaves slightly glaucous beneath, shortly acuminate, racemes elongate, tawny-tomentose. Fruiting-cup entire, berry oblong.

T. ALBICANS, Kz. *E.T.* Pegu Range, Eastern Slopes, along streams.

Leaves whitish or glaucous beneath, and strongly net-veined, shortly acuminate, racemes shortened, tawny puberulous. Fruiting-cup lobed, berry oblong.

T. SEMECARPIFOLIA, Wall. *E.T.* Tree forests of Martaban, rare in the Eastern Slopes of the Pegu Range.

Leaves not glaucous beneath, blunt or nearly so, racemes short and tomentose. Fruiting-cup entire, berry obovate-globular.

In J.A.S.B. ii. 1873, p. 102, Kurz describes *Tetranthera* (*Cyclicodaphne*) *calophylla*, remarking that it may perhaps be a handsome variety of *Cyclicodaphne Wightiana*, but neither names reappear in his later list.

× × *Anthems 2-celled.*

LINDERA, Thunbergh.

Flowers dioecious. *Perianth* 4-6-cleft, deciduous. *Fertile stamens* 6-9, the inner 2-6 bearing glands at the base. *Fruit* resting on a small entire or 6-cleft disk. Mostly aromatic trees.

\* *Leaves chartaceous or almost coriaceous, elegantly and prominently net-veined, the reticulations narrow.*

L. (APERULA) ASSAMICA, Meissn. Nat-toung in Martaban.

Peduncles slightly pubescent, nearly an inch long, perianth pubescent.

*L. NERVOSA*, Kz. Tree forests of Arakan and Upper Tenasserim.  
Peduncles quite glabrous, 3-4 lines long, perianth glabrous.

\*\* *Leaves membranous, laxly reticulate, all parts glabrous.*

*L. (APERULA) NEESIANA*, Bl. Martaban and Upper Tenasserim.  
All parts highly aromatic. Yields excellent sassafras.

× *Anthers 4-celled.*

DODECAGENIA, *Nees von Esenbeck.*

*Flowers* hermaphrodite, solitary in the imbricately-sealed leaf-buds. *Calyx* 6-8-parted. *Perianth* 6-9-cleft. *Fertile stamens* 12-15, all introrse, the outer 6-9 glandless, the inner 6 furnished near the base of the filament with a pair of capitate stalked glands.

*L. GRANDIFLORA*, N.E. *E.T.* Khakyen Hills.

Leaves oblong to linear-lanceolate, scattered, penninerved, 2-3½ inches long, coriaceous, glabrous.

LITSEA, *Jussieu.*

*Flowers* dioecious, several together. *Perianth* 4-6-cleft, the segments deciduous. *Stamens* 4-6 or 9, the innermost ones 2-glanded at base. *Berry* seated on the more or less thickened pedicel or perianth-base.

\* *Leaves whorled, by 3-5, penninerved from the base, the female flowers in small clustered umbels, the male simply clustered.*

*L. (ACTINODAPHNE) CONCOLOR*, N.E. Tenasserim.

Branchlets tomentose. Leaves 4 inches long.

*L. (ACTINODAPHNE) ANGUSTIFOLIA*, Nees. Tree forests of the Pegu Range and Tenasserim.

Branchlets and shoots densely tawny-villous. Leaves 6-8 inches long, soon turning glabrous.

*L. MACROPHYLLA*, Bl. Tenasserim.

Like the last, but leaves 1-1½ feet long, and when adult pubescent beneath.

\*\* *Leaves scattered, alternate, triplinerved above the base, and penninerved further up.*

*L. LEIOPHYLLA*, Kz. *E.T.* Tenasserim.

Leaves quite glabrous. Flowers in short tawny racemes.

*L. FOLIOSA*, N.E. *E.T.* Chittagong and Hills East of Young-ngoo from 3000 to 7000 feet. Kamorta and Nankowry.

Leaves quite glabrous, glaucous beneath. Flowers in sessile involucred umbels.

× × *Anthers 4-celled.*

DAPHNIDIUM, *Nees von Esenbeck.*

*Flowers* dioecious, several together. *Perianth* 6-9-cleft, with the segments deciduous. *Stamens* 9 (rarely more), the 3 innermost ones 2-glanded at the base. *Berry* seated on the entire or 6-lobed perianth-base of the thickened pedicel.

× *Leaves triplinerved.*

*D. PULCHERRIMUM*, Nees. *E.T.* Hills East of Young-ngoo up to 7000 feet.

Leaves glabrous, glaucous beneath.

*D. CAUDATUM*, Nees. *E.T.* Martaban and Tenasserim over 4000 feet.

Leaves densely and shortly tawny-pubescent beneath.

× × *Leaves penninerved.*

*D. ARGENTEUM*, Kz.

Eastern slopes of the Pegu Range and Martaban.

Leaves beautifully appressed silvery-pubescent beneath. Flowers in very short racemes.

\*\* *Anthers opening laterally, the valves separating laterally, from the inner to the outer edge.*

*HERNANDIA*, Blume.

*Flowers* monœcious, the females with an involucre inclosing the fruit. *Perianth-segments* in two series, valvate in bud, the rows in the males of 3-4, in the females 4-5 segments. *Stamens* as many as the outer perianth-segments and opposite to them, basally 2- (rarely 1-)glandular. *Anthers* 2-celled, introrse.

*H. PELTATA*, Meissn. *E.T.*

Coasts of the Andamans. Kamorta.

Katchall and Car Nicobar.

All parts glabrous. Leaves peltate, minute at the base on 3-5 inch long petiole-acute, palmately nerved, 6-8 inches long by 4½-6 broad. Flowers white, conspicuous. Wood very light, and so readily takes fire that it might be used for tinder (Kurz).

Sub-order *CASSYTHEE*.

Parasitical herbs, with the habit of *Cuscuta*, with filiform twining stem adhering by suckers to living plants.

*CASSYTHA*, Linnæus.

*Flowers* hermaphrodite. *Perianth* ovoid or tubular, with 3 outer equal lobes, and 3 inner minute ones. *Stamens* 9, the 3 inner ones with 2 glands at the base. *Anthers* 2-celled, those of the inner stamens turned outwards. *Staminodes* 3, small. *Fruit* inclosed in the succulent tube of the perianth. *Leaves* reduced to minute scales. *Flowers* sessile in axillary spikes.

*C. FILIFORMIS*, L.

Kamorta. Katchall. Car Nicobar (K.).

All the species of this Order are more or less aromatic and fragrant, and some are commercially important, as *Cinnamomum Zeylanicum*, which yields the best sort of Cinnamon, and *Camphora officinarum*, from which much of the Camphor of commerce is prepared. Camphor, however, which is a concrete volatile oil, exists in the wood and roots of several other species of this and other Orders, and is prepared by distilling the wood with water, after which it is refined by a second distillation, which, from the volatile nature of the drug, is easily effected with a very simple apparatus. *Cinnamomum Zeylanicum* is cultivated for its aromatic bark, but several allied species yield a similar, though inferior article, which is used to adulterate the genuine, as *C. cassia*, *C. rubrum*, *C. aromaticum*, *C. nitidum*, *C. tamala*, and others, the two last yielding also 'Tej pat' of the Indian bazaars, or the *folia Malabathri* of authors, so much used in cookery.

*C. parthenoxylon* has a fragrant odour of sassafras, and is called by the Karens, on that account, says Dr. Mason, 'The tree galanga,' 'galanga' being the root of a Zinziberaceous plant, *Kampferia galanga*.

In addition to Camphor, a few Burmese species produce Benzoin. The Avocado, or Alligator Pear (*Persea gratissima*), belongs to this Order, which yields no good fruits.

Many trees of this Order yield useful and even valuable timber, as the 'Green-heart' of Demerara (*Nectandra Rodiei*); 'Madeira Mahogany' (*Persea indica*); The 'fœtid Til' of the Canaries (*Oreodaphne fœtens*); The 'Sweet-wood' of Jamaica (*Oreodaphne exaltata*), and the 'Stink-wood' of South Africa (*Oreodaphne bullata*). The 'Green-heart' yields also a powerful alkaloid, Bebeerine, the active ingredient of Warburg's Drops, and second only to Quinine as a vegetable antiperiodic. The woods of our Burmese *Laurineæ* are not well known, but some seem adapted for light carpentry and indoor work. One such is specified by Dr. Mason as producing a hard wood named in Tavoy 'Kyaizai,' whilst another is recommended for occasional,

or, I may say, limited, use for a singular reason, thus explained by Dr. Mason: "A solitary post of a species of *Laurus* is often found in Tavoy houses. There was one in mine, which the white ants selected in preference to others, and as long as left undisturbed they never wandered from home. It may be an advantage to have one post of a house of this timber, but one is quite sufficient." On the other hand, this Order embraces the Bornean Iron wood (*Eusideroxylon Ziegeneri*), probably the heaviest and hardest wood known, and one which alike defies Tereido and Termite. The Laurel (*Laurus nobilis*) was once held in high esteem, and victors<sup>1</sup> were crowned with a wreath of its leaves, but these have now, alas! descended to the mean office of flavouring dishes, and serving as a lining wherein Turkey figs are packed.

### Order MYRISTICACEÆ.

*Flowers* regular, dioecious. *Perianth* deciduous, 3- (rarely 2- or 4-)lobed, the lobes valvate in bud. *Male flowers*: *Stamens* united in a central column. *Anthers* 3-6 or more, adnate to the column at the apex or in a ring immediately below the column, 2-celled, the cells parallel, opening longitudinally. *Female flowers*: *Ovary* free within the perianth, with a single erect anatropous ovule. *Stigma* sessile or nearly so, capitate or depressed. *Fruit* thick- or fleshy-coriaceous, opening tardily in 2 valves. *Seed* erect, sessile, more or less covered with an entire or more usually lobed or jagged coloured arillus. *Albumen* ruminant. *Embryo* very small, basilar, with divaricate cotyledons. *Trees*, rarely shrubs. *Leaves* alternate, simple, usually dotted and penninerved. *Stipules* none. *Flowers* small, the males more numerous than the females, in axillary or supra-axillary racemes or panicles. *Bracts* minute or none.

An Order consisting of a single genus, of which 5 species occur in Burma. The nutmeg and its envelope *mace* (*Myristica fragrans*) is the produce of this family. Aromatic qualities prevail, while the bark abounds in an acrid juice, which is viscid, and causes a red stain.

#### MYRISTICA, *Linnaeus*.

(Characters, those of the Order.)

\* *Anthers* linear, adnate to the whole back of the cylindrical or spindle-shaped staminal column. *Flowers* in simple racemes. *Arillus* lacinate and lobed.

\* *M. FRAGRANS*.

The *Nutmeg* is indigenous in the Moluccas, but might perhaps thrive in Southern Tenasserim, and has been successfully grown in Mergui.

*M. ELLIPTICA*, Wall. *E.T.*

Tree forests of South Andaman.

Fruits 2 inches long or more, glabrous. Flowers rusty-scurfy, on pedicels 1-2 lines long.

\*\* *Staminal column* pear-shaped or globular, covered all over, or only along the depressed apex, with anthers. *Perianth* globular, or nearly so, 2-3-cleft. *Flowers* minute, in compound panicles. *Arillus* nearly complete and entire.

*M. IRYA*, Gaertn. *E.T.*

Tree forests of Tenasserim and the Andamans.

Fruits globular, the size of a cherry. Inflorescence rusty-scurfy, tomentose.

*M. AMYGDALINA*, Wall. *E.T.*

Tree forests of the southern part of the Pegu Range, Tenasserim, and the Andamans.

Fruits oblong, the size of a prune. Inflorescence glabrous or nearly so.

\*\*\* *Staminal column* club-shaped, at the apex dilated into a disk, round which the anthers are attached. *Female perianth* globular; male 1, turbinate, often lengthened into a stalk. *Flowers* clustered. *Arillus* lacinate or lobed.

<sup>1</sup> For much other curious information, see *Mythologie des Plantes*, vol. ii. p. 188.

M. LONGIFOLIA, Wall. E.T.

Tree forests of Chittagong. Pegu  
and Tenasserim.

Za-deip-lpyu (Kurzs).

Leaves large, 1-1½ feet long. Petiole thick. Fruits 2 inches long.

M. CORTICOSA, H. f. et Th.

Tree forests of Chittagong, Pegu, Tenasserim,  
the Andamans, and Kamorta.

Leaves 7-9 inches long. Petiole ½ an inch long, slender. Fruit an inch long, glabrescent.

#### Order MONIMIACEÆ.

*Flowers* apetalous, usually monœcious, solitary, geminate, or in cymes, bracteoles, caducous. *Sepals* 4, decussate, or 5-8, many-seriate, imbricate in bud. *Stamens* usually indefinite, in male flowers lining the wall of the capsule, or in hermaphrodites occupying the throat only, free. *Anthers* usually adnate to, and shorter than the connective. *Carpels* numerous, 1-celled, free, sessile on the surface of the receptacular capsule (rarely sunk in its walls).

Much diversity of opinion has existed as to the natural relations of this Order, but Hooker, *fil.*, et Thomson, place it next to *Myristicaceæ*, from its aromatic properties, pellucid-punctate leaves, diclinism, solitary anatropous ovule, and divaricate cotyledons.

#### MONIMIEÆ.

*Perianth* fig-like, or sub-globose, at length dehiscent, ovule pendulous.

KIBARA, Endlicher.

K. CORIACEA, H. f. et Th.

Great Nicobar (K.).

#### CHENOPODIALES.

*Flowers* usually hermaphrodite. *Perianth* green or coloured, usually regular, tube very short or none. *Segments* imbricate in bud. *Ovary* superior (except in *Cynocranberæ*) or 1, rarely several carpels. *Ovules* solitary (2 or more in some *Amarantaceæ* and *Paronychieæ*), basal. *Embryo* usually curved. Herbs or shrubs.

#### Order BASILLEÆ.

*Sepals* 5, 1-2-seriate, green or coloured. *Stamens* 5, perigynous, opposite the sepals. *Anthers* 2-celled. *Ovary* 1-celled. *Stigmas* usually 2 or 3-lobed. *Ovule* 1, basal. *Albumen* mealy. Fleshy herbs, often trailing.

#### BASILLA, Linnæus.

*Bracteoles* adhering to the perianth, and united in a 2-lobed external calyx. *Perianth* ovoid, shortly 5-lobed. *Style* single, with 3 oblong stigmatic lobes. *Fruit* inclosed in the globular succulent perianth and bracts. *Seed* vertical. *Embryo* spiral, with little or no albumen. *Leaves* alternate, flat, but succulent. *Flowers* sessile, in simple or branched spikes. *Stem* twining.

\* B. ALBA, L.

Cultivated.

Gyen-baing.

This species (with its var. *rubra*) and *B. cordifolia* are much esteemed as vegetables in India.

#### Order AMARANTACEÆ.

*Flowers* small, hermaphrodite, or dichinous, sessile, or in heads or spikes. *Bracts* usually 3, persistent, the lowest largest, rarely 2, or leafy. *Calyx* usually of 3-5. *Sepals* distinct, or sometimes basally coherent. *Corolla* none. *Stamens* hypogynous, 5 fertile (rarely fewer). *Anthers* introrse, 1-2-celled, dehiscing longitudinally. *Ovary* free, 1-carpelled, 1-celled. *Stigma* capitate, 2-lobed or 2-3-fid. *Ovules* 1 or more, basal or singly suspended from separate erect funicles.

GOMPHRENIEÆ.

*Anthers* 1-celled. *Ovary* 1-ovuled.

ALTERNANTHERA, Mart.

*Perianth* of 5 nearly equal scarious segments, not enveloped in wool. *Stamens* 5, or sometimes fewer, very shortly united at the base. *Anthers* 1-celled. *Ovule* solitary. *Style* short, or scarcely any, with a capitate stigma. *Utricle* usually flattened, ovate or obcordate, indehiscent. *Leaves* opposite. *Flowers* in sessile axillary or terminal clusters or heads. Herbs.

*A. sessilis*, R. Br.

*Telouthera polygonoides*, Seem.

GOMPHRENA, Linnaeus.

\**G. gloiosa*, L.

Cultivated.

Ma-hnyo-ben.

ACHYRANTHIEÆ.

*Anthers* 2-celled. *Ovary* 1-ovuled.

CENTROSTACHYS, Wallich.

*C. aquatica*, Wall.

DIGERA, Forskahl.

*D. muricata*, Mart.

AMARANTUS, Linnaeus.

*Flowers* polygamous. *Perianth* of 5 equal segments, thin, but less scarious than usual in this Order. *Stamens* 5, or rarely 3, free and slightly perigynous. *Anthers* 2-celled. *Ovary* solitary. *Style* divided to the base into 2 or 3 stigmatic lobes. *Utricle* opening transversely or indehiscent. *Embryo* coiled round the albumen. *Leaves* alternate. *Flowers* small, green or reddish, clustered in axillary or terminal spikes or panicles. *Bracts* small.

\**A. tristis*, L. (M.).

Cultivated.

\**A. oleraceus*, L. (M.).

Cultivated.

Nipal spinach.

*A. polygamus*, L. (M.).

var. *atropurpureus*.

Hen-ka-nweh.

*A. spinosus*, L. (M.).

Hen-ka-nweh.

*A. gangeticus* (K.).

Katchall.

*A. viridis*, L. (K.).

Katchall and Kamorta.

A common weed.

All the species of *Amarantus* are edible, their leaves, especially when young, forming a capital spinach, particularly *A. oleraceus*, *A. polygamus*, and *A. tristis*.

ÆRVA, Forskahl.

Æ. *monsonie*, Mart. (M.).

Æ. *scandens*, Mart. (M.).

Æ. *brachlata*, Mart. (M.).

\*Æ. *javanica*, Juss. (M.).

Cultivated.

Æ. *lanata*, Juss. (M.).

Burma. Katchall (K.).

ACHYRANTHES, *Linnaeus*.

*Perianth* usually glabrous, of 5 slightly unequal segments, hardened after flowering, with 1 subulate, almost spinous bracteole on each side. *Stamens* 5, united in a cup at the base, with as many small scales between them. *Anthers* 2-celled. *Ovule* solitary. *Style* simple, with a capitate stigma. *Embryo* coiled round the albumen. *Leaves* opposite. *Flowers* green, or rarely scarious, reflexed, in terminal spikes or rarely heads.

A. ASPERA, L. (M.).

Burma. The Nicobars (K.).

Apang (*fide* Balfour).CYATHULA, *Loureiro*.

Habit, inflorescence and flowers of *Achyranthes*, except that on each pedicel, besides 1 or sometimes 2 perfect perianths, there is on each side a cluster of stiff hooked bristles, slightly dilated at the base, consisting of bracts and abortive perianth segments.

C. PROSTRATA, Blume (K.).

Great Nicobar.

## CELOSIEÆ.

*Anthers* 2-celled. *Ovary* many-ovuled.DEERINGIA, *Brown*.

D. INDICA, Spreng. (M.).

CELOSIA, *Linnaeus*.

*Perianth* of 5 nearly equal segments. *Stamens* 5, united at the base. *Anthers* 2-celled. *Ovary* with several ovules. *Style* simple, with a capitate, or minutely 2-lobed stigma. *Capsule* opening transversely. *Embryo* coiled round the albumen. *Leaves* alternate. *Flowers* white or coloured in terminal spikes. Herbs.

C. ARGENTEA, L. (M.).

White Cockseomb.

C. CRISTATA, L. (M.).

Kyet-yet. Kyet-mouk. Crested Cockseomb.

A species of *Celosia*, allied to *C. cernua*, Roxb., is said by Mason to be cultivated by the Karens, and to be the most elegant member of its tribe. It bears a long pendulous drooping panicle, and is probably a variety of Roxburgh's species.

## Order POLYGONEÆ.

*Flowers* diœcious or dielinous. *Perianth* herbaceous or petaloid. *Stamens* perigynous. *Ovary* 1-celled and 1-ovuled. *Ovule* erect, orthotropous. *Fruit* an achene. *Albumen* farinaceous. *Leaves* alternate, with an intrapetiolar stipule. This Order embraces a few useful plants, as the Rhubarb<sup>1</sup> (*Rheum rhaponticum* and *undulatum*), and Buckwheat (*Fagopyrum esculentum*), so valuable as a bread stuff on the poorer soils of Northern Europe. *Polygonum tinctorium* is cultivated in China for its blue dye, which is extracted from the leaves like indigo. The leaves of many species of the Order are edible, and rich in Oxalic, Citric, and Malic acids.

## POLYGONIÆ.

*Involucre* none. *Stipules* ochraceæ.POLYGONUM, *Linnaeus*.

*Perianth* of 5, rarely fewer, segments, all equal, or the 2 or 3 outer ones enlarged. *Stamens* 8, or sometimes fewer in the same species. *Styles* 3 or 2, sometimes united

<sup>1</sup> 'Rhubarb' is derived from *Rha barbarum*, or Seythian, as distinguished by the ancients from *Rha Ponticum*, or Thracian Rhubarb.

at the base. *Stigmas* entire. *Nut* triangular or flattened, inclosed in the persistent perianth. *Flowers* small, pale green or red with white edges, clustered, or rarely solitary in the axils of the upper leaves, or in little clusters, within a sheathing bract, and collected in terminal spikes, heads or panicles.

*P. FLACIDUM*, Roxb. (K.).

Marsh behind Katjui, Katchall.

*P. TOMENTOSUM*, Willd. (M.).

All tropical Asia.

*P. PLEBEIUM*, Br.

*P. herniarioides*, De Can.

*P. Miquelianum*, *effusum*, *Roxburghii*, *ilicebroides*, *Cliffortioides*, *Perrottetii* and *ciliatum*, Meisn. (Bentham).

\* *Flowers* in terminal spikes. *Stems* erect, ascending or climbing.

† *Stipules* sheathing, wholly scarious, truncate or ciliate.

*P. BARBATUM*, L. (M.).

*Stems* and peduncles glabrous. Sheathing stipules hairy, with long bristles at the top. *Styles* 2.

*P. GLABRUM*, Willd. (M.).

*Spike* slender, continuous. *Perianth* not dotted. *Stipules* not ciliate. *Styles* 2.

†† *Stipules* green and spreading, at least at the top.

*P. PERFOLIATUM*, L. (P.).

A glabrous, prickly climber. *Stipules* spreading from the base. *Leaves* triangular. *Styles* 2.

\*\* *Flowers* in little heads, in dichotomous panicles. *Stems* erect or climbing.

*P. CHINENSE*, L.

A weak half-climbing herb. *Styles* 3.

#### Order PHYTOLACCEÆ.

*Perianth* green or petaloid, tube short or none. *Stamens* hypogynous or nearly so. *Ovary* of several free or connate 1-ovuled carpels. *Embryo* usually curved or coiled. *Albumen* floury or none. *Herbs*, shrubs or trees. *Leaves* usually alternate, stipulate or not.

*GISEKIA*, *Linnaus*.

*G. PHARNACEOIDES*, L. (M.).

#### Order NYCTAGINEÆ.

*Perianth* simple, inferior, the lower portion persistent, and inclosing the ovary and fruit, the upper portion variously shaped with 5, rarely 4, angles, folds, teeth or lobes, deciduous or withering. *Stamens* 4 or 5, or fewer, or rarely more (up to 20), inserted on, or united at the base with a narrow or cup-shaped disk, more or less adnate to the stalk of the ovary. *Filaments* slender, often exerted. *Anthers* 2-celled, the cell attached back to back, and opening longitudinally round the outer margin. *Ovary* shortly stalked, 1-celled, with a solitary erect ovule. *Style* terminal, simple. *Fruit* 1-seeded, inclosed in the persistent tough or hardened base of the pericarp-like perianth, the real pericarp thin and membranous, more or less adherent to the thin testa of the seed. *Embryo* curved transversely, folded, or longitudinally convolute around or within a mealy albumen. *Radicle* inferior. *Herbs*, shrubs or trees, with often thickened-jointed branches. *Leaves* usually opposite, rarely alternate, simple. *Flowers* solitary, or in clusters or umbels, the bracts sometimes forming a coloured involucre, or small and deciduous.

## BOERHAAVIEE.

PISONIA, *Plumier*.

*Perianth* in hermaphrodite flowers contracted above the ovary, in the males, bell-shaped, in the females ovoid or cylindrical, the limb in all 5-angled or 5-toothed. *Stamens* 6-8, rarely 10, longer than the perianth, rudimentary in the females. *Seed* solitary. *Albumen* scanty. The roots possess emetic and purgative properties.

\* *Fruits with a double or simple row of prickles along the 5 corners.*

P. ACULEATA, L. S.S.

Beach jungles of Tenasserim and the Andamans.

Leaves 1-3 inches long, bluntish; prickles of fruit in a double row, short, glandular-headed.

P. ALBA, Span. E.T.

Beach forests of the Andamans.

Leaves 7-10 inches long. Prickles in a single row, short, and irregular, acute.

\*\* *Fruits unarmed, with a broad, blackish sticky line along the 5 bluntish corners.*

P. UMBELLIFERA, Seem. E.T.

Tree forests of the Andaman coast.

Flowers diceious, small. Fruit glabrous.

BOERHAAVIA, *Linnaeus*.

B. GLUTINOSA, Vhl.

## MIRABILIEE.

MIRABILIS, *Linnaeus*.

\* M. JALAPA, L.

This is a native of Tropical America, but Dr. Mason remarks: "The red, white and yellow varieties of this pretty annual are all cultivated by the Burmese, as well as by Europeans, who often call it the Jalap plant. The true Jalap is, however, quite a different plant, a species of *Ipomœa*." The root was once supposed to be the source of Jalap, whence its name, and possesses an acrid and nauseous flavour, but is worthless and uncertain in its action. It is easily propagated and soon becomes a weed in a garden.

## Division II. MONOPETALOUS.

*Flowers furnished with both Sepals and Petals, the latter connate.*

Exceptionally *Polypetalous* species occur in *Primulaceæ*, *Oleaceæ*, *Plantagineæ*, *Lobeliaceæ*, *Ericaceæ*, *Monotrupeæ*, *Pyrolaceæ*, *Plumbagineæ*, *Myrsineæ*, *Sapotææ*, *Cyrilleæ*, *Styraceæ*, *Ebenaceæ* and *Jasminææ*, and *Apetalous* species in the three first-named Orders.

## Series I. HYPOGYNOUS or PERIGYNOUS.

## OVARY SUPERIOR.

Exceptions: Inferior in *Vaccinieæ* and some *Primulaceæ*, *Myrsineæ*, *Styraceæ* and *Gesneraceæ*.

\* *Flowers very irregular, rarely regular.*

## LAMIALES.

*Corolla* usually 2-lipped, rarely sub-regular or quite regular, hypogynous. *Stamens* fewer than the corolla-lobes, rarely as many, unequal, generally quadridynamous or two. *Ovary* 2- or 4-celled. *Style* simple. *Ovules* solitary in the cells, rarely 2 or more, in some *Myoporineæ* and *Verbenaceæ*. Fruit an indehiscent 2- or 4-celled drupe or of 2 or 4 nucules. *Leaves* exstipulate.

## Order LABIATÆ.

*Flowers* irregular, very rarely almost regular. *Calyx* persistent, 2-lipped or 5-toothed. *Corolla* more or less 2-lipped or rarely nearly equally 4-5-lobed, imbricate in the bud. *Stamens* 2 or 4, in pairs, inserted in the tube of the corolla, and alternating with its lower lobes. *Anthors* either 2-celled or 1-celled by abortion or by amalgamation of the 2 cells. *Ovary* 4-lobed and celled, with a solitary erect ovule in each cell. *Style* simple, 2-lobed, arising from the centre of the ovary. *Fruit* of 4 small 1-seeded nuts inclosed in the calyx. *Albumen* none. *Embryo* straight (curved in *Scutellaria*), the radicle inferior. *Cotyledons* thick. Herbs or shrubs, very rarely small trees, glandular-dotted and aromatic, the branches usually 4-cornered. *Leaves* opposite or whorled, simple or divided. *Stipules* none. *Flowers* in clusters or half-whorls or solitary, forming often racemes, cymes or panicles.

This Order is rich in bitter aromatic or astringent herbs, especially prized as condiments or carminatives, as: Peppermint (*Mentha piperata*), Spearmint (*M. viridis*), Pennyroyal (*M. pulegium*), Thyme (*Thymus vulgaris*), Savory (*Satureia hortensis* and *montana*), Balm (*Melissa officinalis*), Basil Thyme (*Calamintha acinos*), Lemon Thyme (*Thymus citriodorus*), Sweet Basil (*Ocymum Basilicum*), Bengal Sage (*Meriandra Bengalensis*), Sage (*Salvia grandiflora* and *officinalis*), Marjoram (*Origanum Marjorana*), Hyssop (*Hyssopus officinalis*). Among scents and cosmetics included in this Order may be mentioned Rosemary (*Rosemarinus officinalis*), Lavender (*Lavendula vera* and *spica*), and Patchouly (*Pogostemon intermedius*), the first of which enters into the composition of Hungary water and Eau de Cologne. Ground ivy (*Glechoma hederacea*) is an antiscorbutic, and Horehound (*Marrubium vulgare*) still maintains its reputation for relieving coughs in the form of the sweetmeat called "Horehound rock."

## AJUGOIDIÆ.

*Nucules rugose, basally sub-connate. Stamens parallel, ascending.*

## CYMARIA, Benth.

C. DICHOTOMA, Benth. (M.).

C. ELONGATA, Benth. (M.).

## AJUGA, Linnæus.

A. MACROSPERMA, L. (M.).

## TEUCRIUM, Linnæus.

T. STOLONIFERUM, Buch. (M.).

T. QUADRIFARIUM (M.).

## PRASIÆ.

*Stamens 4, parallel, and ascending under the upper lip. Nucules fleshy, sub-connate basally.*

## GOMPHOSTEMMA, Wallich.

G. STROBILINUM, Wall. (M.).

G. VIRIDE, Wall. (M.).

G. OBLONGUM, Wall. (M.).

G. LUCIDUM, Wall. (M.).

G. CRINITUM, Wall. (M.).

\* G. MELISSIFOLIUM, Wall. (M.).

## COLQUHOUNIA, Wallich.

*Calyx* tubular, bell-shaped, 10-nerved, sub-equally 5-dentate. *Corolla* 2-lipped, the upper erect, entire, the lower almost spreading, and 3-lobed. *Stamens* 4, ascending, didynamous, the lower ones shorter. *Anthors* 2-celled. *Style* unequally

bifid, the lobes subulate. *Flowers* crimson or dull purple, in lax axillary half-whorls, or rarely crowded into a terminal spike. *Bracts* minute. Scandent or straggling shrubs, often tomentose.

*C. ELEGANS*, Wall.

Khakyen Hills and Martaban at 4000 to 5000 feet.

All soft parts pilose-pubescent. Flowers orange-coloured, crimson-dotted, very shortly pedicelled. Corolla curved, half an inch long, pubescent outside.

*COLEBROOKIA*, Sm.

*Stamens* straight or diverging. *Corolla-tube* hardly longer than the calyx, the limb subequally quadri- or quinque-fid. *Calyx* bell-shaped, 5-parted, feathery, turning pappose in fruit, adhering to the achenes. *Anthers* 4, distant, almost sessile, parallelly 2-celled. *Disk* glandless. *Style* deeply 2-cleft, the lobes subulate.

*C. OPPOSITIFOLIA*, Sm.

Khakyen Hills. Tenasserim.

Leaves opposite, erennate, thick-membranous. Flowers minute, with a pair of floral leaves at the base of the panicle. Achenes oblong, subtriquetrous, villous at the apex.

*STACHYDIEÆ.*

*Stamens of Prasiceæ. Nucules quite free, erect.*

*LEONOTIS*, R. Brown.

*L. LEONURUS*, R. Br. (M.).

*LEUCAS*, Bentham.

*L. (ANISOMELES) OVATA*, R. Br. (M.).

*L. (ANISOMELES) MALABARICA*, R. Br. (M.).

*L. TERES*, Benth. (M.).

*L. STRIGOSA*, Benth. (M.).

*L. MOLLISSIMA*, Wall.

*L. pilosa*, Benth. (M.).

*L. FLACUIDA*, Brown (M.).

*L. MARTINICENSIS*, Brown (M.).

*L. ZEYLANICA*, Brown (M.).

*L. aspera*, Spr.

*L. hyssopifolia*, Benth.

*L. dimidiata*, Spr.

*L. linifolia*, Spr.

Thwaites says this is a most variable species, and is eaten in curries in some places.

*L. NUTANS*, Spr. (M.).

*L. (ANISOMELES) CAUDICANS*, Bentham (M.).

*SCUTELLARIA*, Linnæus.

*S. INCURVA*, Wall. (M.).

*S. DISCOLOR*, Colebrooke (M.).

*S. RIVULARIS* (P.).

*MONARDIEÆ.*

*Stamens* 2, straight or ascending. *Anther-cells* linear, oblong, solitary or separated by a long connective.

*SALVIA*, Linnæus.

*S. OFFICINALES*, L. (M.).

Garden sage.

*S. SPLENDENS*, Sello. (M.).

*SATUREIEÆ.*

*Stamens* remote, straight, spreading, or connivent under the upper lip, 4 or 2, with *Anther-cells* contiguous. *Corolla-lobes* flat.

MENTHA, *Linnaeus*.

\* M. SYLVESTRIS, L. (M.).

Bu-di-na. Mint.

PERILLA, *Linnaeus*.

P. SCYMOIDES, L. (M.).

ELSHOLTZIA, *Willdenow*.

E. BLANDA, Willd. (M.).

E. INCISA, Benth. (M.).

DYSOPHYLLA, *Blume*.

D. AURICULARIA, Bl. (M.).

Burma. Kamorta (K.).

D. QUADRIFOLIA, Benth. (M.).

D. VERTICELLATA (P.).

POGOSTEMON, *Desfontaines*.

P. PANICULATUS, Benth. (M.).

A species of this genus, *P. intermedius*, Benth., yields an essential oil known as 'Patchouli.' The leaves are used for flavouring tobacco, and scenting real and imitation Kashmir shawls.

## OCIMOIDIEÆ.

*Stamens declinate.*ANISOCHILUS, *Wallich*.

A. CARNOSUS, Wall. (M.).

A. PALLIDUS, Wall. (M.).

PLECTRANTHUS, *L'Heritier*.

P. COETSA, Don. (M.).

*P. menthoides*, Benth.*P. Macraei*, Benth.

P. TERNIFOLIUS, Don. (M.).

P. AROMATICUS, Roxb. (M.).

Pyn-bu.

The tuberous roots of *P. tuberosus*, Blume, are cultivated in Ceylon as a vegetable.

ORTHOSIPHON, *Bentham*.

O. RUBICUNDUS, Benth. (M.).

O. STRAMINEUS, Benth. (M.).

\* O. ROSEUS, Benth. (M.).

\* O. INCURVUS, Benth. (M.).

MOSCHOSMA, *Reich*.

M. POLYSTACHYUM, Benth. (M.).

ACROCEPHALUS, *Bentham*.

A. CAPITATUS, Benth. (M.).

GENIOSPORUM, *Wallich*.

G. STROBILIFERUM, Benth. (M.).

OCIMUM, *Linnaeus*.

O. CANUM, L. (M.).

Burma.

O. BASILICUM, L. (M.).

Burma.

O. VILLOSUM, Roxb. (M.).

Burma.

Pyn-zeing or Hlung.

O. SANCTUM, L. (M.).

Burma. Kamorta. Katchall and Nankowry.

Pyn-zeing-zi. Holy Basil. Tulsi, of the Hindus.

This plant is extremely venerated by Hindus, as sacred to Vishnu, and the most binding oath is that on Ganges water and the Tulsi leaf. For example, in the tale of the 'Enchanted Fruit,' by Sir W. Jones, Drapuli, when compelled to confess her indiscretions, appeases the suspicions of her five husbands by swearing by this plant:

"By Tulsi's leaf the truth I speak,  
The Brahmin only kissed my cheek."

The leaves of several species of *Ocimum* are fragrant and aromatic, and a decoction of them is in some repute as a mild febrifuge and carminative in infantile diarrhoea. The leaves are also used for flavouring sauces, and the seeds are mucilaginous and cooling, and administered in renal complaints. The root is fashioned into beads worn by some classes of Brahmins.

LAVENDULA, *Linnaeus*.

L. CARNOSA, L. (K.).

Tōn-doung. Pegu.

HYPTIS.

H. SUAVEOLENS, Poir.

Nankowry.

Mason gives the following Sgau-Karen names for sundry plants of this Order: Phau-ka-bo, Hau-wor-thwac, Klo-ma-ni, Hpor-lai-thwai, Hor-lipgi, and the Burmese Su-la-na-lpa.

## Order VERBENACEÆ.

*Flowers* irregular, or rarely regular. *Calyx* persistent, truncate-toothed or lobed. *Corolla* 4- or 5- rarely 6-8-lobed or rarely truncate, the lobes more or less 2-lipped or nearly or quite equal, imbricate in bud, the upper lip or uppermost lobe or sometimes the lateral ones outside. *Stamens* inserted in the corolla-tube, usually 4, in pairs or nearly equal, and alternating with its lower lobes, or when the corolla is regular 4 to 8, alternating with its lobes. *Anthers* 2-celled, the cells usually parallel, and opening longitudinally. *Ovary* not lobed, or only shortly 4-lobed, usually more or less perfectly divided into 2 or 4 cells or half-cells, with a solitary ovule in each cell, or half-cell, either anatropous and erect from the base, or more or less amphitropous, and attached laterally or near the top, so as to appear pendulous. *Style* terminal, simple, entire, or more frequently with 2 short stigmatic lobes. *Fruit* dry or more or less drupaceous, the whole fruit, or the endocarp, separating into 2 or 4 nuts or pyrenes, or quite indehiscent and 2- or 4-celled, and sometimes with an additional central cavity between the carpels, having the appearance of a third or fifth empty cell. *Seeds* solitary in each cell or half-cell, erect, usually without albumen. *Embryo* straight, with thick cotyledons, and an inferior radicle. *Leaves* opposite, whorled, or rarely alternating, entire or divided. *Stipules* none. *Inflorescence* various. Herbs, shrubs or trees.

## AVICENNIEÆ.

*Inflorescence* capitate, spiked, or centripetal. *Flowers* with imbricate bracts. *Calyx* 5-leaved. *Corolla* 4-fid. *Orules* geminate, pendulous, amphitropous. *Fruit* indehiscent. *Embryo* germinating in the pericarp.

AVICENNIA, *Linnaeus*.

*Fruit* a 2-valved capsule. *Seed* solitary, without integuments, germinating white on the plant, cotyledons large, folded, radicle very hairy.

A. OFFICINALIS, L. *E.T.*

Tidal forests all over Burma and the Andamans.

Flowers shortly spiked. *Calyx*-lobes 1 line long, style very short.

Wood grey, soft, with very cross-grained fibres, and hence much used for rice-husking mortars. Weight 47 lbs. Gamble (Manual, p. 300) says the wood weighs 58 lbs. and is 'very brittle,' which is ludicrously inaccurate, as from its interlacing or cross fibres, it is next to impossible to split it, and on this account it is used for rice-mortars and oil mills (W.T.).

A. TOMENTOSA, Roxb. E.T.

Tidal forests of Arakan and Burma.

Flowers in heads. Calyx-lobes 2 lines long. Style long and slender.

A small tree, which, like the mangrove, springs from arching roots and occasionally attaining to 70 feet in height. The kernels are bitter but edible, and the green fruit boiled and mashed with butter is used for ripening tumours and as an application to the suppurating pustules of Variola. The timber is also used, and the bark supplies materials for tanning.

VITIEÆ.

*Inflorescence cymose, definite. Ovules pentulous, amphitropous or sub-anatropous.*

\*\* *Ovules laterally attached above the base, or near the summit of the cells. Flowers usually supported by 2 bractlets.*

† *Cymes involucrel. Capsule coriaceous, indehiscent.*

SYMPHOREMA, Roxburgh.

*Involucre* 6-8-phyllous, corolla limb regular, 5-12-cleft. *Style* very short. *Stamens* as many as corolla-lobes, inserted at the throat. *Anthers* dorsifixed, 2-celled. *Ovary* 2-celled, with 2 erect collateral ovules in each cell. Scandent shrubs with opposite simple leaves.

\* *Involucre shorter than the calyces.*

S. GROSSUM, Kz. E.S.S.

Swampy forests of Pegu and Tenasserim.

Leaves entire, shortly tomentose beneath.

\*\* *Involucre much longer than the calyces. The leaflets an inch long or more.*

† *Ovary smooth, leaves more or less pubescent beneath.*

S. INVOLUCRATUM, Roxb. W.C.

All over Ava, Pegu, and Martaban.

Nweh-sat (Kurz).

Leaves coarsely-toothed, and with the inflorescence greyish pubescent beneath. Flowers small, white, sessile.

S. UNGUICULATUM, Kz. S.S.

Pegu. Tenasserim and the Andamans  
up to 3000 feet.

Ka-nweh (Kurz).

Leaves entire, tawny-pubescent beneath. Inflorescences tawny or rusty-pubescent. Flowers small, cream-coloured, sessile.

‡‡ *Ovary pubescent or villous. Leaves glabrous, or nearly so. Cymes collected into terminal panicles.*

S. PENTANDRUM, Kz. S.S.

South Tenasserim.

Calyx piloso-tomentose. Corolla-throat glabrous. Flowers small, purple, sessile, in small clusters.

S. JACKIANUM, Kz. S.S.

South Tenasserim.

Calyx glabrous. Corolla-throat woolly.

CONGEA, Roxburgh.

*Involucre* 3-phyllous. *Corolla* 2-lipped, the upper lip elongate. *Stamens* 4, didynamous. *Style* capillary, exerted.

C. TOMENTOSA, Roxb. S.S.

All over Burma.

Tha-ma-kā-nweh (Kurz).

Branchlets covered with a short soft tomentum. Flowers whitish, sessile, supported by a pinkish involucre.

C. AZUREA, Wall. (M.).

C. VELUTINA, Wight (M.).

Ka-yau.

*Inflorescence without involucre.*

+ *Ripe capsules separating into 4 (or by abortion fewer) valves.*

† *Calyx very ample, orbicular-explanate, corolla tubular, 2-lipped.*

HOLMSKIOIDIA, Retzius.

*Calyx* membranous, usually red. *Stamens* 4, didynamous, exserted. *Ovary* 4-celled, with a solitary ovule in each cell. *Style* almost simple, with a short lateral lobe. Scandent shrubs with opposite simple leaves.

H. SANGUINEA, Retz.

Ava and Prome.

Leaves ovate, acute at the rounded base, slightly serrate, membranous. Flowers nearly an inch long, crimson, on filiform minutely pubescent pedicels.

†† *Calyx more or less cup- or bell-shaped.*

△ *Fruiting calyx not winged.*

GLOSSOCARYA, Wallich.

*Calyx* bell-shaped, 4-5-toothed, with twice as many nerves as teeth. *Corolla* funnel-shaped, with a slender tube, the limb nearly equal, 4-5-parted, spreading. *Stamens* 4 or 5, inserted in the corolla tube and exserted. *Ovary* 2-celled, with 2 ovules in each cell, suspended from the 2-lamellate spermaphore. *Style* filiform, with a 2-cleft stigma. Shrubs, with opposite simple leaves.

G. MOLLIS, Wall.

Ava and Tenasserim.

Branches 4-cornered, greyish tomentose. Leaves ovate, 3-4 inches long, on short pubescent petioles.

△△ *Fruiting calyx 4-winged, bladdery.*

HYMENOPYRAMIS, Wallich.

*Calyx* very small, 4-toothed, much enlarging after flowering. *Corolla* almost funnel-shaped, with a short tube the length of the calyx, the limb 4-parted, almost equal. *Stamens* nearly equal, inserted at the throat, exserted. *Anthers* 2-celled, opening longitudinally. *Ovary* 2-celled, with 2 ovules in each, suspended from a bilamellate spermaphore. *Style* capillary, with a 2-cleft stigma. Scandent shrubs, with opposite simple leaves.

H. BRACHIATA, Wall.

Ava and Prome.

Chin-thea-lek-nweh (Kurz).

Leaves ovate, lanceolate, entire, almost chartaceous, glabrous above, whitish velvety beneath, 3-5 inches long. Flowers minute, white, on short capillary, puberulous pedicels, much elongated in fruit. Capsule globular, inclosed in the calyx, pilose.

VITICIEÆ.

++ *Fruit indehiscent, dry or drupaceous.*

† *Nut dry, spongy-villous, included in the enlarged calyx.*

TECTONA, Linnæus, f.

*Calyx* bell-shaped, 5-6-cleft. The corolla tube nearly as long as the calyx, the limb 5-6-cleft, almost equal and spreading, hairy at the throat. *Stamens* 5-6. *Anthers* cordate, 2-celled. *Ovary* 4-celled, with a solitary ovule in each cell. *Style* as long as the stamens. *Stigma* sharply 2-cleft.

*T. GRANDIS*, L. f.

From Ava to Upper Tenasserim.

Kyoon-pen. Teak.

Wood too well known to need description. Weight 40-50 lbs. Breaking weight of 'girdled' timber 202 lbs., of 'ungirdled' timber 238 lbs. These remarkable results were obtained by experiments on rods 1 inch square and 4 feet in length, conducted by the Forest Department, and which were analysed and summed up in a Report on Forestry, submitted by me in 1873.—W. T.

*T. HAMILTONIANA*, Wall.

Ava and Prome.

*T. ternifolia*, Buch.

Ta hât (Mason).

The branchlets 6-8, angular-furrowed. Leaves ternate, obovate, acute at the base, but not decurrent, on a shortly-pubescent petiole 4-6 lines long. Flowers small, pale blue. Calyx tawny, in fruit about 4 lines long, ovoid, closely inclosing the small tomentose nut.

Wood uniformly pale brown, heavy, close grained, takes a fine polish (Kurz).

†† *Drupe more or less sappy or fleshy.*

△ *Drupe containing a single 4-celled (or by abortion fewer) nut.*

PREMNA, *Linnaeus*.

*Calyx* bell-shaped, 4-5-cleft or toothed, or almost 2-lipped. *Corolla* small, funnel-shaped, 2-lipped, with a short tube. *Stamens* 4, didynamous, or almost equal, usually as long as the corolla. *Ovary* 4-celled, each cell with a single ovule. *Style* filiform, with 2 spreading stigmatic lobes.

× *Tomentose or velvety pubescent trees. Calyx 5-toothed.*

*P. TOMENTOSA*, Willd.

All over Burma.

Kyoon-na-long (Kurz).

All parts stellate-tomentose. Flowers small, yellowish-white, in panicles. Drupes obovoid, 2 lines long, smooth.

Wood yellowish, close-grained, weight 45 lbs. Adapted for cabinet-work.

*P. VIBURNOIDES*, Wall.

Ava and Prome.

All softer parts velvety-pubescent. Flowers cymose in corymbs. Drupes globular, bluish-black, smooth, the size of a peppercorn.

× × *Almost glabrous trees. Calyx 4-toothed.*

*P. SAMBUCINA*, Wall. *E.T.*

Arakan and Upper Tenasserim.

Leaves glabrous, except the pubescent nerves. Flowers small, greenish white, cymose, in corymbs. Corolla 4 cleft, bearded at the throat.

× × × *Shrubs. Calyx 5-toothed. Leaves toothed, at least towards the apex.*

*P. ESCULENTA*, Roxb.

Chittagong.

Glabrous. Leaves acuminate, 2-4 inches long, on a petiole 2-3 lines long. Flowers small, yellowish white. Corolla yellowish-white, with a golden blotch at the base of the middle lobe.

*P. AMPECTENS*, Wall.

Pegu and Upper Tenasserim.

Glabrous. Leaves nearly obovate, 2-10 inches long, serrate towards the apex, on a very thick petiole 1-2 inches long. Corolla glabrous; the tube pubescent within. Drupes the size of a peppercorn, smooth, purplish.

*P. MACROPHYLLA*, Wall.

Pegu and Martaban.

All parts softly and shortly puberulous. Leaves, whilst young, sessile. Calyx puberulous. Drupes globular, the size of a peppercorn, smooth, bluish-black.

× × × × *Scandent shrubs or climbers.*

*P. SERRATIFOLIA*, L. *E.S.S.* Tenasserim. The Andamans. Kamorta.  
*P. integrifolia*, L. Katchall and Car Nicobar.

Leaves blunt, glabrous. Calyx 4-toothed.

*P. SCANDENS*, Roxb. *S.S.* Hills East of Toung-ngoo.

Leaves acuminate, glabrous. Calyx truncate.

*P. LUCIDULA*, Miq. *E.S.S.* Tree forests of the Andamans and Upper Tenasserim.

Leaves acuminate, more or puberulous beneath. Calyx 2-lipped and 5-toothed.

*Flowers clustered or forming a more or less interrupted raceme or spike.*

*P. RACEMOSA*, Wall. *E.T.* Upper Tenasserim.

Leaves glabrous, or nearly so. Flower-clusters sessile or nearly so. Flowers greenish-white. Filaments pubescent at their insertion.

*GMELINA, Linnaeus.*

*Calyx* 4-5-toothed or sinuately lobed. *Corolla* usually large. *Drupe* large, fleshy. *Stamens* 4, didynamous, inserted at the inflated part of the tube, shorter than the corolla. *Ovary* 4-celled, with a solitary ovule in each cell, laterally attached at or above the middle. *Fruit* a fleshy drupe, the putamen hard or bony.

\* *Bracts small and deciduous, green.*

*G. ARBOREA*, Roxb. All over Burma and the Andamans.

Ya-ma-nay.

Leaves glaucous beneath. *Corolla* 2-lipped. The upper lip short, 2-lobed, straight. *Drupe* smooth, glossy and yellow, the size of a plum. Wood white and light. Weight 35 lbs. Kurz recommends it for furniture, but its weight marks it for a poor wood of small value.

Mason gives Kywon-hpyu as the vernacular name (White teak).

*G. ASIATICA*, L. Swampy forests near Rangoon, and  
*G. parvifolia*, Roxb. of the Tsittoung Valley. Kamorta.

Leaves villous-pubescent beneath. *Corolla* 4-lobed, lobes sub-equal, the upper reflexed. *Drupe* smooth, glossy and yellow, the size of a cherry.

\*\* *Bracts large and gaily coloured, densely imbricate, spiny-armed.*

*G. HYSTRIX*, Schult. Tenasserim and Siam.

Leaves glabrous. Flowers large, yellow, sessile.

△ △ *Drupe* containing 2-4 distinct 1-celled nuts. *Stamens* exerted.

‡ *Style* shortly 2-lobed.

|| *Corolla tube* longer than the limb.

*CLERODENDRON, Linnaeus.*

*Calyx* bell-shaped. *Corolla* funnel-shaped, the limb unequal and almost 2-lipped, 5-cleft. *Stamens* 4, nearly didynamous, inserted on the tube and long exerted. *Ovary* 4-celled, each with a solitary ovule laterally attached at or above the middle of each cell. *Fruit* a drupe, containing 4 (or by abortion fewer) 1-celled pyrenes. Shrubs.

\* *Drupe* dry, capsule-like, when ripe, separating into 4 or fewer, woody, valve-like nuts.

*C. INERME*, Gaertn. *E.S.* var. *α* Tidal Jungles of Burma, the Andamans,  
 Kamorta and Car Nicobar.  
 var. *β* Arakan and Tenasserim Coasts.

Unarmed. Leaves glabrous. Calyx minutely toothed and truncate.

var. *a genuinum*.

Leaves opposite, shorter, obovate, about 1-2 inches long, blunt.

var. *β neriifolium*, Wall.

Leaves opposite and often ternate, lanceolate, 2-4 inches long, acute.

\*\* *Drupes sappy*, 4- (or by abortion fewer-) lobed. Nuts quite smooth.

× *Calyx truncate, with 5 short teeth.*

*C. SERRATUM*, Spreng. *E.S.* Ava. Arakan and the Pegu Range up to 2000 feet.  
Bē-byā or Bai-kyo (Kurz).

Panicle more or less leafy-bracted, more or less mealy-puberulous. Flowers blue. Leaves glabrous, serrate.

The name 'Bē-byā' is also applied, according to my experience, to a tree yielding a fairly good timber, dark-reddish, and 52 lbs. in weight.

× × *Calyx 5-lobed, to the middle or lower.*

+ *Pubescent or tomentose.*

*C. VILLOSUM*, Bl. *E.S.* Martaban between 2000 and 4000 feet.

Corolla tube only as long as the calyx, panicle with small bracts only, leaves entire, softly pubescent-tomentose.

*C. INFORTUNATUM*, L. *E.S.* Tree forests all over Burma and the  
Kha-oung-kyee (Kurz). Andamans up to 3000 feet.

Corolla-tube 5-6 lines long. Panicle conspicuously and densely bracted. Leaves serrate, appressed, pubescent.

++ *Quite glabrous.*

*C. NUTANS*, Wall. Khakyen Hills.

Panicles terminal, nodding, elongate.

Of this plant Dr. Mason remarks: "The Karen glens of Tavoy and Mergui are embellished with one of the most elegant flowering shrubs that ever beautified a landscape; it is the nodding *Clerodendron*. The flowers are tinged with rose, but nearly white, growing in long panicles at the extremities of the branches, from which they make a graceful curve, and hang down perpendicularly from 10 to 15 inches, like an inverted cone, so that the soft green foliage seems canopied with rosy-white veils. The flowerets are few, the divisions of the panicle being remote, and each bearing only 3 or 5 flowers. The divisions and sub-divisions being all rectangular, and each blossom hanging from its pedicel like an ear-drop, order and beauty are inseparable associations with this rare plant. The shrub blossoms in the dry season and rarely exceeds in its native soil more than 10 feet in height."

*C. GRATUM*, Wall. Ava. Khakyen Hills.

Panicles raceme-like, spreading, axillary.

Kurz adds from the Nicobars:

*C. PANICULATUM*, L.

Mason enumerates the following species also:

*C. SQUAMATUM*, Vahl. (M.).

Bu-gyi-ni.

*C. SIPHONANTHUS*, R. Br. (M.).

*C. URTICAEFOLIUM*, Gertn. (M.).

*C. FRAGRANS* (M.).

*C. VISCOSUM* (M.).

Bu-gyi-hpyu.

||| *Corolla-tube shorter than the limb.*

VITEX, *Linnaeus*.

*Calyx* cup-shaped, 5-toothed or lobed. *Corolla* almost 2-lobed, the limb unequally 5-lobed, the lower lobe larger and lip-like. *Stamens* 4, didynamous, inserted in the tube and exserted. *Ovary* 2- (or less perfectly) 4-celled, with a solitary ovule, laterally attached, in each cell. *Style* filiform, shortly and acutely 2-lobed. Mostly trees, with 3-7 digitate, rarely 1-foliolate leaves. *Bracts* very small.

\* *Flowers in panicles.*

† *Panicles terminal, without or only with minute subulate bracts.*

V. AGNUS-CASTUS, L. *E.S.* var.  $\beta$  Valley of the Irrawaddy and Salween.  
V. trifolia, L.

Kyoung-bân.

All parts minutely greyish-mealy, leaves white, at least beneath. Leaflets sessile, flowers sessile or nearly so.

var.  $\alpha$  *Agnus-castus*, L.

Leaves 5-7, foliolate, more or less linear, acuminate.

var.  $\beta$  *trifolia*.

Leaves 3-1, foliolate, broader, acute or bluntish.

V. CANESCENS, Kz.

Prome.

All parts softly and shortly pubescent. Flowers on slender pedicels, median leaflets petioled.

V. HETEROPHYLLA, Roxb. *E.T.*

Tree forests of Pegu and Tenasserim.

Adult parts all glabrous, at least above. Leaflets petioled.

V. WIMBERLEYI, Kz. *E.T.*

Tree forests of the Andamans.

Glabrous. Corolla tomentose. Calyx puberulous. Leaflets coarsely crenate.

†† *Panicles terminal, with numerous conspicuous leafy bracts. All parts pubescent. Leaves digitately 3-foliolate, leaflets sessile.*

V. PUBESCENS, Vhl. *E.T.*

Southern Pegu and Tenasserim.

Kyet-yoh (Kurz).

Petiole not, or but slightly winged at the apex, panicle cymose-branched. Flowers blue.

V. LIMONIFOLIA, Wall.

Ava and Prome.

Petiole broadly and leafy winged. Panicle spike-like, interruptedly cymose.

††† *Panicles axillary, elongate, lar, leaves 3-foliolate, leaflets sessile, glabrous.*

V. ALATA, Rottl. et Willd. *E.T.*

Pegu and Tenasserim up to 2000 feet.

Kyet-yoh.

Bark grey, smooth, 2 lines thick, peeling off in long curved flakes.

Kurz describes the wood: "Yellowish or light brown, clouded, close-grained, rather heavy, soft but strong, weight 45 lbs." This is hardly correct. The wood is hard, as its name imports, '*Fuel's-bone*,' and its weight proves, which is 61 lbs. to the cubic foot. It is one of the handsomest woods I know, of a rich pale nankin-brown, and highly deserving of attention as a furniture wood of the better sort. The native name, however, applies to more trees than one, and my remarks apply to selected samples of the heavier wood. Brandis describes a wood of this name as 45 lbs. weight, and "much prized, but scarce" (W.T.).

\*\* *Flowers in axillary dichotomous cymes. Petiole not winged.*

V. VESTITA, Wall.

Ava.

All softer parts pubescent. Cymes pubescent, shorter than the petiole.

V. LEUCXYLON, L. f.

Chittagong. Pegu and Upper Tenasserim.

Htoug-shah.

All adult parts quite glabrous. Cymes repeatedly dichotomous, longer than the petiole.

Kurz describes the wood as "pale greyish-brown, rather heavy and close-grained, soft, durable, takes a fine polish, weight 42 lbs." The wood is not heavy, as seasoned samples are only 38 lbs. weight, and I doubt its durability. Kurz adds (following Brandis), "used for cartwheels and recommended for furniture." Now this wood, or any wood, may be used for cartwheels, where no better is available; but it is never selected for such a purpose, being in notorious disfavour. It is at the best a very second-class furniture wood, weak, and, if I mistake not, rather subject to decay; hence, though abundant, it is seldom used.

Kurz adds, from the Nicobars:

V. NEGUNDO, L.

Katchall and Kamorta.

CALLICARPA, *Linnaus*.

*Calyx* cup-shaped, rarely tubular, 4-5-toothed or ribbed, and often angular. *Corolla* very short, the limb equal, 4-5-cleft. *Stamens* 4 (rarely 5), equal, inserted in the corolla-tube and somewhat exerted. *Ovary* 4-celled, each cell with a solitary ovule laterally attached. *Fruit* a small succulent drupe, containing 4 distinct 1-seeded nuts or pyrenes.

\* *Leaves entire or nearly so.*

C. ARBOREA, Roxb. T.

All over Burma up to 4000 feet.

Doung-hsap-pya (Kurz).

Leaves mealy-tomentose beneath.

\*\* *Leaves serrate. Shrubs with 4-merous flowers.*

† *Leaves softly pubescent or floccose-tomentose beneath.*

C. MACROPHYLLA, Vhl. E.S.

Ava.

Petiole  $\frac{1}{2}$  to 1 inch long. Drupes white.

C. RUBELLA, Lindl. E.S.

Martaban hills.

Petiole 2-3 lines long.

‡ ‡ *Leaves glabrous, except the mealy nerves, at both ends long-acuminate.*

C. LONGIPLEA, Lamk.

Martaban, Tenasserim and the Nicobars.

Drupes depressed-globular, on slender pedicels; about a line thick, glabrous, snow-white.

Mason also gives *Sphenodesme Griffithiana*, Wight.

VERBENIÆ.

*Inflorescence indefinite. Ovules erect, anatropous.*

VERBENA, *Linnaus*.

V. OFFICINALIS, L. (M.).

Cultivated.

Common vervain.

Verbena or Vervain was held in high esteem among the ancient Greeks and Romans, and also among our own Druids. It was commonly used to decorate altars at religious celebrations, as when Horace makes a feast on the birthday of Mæcenas:

"Ridet argento domus; Ara castis

Vincta verbenis ac et immolato

Spargier agno."

*Carm. III. 11. 6.*

And more especially was it supposed to act as a love charm, whence its introduction in Carm. I. 19, where Horace describes his love for Glycera :

“ Hic vivum mihi cespitem, hic  
Verbenas, pueri, ponite ; thuraque  
Bimi cum paterâ meri ;  
Mactatâ veniet lenior hostiâ.”

Still more explicit as regards the magic powers attributed to this herb is the invocation scene in Virgil's eighth Eclogue, where Alphesibœus says :

“ Effer aquam, et molli cinge hæc altaria vittâ,  
Verbenasque adole pingues et mascula thura.  
Conjugis ut magicis sanos avertere sacris  
Experiar sensus.” *Ecloga VIII. 64.*

V. BONARIENSIS, L. (M.).

STREPTIUM, *Roxburgh.*

S. ASPERUM, Roxb. (M.).

STACHYTARPHETA, *Vahl.*

S. INDICA, Vahl. (K.).

Kamorta.

S. MUTABILIS, Vahl. (M.).

A plant with variegated scarlet flowers in terminal spikes.

S. URTICIFOLIA, Sims. (M.).

*Ovules ascending from the base of the cells. Flowers without bractlets. Fruit a drupe.*

LANTANA, *Linnaeus.*

*Flowers* in heads or cymes. *Drupe* of 2 1-celled pyrenes. *Calyx* very shortly tubular, or almost bell-shaped, obscurely 4-toothed. *Corolla* slightly widened at the throat. *Stamens* 4, didynamous, inserted and included in the corolla-tube. *Anther-cells* dehiscing longitudinally. *Ovary* 2-celled, with a solitary erect ovule in each cell.

\* L. MIXTA, L.

A Brazilian plant cultivated in Burma,  
and in some places become feral.

Branchlets usually aculeate along the corners, nuts, if not entirely, at least at the base separated by a spongy mass.

Of this plant Thwaites remarks that it “appears to have found in Ceylon a soil and climate exactly suited to its growth, for it now covers thousands of acres with its dense masses of foliage, taking complete possession of land when cultivation has been neglected or abandoned, preventing the growth of any other plant, and even destroying small trees, the tops of which its subscandent stems are able to reach. The fruit of this plant is so acceptable to frugivorous birds of all kinds, that through their instrumentality it is spreading rapidly, to the complete exclusion, in spots where it becomes established, of the indigenous vegetation.”—*Enumeratio plantarum Zeylanicæ*, p. vii.

L. ALBA, Mill.

Maulmain (feral *vide* Mason).

*L. Indica*, Roxb.

*L. nivea*, var. *mutabilis*, Mason.

Flowers small, white, yellow at the throat, arranged in dense axillary heads, elongating into spikes. Mason describes the flowers as yellow when they first open, but soon changing to a rose colour. Kurz, quoting Mason, says “probably Ava,” but Mason says “Maulmain.”

L. ODORATA, L. (M.).

L. ACULEATA, Wall. (M.).

## Order MYROPORINEÆ.

*Corolla* sub-regular, or 2-lipped. *Lobes* 4-5, imbricate. *Stamens* 4, sub-equal, or 2. *Anthers* 1-celled. *Ovary* 2-celled. *Stigma* simple. *Ovules* 1 in each cell, pendulous. *Fruit* of 1 or 2 unequal achenes or utricle. *Embryo* straight. *Albumen* fleshy. Herbs or under shrubs. *Leaves* alternate, fascicled or sub-opposite, narrow.

MYROPORUM, *Banks.*

*M. acuminatum*, BROWN (M.).

The heartwood of *M. tenuifolium*, from the Sandwich Islands, is very fragrant, though less esteemed than sandal-wood.

## PERSONALES.

*Corolla* monopetalous, hypogynous, often bilabiate. *Stamens* fewer than the corolla-lobes, rarely as many, generally 4, didynamous, or 2. *Ovary* 1- or 2-, very rarely 4-celled. *Style* simple. *Stigmas* 1 or 2. *Ovules* usually very numerous. *Fruit* usually capsular. *Leaves* exstipulate. Herbs, rarely shrubs or trees.

## Order SESAMEÆ (PEDALINEÆ).

*Corolla* bilabiate, lobes imbricate. *Stamens* 4, didynamous, or 2. *Anther-cells* shorter than the connective, tip glandular. *Disk* annular or capular. *Ovary* 1- to 4-celled. *Stigma* bilamellate. *Placentas* axile or parietal. *Ovules* few or many. *Fruit* a capsule or drupe, often of remarkable form. *Embryo* straight, exalbuminous or nearly so. *Leaves* opposite or alternate, exstipulate. Herbs with vesicular glands.

## EUSESAMEÆ.

SESAMUM, *Linnæus.*

\**S. INDICUM*, L. (M.).

Huñā or Huñā-mā.

Largely cultivated as an oil seed. Sesamum oil, when carefully prepared, is excellent for culinary purposes, and not inferior for the table to good salad oil.

The sesamum or 'til' seed enters largely into certain ceremonies of the Hindus, and is thus described by De Gubernatis: "D'après le *Brahmapurāna* le sésame aurait été crée par Yama, dieu de la mort, après de longues pénitences. Cette légende a été probablement imaginée, après coup, pour commenter l'usage indien, d'employer le sésame spécialement dans les cérémonies funéraires et expiatoires, comme un purificateur et un symbole de l'immortalité. La sésame devait représenter le principe de la vie." And again, "Le sésame, avec le riz et avec le miel, entrain aussi dans la composition de certains gâteaux appelés *pindās*, offerts aux Mânes, dans les cérémonies *graddās*, mais mangés par les assistants, qui s'appelaient en consequence *sapindās*." —*Mythologie des Plantes*, vol. ii. p. 345.

## PEDALINEÆ.

\* *Seeds winged.*

BRANDISIA, *Hooker f. et Thompson.*

*Calyx* bell-shaped, gamosepalous, 5-ribbed, 5-7-toothed. *Stamens* 4, inserted near the base of the corolla-tube, didynamous. *Filaments* glabrous. *Anthers* rotundate, 2-celled. *Ovary* 2-celled. *Seeds* linear at both ends, elongated in a narrow wing.

*B. DISCOLOR*, H. f. et Th. *E.S.*

Martaban at 3000 to 6000 feet.

Leaves lanceolate, on a mealy-puberulous petiole 3-4 lines long, acuminate, 1-2 inches long. *Calyx* 3 lines long, shortly tawny-tomentose.

\*\* *Seeds not winged.*

*Buddleia*, *Linnaeus*.

*Calyx* 4-toothed or almost 4-cleft. *Corolla* nearly bell-shaped, the limb 4-lobed. *Stamens* 4. *Anthers* almost sessile at the throat of the corolla, or the filaments longer and inserted half way up the tube. *Ovary* 2-celled. *Seeds* numerous, small, spindle-shaped.

*B. ASIATICA*, Lour. *E.S.*

All over Burma.

Kyoung-mi-ku.

Leaves lanceolate, minutely toothed, membranous, glabrous above, beneath covered with a whitish appressed tomentum. Flowers small, white, almost sessile.

*B. PANICULATA*, Wall.

Khakyen Hills.

A tall tomentose shrub.

Leaves ovate-lanceolate, pointed at both ends, entire or slightly serrate upwards, thick membranous, above glabrescent. Flowers small, sessile, clustered. *Calyx* about a line long. *Corolla* tubular, about 3 lines long, tomentose outside, the lobes spreading very short, rotundate.

#### Order ACANTHACEÆ.<sup>1</sup>

*Corolla* usually bilabiate, lobes imbricate or twisted. *Stamens* 4, didynamous or 2. *Disk* cupular or annular. *Ovary* 2-celled, cells 2- or many-ovuled, placentas usually on the septum. *Ovules* often inserted on processes of the placenta. *Capsule* bivalved. *Embryo* exalbuminous. *Cotyledons* large, sometimes crumpled. Herbs, rarely shrubs, nodes tumid. *Leaves* opposite or whorled, exstipulate.

#### Sub-order ACANTHIDEÆ.

*Calyx* herbaceous, 5- (rarely 4-)partite. *Corolla* lobe imbricate, or imbricately bilabiate in æstivation. *Seeds* borne on a hooked retinaculum.

#### ASYSTASIEÆ.

*Corolla* infundibuliform or campanulate, rarely hypocraterimorphous, bilabiate in æstivation. *Stamens* 4, 2 often being sterile and without anthers.

#### ASYSTASIA, *Blume*.

*Corolla* infundibuliform, tube long. *Stamens* 4, all fertile. *Anther-cells* basally mucronate.

*A. LANCEOLATA*, T. And.

Burma ad Baragyn<sup>2</sup> (B.).

*A. PARISHII*, T. And.

Tenasserim (P.).

*Eranthemum crenulatum*, var. *grandiflorum*. Hook. Bot. Mag. t. 5140, *excl. syn.*

#### ERANTHEMUM, *Linnaeus*.

*Corolla* hypocraterimorphous, with sub-equal lobes. *Stamens* 2 fertile, and 2 rudimentary sterile ones. *Anthers* 2-celled.

*E. CRENULATUM*, Wall. (P.).

Amherst (Wall.). Ceylon. Java.

*E. (JUSTICIA) ALBUM*, Roxb.

Pegu. Andamans. Katchall and Car Nicobar (K.).

<sup>1</sup> The arrangement here adopted is generally that of Dr. Thomas Anderson, as contained in his 'Enumeration of the Indian species of *Acanthaceæ*,' in the Linnean Society's Journal, Botany, vol. ix. with which several other species since described by Kurz are now incorporated. In J.A.S.B. ii. 1873, p. 98, Kurz gives an emended arrangement of the genera after the system of Nees von Essenbeck, which may be advantageously consulted. The letters stand for the following authorities: B. Brandis, C. Cross, Cleg, Cleghorn, F. Falconer, G. Griffith, H. Heller, Haugh, Haughton, K. Kurz, M. Mason, P. Parish, S. Scott, W. Wallich.

<sup>2</sup> A locality given in this fashion, without specifying the Province, or giving some similar aid to recognition, is simply useless, so far as any information it conveys to the general reader.

- E. CINNABARINUM*, Wall. (P.). Tenasserim. Katchall and Great Nicobar (K.).  
*E. SUCCIFOLIUM*, Kz. Kamorta. Katchall. Car and Great Nicobar (K.).  
 Near to *E. Blumei*.

## JUSTICIEÆ.

*Corolla bilabiate. Fertile stamens 2. Anther-cells more or less superposed. Capsule 4-seeded, sterile capsule basally contracted.*  
 + *Corolla-tube shortened, dilated. Lower lip unequally lobed. Stamens 2 or 4. Bracts small or none.*

## GRAPTOPHYLLUM, Nees von Esenbeck.

*Stamens 2. Anthers 2-celled. Style included. Bracts minute. Leaves generally variegated.*

- \* *G. HORTENSE*, Wall. All India and Burma. Patria unknown.

## Sub-tribe DICIPTERIEÆ.

× × *Corolla-tube elongate, straight or curved. The middle lobe of the lower lip largest, side lobes linear. Bracts (except in Rhinacanthus) much larger than the calyx.*  
 † *Corolla-tube straight.*

## RHINACANTHUS, Nees von Esenbeck.

*Calyx 5-partite. Corolla tubular, with bilabiate limb. Anthers 2-celled. Flowers in panicles. Bracts small, subulate.*

- R. COMMUNIS*, Wall. Prome Hills (Wall.).  
*Justicia nasuta*, L.  
*R. osmospermus* and *Rottlerianus*, Nees.

† † *Corolla-tube resupinate.*

## PERISTROPHE, Nees von Esenbeck.

*Capsule elongate, with persistent placentas.*

- |  |   |
|--|---|
| <i>P. BICALYCVLATA</i> , Wall.           | Prome (W.). India.  |
| <i>P. ACUMINATA</i> , Wall.              | Tenasserim. Silhet (W.).<br>Katchall. Great Nicobar (K.). |
| <i>P. FRAGILIS</i> , Wall.               | Tavoy (W.). Maulmain (P.).                                |
| <i>P. (JUSTICIA) LANCEOLARIA</i> , Roxb. | Tenasserim (H.). Maulmain (P.).                           |

## DICIPTERA, Jussieu.

*Capsule shortened. Placentas and their retinacules dehiscant.*

- D. RIPARIA*, Wall. Pegu (B.). Maulmain (F.).

## Sub-tribe EUJUSTICIEÆ.

*Corolla-tube not elongate, straight, lower lip trifid, the central lobe largest. Upper lip very shortly bidentate. Stamens 2.*  
 † *Capsule walls membranaceous, dehiscing, the placentas leaving the valves.*

## RUNGIA, Nees von Esenbeck.

*Lower corolla lip biplicate. Spike densely bracted.*

- R. (JUSTICIA) PECTINATA*, L. Burma (G.). Andaman (H.).  
*R. parviflora*, Wall.  
*R. muralis*, Royle.  
*R. polygonoides* and *origanoides*, Wall.

† † *Capsule dehiscing, simply bivalve.*

## JUSTICIA, Linnaeus.

*Calyx divided to near the base into 5 or 4 equal segments. Corolla 2-lipped, the upper lip erect, concave, the lower 3-lobed. Stamens 2. Anther-cells oblique or*

almost distinct and superposed, the lower one usually mucronate or spurred. *Ovary-cells* 2-ovuled.

Section *BETONICA*.

*Spikes terminal or axillary, bracts imbricate.*

J. VENTRICOSA, Wall.	Attaran Valley (W.).
J. ARGYROSTACHYA, Wall.	Prome Hills (W.).
J. GRANDIFOLIA, T. And.	Tenasserim (P.).

*\*\* Bracts decussate, conspicuous,  $\frac{1}{2}$  to  $1\frac{1}{2}$  inch long.*

† *Bracts uniformly green, from orbicular to ovate and lanceolate. Capsule glabrous.*

J. ADHATODA, L. (P.).	Ava. Prome. Chittagong.
-----------------------	-------------------------

An evergreen shrub, sometimes growing into a small tree.

Leaves long-petioled. Spikes on long stiff peduncles. Bracts orbicular to ovate, glabrous, 1-flowered. Corolla an inch long, white, minutely rusty-dotted, the upper lip longitudinally purple-streaked.

J. VENTRICOSA, Wall. E.S.	Tenasserim.
---------------------------	-------------

Leaves shortly-petioled, usually somewhat blunt. Spikes on very short peduncles or almost sessile. Bracts orbicular to ovate, minutely puberulous, 3-4 flowered.

Section *ROSTELLARIA*.

*Flowers terminal, spicate or axillary, and sub-solitary. Calyx 4-partite, with a rudimentary fifth division.*

† *Flowers terminal, spicate.*

J. PROCUMBENS, L.	Burma (W.) and all India.
J. hedyotifolia, mollissima and crinita, Wall.	Java, China, Abyssinia.
Rostellaria sarmentosa, Zell.	
R. Abyssinica, Brongn.	
R. simplex, Wight.	
J. DIFFUSA, Willd.	Attaran Valley (B.).

Section *GENDARUSSA*.

*Flowers axillary, pedunculate, clustered, or solitary and sessile, very rarely pseudospicate, with small bracts. Under shrubs or woody plants.*

† *Flowers subspicate, axillary, pedunculate.*

*\* Lower anther-cell spurred or mucronate. Bracts inconspicuous, shorter than the calyx.*

J. GENDARUSSA, L. (P.).	Tree forests of Ava. Tenasserim and the Andamans (K.).
Bawa-neck (Kurz).	

An evergreen dense shrub. Flowers in terminal spikes; all parts glabrous. Calyx small, the segments linear, stiff, about a line long. Corolla  $\frac{1}{2}$  an inch long or more, pale greenish-white, sparingly stained with purple. The strongly-scented leaves are used to preserve books from insects.

†† *Flowers solitary, axillary by twos or threes.*

J. QUADRIFARIA, Wall.	Tenasserim (H.).
Adhatoda Zollingeriana, De Can.	
J. BRANDISHII, T. And. (M.).	Toung-ngoo (B.).

Section *RIAPHIDOSPORA*.

*Flowers in lax panicles, less frequently in interrupted spikes, verticillately disposed. Corolla-tube more or less elongate.*

J. DECUSATA, Roxb.	Pegu (W.). Maulmain (P.).
Gendarussa Sumatrana, Miq.	Katchall (K.).

The corolla is uniformly white (K.).

J. VASCULOSA, Wall. (P.).

Tenasserim (H. F.). Katelall. Trice,  
Track, and Great Nicobar (K.).

Section LEPTOSTACHYA.

*Spikes trichotomely ramosc. Flowers sessile. Corolla minute, tube short. Anthers  
muticous.*

J. VIRGATA, Wall.

Taong-doung (W.). Tenasserim (H.).

(Incertæ sedis.)

J. BOERHAAVIEFFOLIA, T. And.

Amherst (F.).

J. DASYCARPA, Kz.

Martaban.

J. CALONEURA, Kz.

Martaban.

J. FLAVA, Kz.

Martaban.

For descriptions of these three species, see J.A.S.B. ii. 1873, p. 96.

## PHLOGACANTHEÆ.

*Corolla tubular, limb bilabiate. Stamens 2. Anthers 2-celled. Cells parallel  
muticous. Capsule roundish, many-seeded. Inflorescence terminal, spicate.*

## PHLOGACANTHUS, Nees von Essenbeck.

*Capsules terete, seed-bearing from the base. Calyx regular. Stamens fertile.  
Corolla firm, terete, more or less incurved.*\* *Calyx and racemes velvety or puberulous.*‡ *All parts glabrous.*

P. (JUSTICIA) THYRSIFLORUS, Roxb.

Ava and Martaban (K.).

*An evergreen branched shrub 6-10 feet high. Branches almost 4-cornered.  
Flowers yellowish-brown, conspicuous, on short pubescent pedicels. Capsules rather  
woody, fully an inch long, 4-cornered, furrowed. Seeds 8 or fewer, shortly stipose.*

P. PULCHERRIMUS, T. And.

Tenasserim (H. F. P.).

P. ELONGATUS, T. And.

Amherst (F.).

\*\* *Calyx and racemes quite glabrous.*

P. INSIGNIS, Kz.

Kambalu Toung, and Eastern Slopes  
of the Pegu Range up to 3000 feet.*An evergreen meagre shrub 3 to 5 feet high. The stems almost terete with  
4 elevated lines, white. Leaves membranous, 7-8 inches long. Flowers dark violet,  
in terminal racemes.*

## ANDROGRAPHIDIEÆ.

*Corolla limb bilabiate. Stamens 2. Anthers 2-celled, more or less bristly-ciliate.  
Filaments ligulate, winged. Capsule many-seeded.*

## GYMNOSTACHYUM, Nees von Essenbeck.

*Corolla infundibuliform, tube curved. Stamens free. Filaments often dilated,  
ciliated. Capsule 4-angled. Inflorescence subsecund.*

G. PARISHII, T. And.

Tavoy (W.).

Maulmain (F. S.). Andamans (H.).

G. ANDROGRAPHIODES, T. And.

Burma (G.). Assam (M.).

## HAPLANTHUS, Nees von Essenbeck.

*Corolla subinfundibuliform. Stamens cohering. Capsule 8- to 20-seeded.  
Branches axillary, difform, verticillately fasciculate, at the tip spiniform.*

H. HYGROPHILOIDES, T. And.

Pegu (B.).

(Only provisionally referred to the genus.)

## ANDROGRAPHIS, Wallich.

*Corolla* resupinate, limb constricted. *Stamens* cohering by the barbed anthers. *Capsule* very compressed. *Racemes* secundifloral.

- A. (JUSTICIA) TENUIFLORA, Wall.                      Prome Hills and Taong-doung (W.).  
*Haplanthus tener*, Nees.  
 A. (JUSTICIA) ECHIOIDES, L.                      Ava (W.).

## ACANTHIEÆ.

*Corolla* unilabiate, lobes 3-5, the middle one exterior in æstivation. *Stamens* 4. *Antlers* 1-celled.

## ACANTHUS, Linnaeus.

*Corolla-tube* very short. *Calyx* upper segment, 4- or many-nerved.

\* *Filaments* all straight. *Bracts* entire.

- A. ILICIFOLIUS, L.                      Coasts of Burma, the Andamans, and Kamorta.  
 Kha-ya (Kurze).

An erect evergreen shrub. Leaves sessile, or very shortly petioled, prickly lobed. Flowers  $1\frac{1}{2}$  to 2 inches long. Capsule nearly an inch long, very shining, blunt, seeds large.

- A. EBRACTATUS, Vhl.

An evergreen glabrous shrub, 3-4 feet high. Petioles  $\frac{1}{2}$  an inch long, rarely very short, leaves entire, or toothed. Flowers an inch or more long.

- A. VOLUBILIS, Wall.                      Tidal Jungles of Arakan and Pegu.  
*Dilivaria scandens*, De Can.

An evergreen twining shrub, 10-15 feet long, unarmed and glabrous. Leaves obovate, entire, fleshy-coriaceous. Corolla white, an inch long, the lower lip shortly 3-lobed, velvety inside.

## BLEPHARIS, Jussieu.

*Calyx* upper segment whole, 3-nerved, lower segment 2-nerved. *Capsule* with membranous valves.

- B. BOERHAAVEFOLIA, Pers.                      Ava. Prome (W.).  
*Acanthus Maderaspatensis*, L.                      India. Ceylon. Abyssinia.  
 A. ciliaris, Burm.  
 B. Abyssinica, Hochst.

## BARLERIEÆ.

*Corolla* hypocraterimorphous, or infundibuliform, the lobes imbricate in æstivation (bilabiate in *Lepidagathis*).

† *Antlers* 1-celled.

## LEPIDAGATHIS, Willdenow.

*Calyx* 5-partite. *Corolla* bilabiate. *Stamens* 4, didynamous. *Antlers* 2-celled.

- L. FALCATA, Wall.                      Taong-doung (W.).  
 L. CHLOROSTACHYA, De Can.                      Mergui (G.).  
 L. PURPURICALLIS, Wall.                      Burma (W.).  
*Ruellia retrofracta* and *striata*, Wall.  
 L. (RUELLIA) DULCIS, Wall.                      Prome Hills (W.).  
 L. IRIDESCENS, T. And.                      Rangoon (MacC.).  
 L. LINEARIS, T. And.                      Burma (R. S.).  
 L. SIMPLEX, T. And.                      Tenasserim (H.).  
 L. HYALINA, Wall. (P.).                      Pegu. Attaran Valley (W.).  
 L. FASCICULATA, Wall.                      Pegu (B.). Tenasserim (W. F. H.).  
 L. STROBILINA, F. And.                      Martaban (P.).

|| *Anthors* 2-celled.  
§ *Corolla-lobe imbricate in æstivation.*

*NEURACANTHUS*, *Nees von Essenbeck*.

*Calyx* unequally 5-partite. *Corolla* infundibuliform, the lobes in æstivation folded-imbricate. *Stamens* 4, fertile, didynamous.

<i>N. SUBUNINERVIS</i> , Kz.	Prome (K.).
<i>N. GRANDIFLORUS</i> , Kz.	Prome (K.).
<i>N. TETRAGONOSTACHYUS</i> , Wall. (P.).	Prome Hills (W.).

*BARLERIA*, *Linnaeus*.

*Calyx* 4-partite. *Corolla* regularly infundibuliform or hypocraterimorphous. *Stamens* 2 or 4, fertile, and 3 or 1 sterile and shorter ones.

\* *B. CRISTATA*, L. (P.).  
*B. ciliata* and *dichotoma*, Roxb. Prome. Segain (W.).  
*B. laciniata*, *Nepalensis*, and *nuda*, Wall.

Extensively cultivated, and with *B. prionitis* used in Java as a hedge plant (T. And.).

<i>B. POLYTRIDEA</i> , Wall.	Irrawaddy Valley (W.).
<i>B. hirsuta</i> , Wall.	Tenasserim (F. H.).
<i>B. STENOPHYLLA</i> , Kz.	Ava (K.).

Sub-order *RUELLIDEÆ*.

*Calyx* herbaceous, 5- rarely 4-partite. *Corolla-lobes* in æstivation contorted. *Seeds* borne on a hooked retinaculum or papilla. *Stem* not twining.

*RUELLIÆÆ*.

*Calyx* small, herbaceous. *Seeds* conspicuous, compressed, borne on a hooked retinaculum.

*STROBILANTHIEÆ*.

*Calyx* unequally divided. *Corolla* infundibuliform, usually curved, with unequal lobes. *Stamens* 4. *Stigma* subulate. *Capsules* basally sterile, 4- to 16-seeded.

*DEDALACANTHUS*, *T. Anderson*.

*Bracts* large, variegated. *Calyx* scarious. *Anthors* mucous. *Capsule* oblong, 4-seeded.

<i>D. (ERANTHEMUM) SCABER</i> , R. Br.	Pingee. Irrawaddy Valley (W.).
<i>Eranthemum nervosum</i> , var. <i>scabrum</i> , R. Br.	
<i>D. (ERANTHEMUM) MACROPHYLLUS</i> , T. And.	Irrawaddy Valley. Karen Hills (M.).
<i>D. stricti</i> , T. And. Kew, No. 6128.	Tenasserim or Andamans (H.).
<i>D. (ERANTHEMUM) TETRAGONUS</i> , Wall.	Burma ad Trogl <sup>1</sup> (W.). Maulmain (P.).
"Nees von Essenbeck has described the corolla as 'coccinea' ? Parish says it is blue."—T. And.	

<i>D. (ERANTHEMUM) SUFFRUTICOSUS</i> , Roxb.	Andamans (R. Haugh.).
<i>E. barlerioides</i> , Roxb.	Car Nicobar (K.).
<i>D. MICROSTACHYUS</i> , T. And.	Tenasserim (P.).
<i>D. (JUSTICIA) MONTANUS</i> , Roxb.	Maulmain (P.).
<i>D. PARISHII</i> , T. And.	Maulmain (P.). Pegu (B.). Shuayghin (S.).

*STROBILANTHES*, *Blume*.

*Corolla* straight or curved, traversed within by 2 longitudinal bearded lines.

<sup>1</sup> Or Trockla (no doubt), the village on the Salween River near which the noble *Antherstia* was first discovered.

*Anthers* muticous. *Capsule* 4-seeded, more or less angular, often tapering in a sterile base. *Calyx* segments more or less unequal.

Section *LEPTACANTHUS*.

*Flowers* in lax panicles, usually deciduous. *Calyx* segments unequal, 2 being the longer. *Capsules* large, ovoid.

*S. MICROCARPUS*, T. And.

Tenasserim or the Andamans (H.).

Section *PANICULATI*.

*Flowers* paniculate. *Bracts* and *bracteoles* herbaceous, less than the calyx. *Calyx* segments equal.

\* *S. FLACCIDIFOLIUS*, De Can (M.).

Karen Hills.

*S. Championi*, T. And.

*Ruellia indigofera*, Griff. (apud Mason).

"This is the plant that yields the blue dye called by the Assamese 'Room.' Although the plant is indigenous, it is said to be cultivated by the Assamese near their dwellings." It is, no doubt, also the plant mentioned by Dr. Mason as cultivated by the Burmese for its blue dye.

*S. LANCEIFOLIUS*, T. And.

Tenasserim (P.).

Section *GOLDFUSSIA*.

*Flowers* spicate. *Spikes* nude. *Bracts* soon deciduous.

*S. CRATEGIFOLIUS*, T. And.

Hill Forests near Maulmain (P.).

*S. BICEPS*, Wall.

Taong-doung (W.).

*S. BRANDISHII*, T. And.

Toung-ngoo at 4000 feet (B.).

*S. CAPITATUS*, Wall.

Karen Hills, Toung-ngoo (M.).

*S. (RUELLIA) GLOMERATUS*, Wall. Salween Valley and Taipu Hills at 3000 (B.).

Section *AMENTIANTHES*.

*Flowers* spicate, *spikes* rather lax, elongate, flaccid (except *S. acrociphala*), *bracts* subimbricate.

*S. (ADINACANTHUS) ACUMINATUS*, Wall.

Tenasserim (H.).

*S. IMERICATUS*, Wall.

Taong-doung (W.). Tenasserim (H.).

*S. (RUELLIA) RUFESCENS*, Roth.

Pegu (B.). Tenasserim (H.).

*Buterea ulmifolia*, Wall.

*S. ATRICULATUS*, Wall. (P.).

Taong-doung and Prome Hills (W.).

*S. amplexans* and *plumulosus*, Wall.

Pegu (B.). Karen Hills (M.).

*S. Edgeworthianus*, De Can.

*S. HELFERI*, T. And.

Tenasserim, "3 Pagodas" (H.).

*S. HAPLANTHOIDES*, T. And.

Maulmain (F.).

*S. REMOTS*, T. And.

Tenasserim (H.).

Section *EUSTROBILANTHES*.

*Flowers* clustered in dense, shortened strobiliform spikes. *Bracts* imbricate.

*S. GLAUDESCENS*, Wall.

Tenasserim (H.). Pegu (B.).

*S. CRISTUS*, Bl.

Rangoon (C.). Maulmain (F. P.).

*S. (RUELLIA) ROSEUS*, Wall.

Taong-doung (W.).

*S. (RUELLIA) SCABER*, Wall.

Prome Hills (W.).

*R. flava*, Roxb.

*Incertæ sedis.*

*S. FALCONERI*, T. And.

Maulmain (F.).

Kurz also records the following species:

\* *Capsules* 6-15-seeded. *Corolla* yellow.

*S. FLAVA*, Kz.

Tree forests of Pegu and Tenasserim (K.).

Myet-hna-pan (Kurz).

An evergreen, very bushy shrub. Leaves harsh, glabrous, shortly petioled. Flowers yellow, in dense spikes, bracts green, capsules 6-8-seeded.

\*\* *Capsules 2-4-seeded. Corolla purple or blue.*

*S. SIMONII*, T. And.

Tree forests of Kambalu Toung in the Pegu Range and of Upper Tenasserim.

An evergreen shrub up to 12 feet high. Spikes head-like, on longer or shorter peduncles, occasionally sessile. Bracts conspicuous, irregularly imbricate. No leafy involucre. All parts glandular-puberulous.

*S. LAMIODES*, T. And.

Tree forests of Martaban from 2000 to 4000 feet.

An evergreen shrub, branches slightly 4-cornered, almost terete, glandular-puberulous. Flower heads dense, at or near the base surrounded by floral leaves, which form a conspicuous involucre. Leaves glabrous above. Flower buds yellowish villous. Bracts leafy.

*S. FIMBRIATA*, N.E.

Tree forests of the Pegu Range and of Upper Tenasserim.

An evergreen, glabrous shrub 4-8 feet high. Spikes glabrous, lax. Bracts long, lanceolate, minutely appressed, bristly, not glandular, filaments villous.

*S. NEESII*, Kz.

Tree forests East of Toung-ngoo, along streams.

A large shrub, 6-12 feet high. Spikes and the long lanceolate bracts glandular-pubescent. Corolla and filaments glabrous.

*S. FETIDISSIMA*, Kz.

Martaban.

*S. PTEROCAULIS*, Kz.

Pegu.

*S. KARENSIUM*, Kz.

Martaban.

*S. SUB-FLACCIDA*, Kz.

Tenasserim.

*S. DASYSPERMA*, Kz.

Pegu.

For descriptions of these 5 last species refer to J.A.S.B. ii. 1873, p. 93.

#### HEMIGRAPHIS, Nees von Essenbeck.

*Bracts* large, imbricate, covering the calyx. *Corolla* straight, tomentose within. *Stamens* included. *Capsule* 6- to 16-seeded.

*H. (RUELLIA) GRIFFITHIANA*, Nees.

Mergui (G.).

*H. (RUELLIA) QUADRIFARIA*, Wall.

Taong-doung (W.). Tenasserim (P.).

*H. (RUELLIA) ELEGANS*, Roxb.

Rangoon (S.). Prome Hills (W.).

*H. GLANDULOSUS*, T. And.

Katchall. Car Nicobar (K.).

*H. BURMANICUS*, Kz.

Ava. Prome (K.).

#### EURUELLIEÆ.

*Corolla* infundibuliform. *Capsule* basally sterile. *Seeds* produced above the middle.

† *Bract* 1, large. *Bracteoles* 2, shorter.

\* *Capsule* subterete.

#### PHAYLOPSIS, Willdenow.

*P. PARVIFLORA*, Willd.

Prome Hills and Taong-doung (Wall.).

*Atherlema reniforme*, Wall.

†† *Bracts* minute or none.

#### RUELLIA, Linnaeus.

*Corolla* straight or curved. *Anthors* muticous. *Capsule* with a swollen apex, subglobose, many-seeded.

*R. CILIATA*, Hornem.

Prome Hills (W.).

*R. PROSTRATA*, Poir.

Oil wells, Ava (W.). Meaday (S.).

*Ruellia ringens*, Roxb.

*R. FLACCIDA*, Kz.

Pegu.

R. MACROSIPHON, Kz.

Pegu.

For description see J.A.S.B. Part ii. 1873, p. 91-92.

R. REPENS, L.

Mergui (G.).

*Dipteracanthus lanceolatus*, Wall.

\*\* Capsule compressed, sublinear.

CYSTACANTHUS, T. Anderson.

*Bracts* 2, opposite remote from the calyx. *Calyx* 5-partite, segments equal, elongate, cleft to the base. *Corolla* inflated, slightly curved, tube short, limb contracted at the top, equally 5-toothed. *Stamens* 2, included, with 2 rudimentary sterile ones. *Filaments* round, smooth, basally geniculate bearded. *Anthens* 2-celled, connective submueronate. *Ovary* hairy. *Style* round, smoothish. *Stigma* very shortly 2-fid. *Capsule* 12-seeded.

C. CYMOSUS, T. And.

"ad Hoandro" (B.).

C. PANICULATUS, T. And.

Maulmain (Lobb).

## HYGROPHILIEÆ.

*Corolla* bilabiate. *Capsule* many-seeded, with striated or grooved valves.

HYGROPHILA, R. Browne.

*Capsule* roundish, or oblong. *Flowers* sessile, verticillate.

† Fertile stamens 4.

H. SPINOSA, T. And. (P.).

Prome (W.).

*Asteracantha longifolia*, Nees.

H. SALICIFOLIA, Wall.

Kamorta (K.).

var. *a* glabra, T. And.

Tavoy (W.). Rangoon (Cleg.).

*H. quadrivalvis*, obovata, undulata, and radicans, Wall.*H. angustifolia*, R. Br.var.  $\beta$  *H. (Ruellia) hirsuta*, Roxb.*H. phlomooides*, Wall.*H. incana* and *assurgens*, De Can.

†† Fertile stamens 2.

H. (HEMIDELPHIS) POLYSPERMA, Wall.

Rangoon (MacClell.).

NOMAPHILA, Blume.

*Capsule* linear, compressed. *Flowers* in lax panicles.

N. PARISHII, T. And. (P.).

Tenasserim (F. P.). Pegu (B.).

## NELSONIEÆ.

*Calyx* small, herbaceous. *Seeds* minute, globose, borne on a small papilla.

† Corolla bilabiate.

ADENOSMA, Nees von Essenbeck.

*Stamens* 4, very rarely 2.

A. BIFLICATA, Wall.

Prome (W.).

*Synnuma Aratum*, Benth.

A. HIRSUTUM, Benth.

Kamorta (K.).

†‡ Corolla infundibuliform.

EBERMAIERA, Fuhl.

\* Flowers in spikes.

E. MACCLELLANDII, T. And.

Pegu (MacClell.).

E. PANICULATA, Wall.

Burma (G.).

*E. venosa*, T. And.

- E. (ERYTHRACANTHUS) OBTUSA*, De Can. Mergui (G.). Maulmain (F.).  
*E. GRACILIS*, T. And. Zing-zeik, Martaban (P.).  
*E. MERGUENSIS*, T. And. Mergui (H.).  
*E. LASIOBOTRYS*, De Can. Mergui (G.). Tavoy (P.). Maulmain (F.).  
*E. HELFERI*, T. And. Thongyin (B.). Maulmain (P.).  
*E. VELUTINA*, De Can. Mergui (G.).  
*E. (STAUROGYNE) ANGUSTIFOLIA*, Wall. Tenasserim (F. W.). King's Island (H.).  
*E. thyrsoides*, Wall. (Catalogue).  
*E. ZEYLANICA*, De Can. Maulmain (W.). Rangoon (Cleg.).  
*E. thyrsoides*, Wall. (Pl. As. Rar.).

\*\* *Flowers axillary, solitary, or in little cymes.*

- E. HUMILIS*, Wall. Prome (W.).  
*E. GLAUCA*, De Can. Pegu. Prome (W.).  
*E. polybotrya*, De Can.  
 Kurz adds from the Nicobars :  
*E. LANCEOLATA*, Hassk. Great Nicobar.

#### NELSONIA, R. Br. & A. DC.

*Stamens* 2, fertile, none sterile.

- N. TOMENTOSA*, Willd. Attaran and Salween valleys (W.).  
*N. rotundifolia*, R. Br. Pegu (B.).  
*N. NUMMULARIFOLIA*, Roem. et Sch.  
*N. Pohlîi*, Nees.  
*N. canescens*, De Can.

#### Sub-order THUNBERGIDEÆ.

*Calyx* reduced to a toothed or naked ring. *Corolla* lobes contorted in æstivation. *Seeds* resting on a cup-shaped expansion of the placenta. Twining plants, rarely prostrate.

#### THUNBERGIA, Linnaeus fil.

*Calyx* inconspicuous, concealed by 2 large bracts.

| *Calyx limb many-toothed.*

- T. FRAGRANS*, Roxb. Mergui (G.).  
*T. lavis*, Wall.  
*T. Javanica*, Gaert.  
*T. angustifolia*, Ham.  
*T. Roxburghia*, Nees.  
*T. LAURIFOLIA*, Lind. Tenasserim (W. F.). Ava (W.).  
*T. Harrisi*, Hook. Tree forests all over Burma and the Andamans (K.).  
*T. grandiflora*, var. *sinuata*, Wall.  
*Hexacentris acuminata*, De Can.

Nweh-chō (K.).

- T. GRANDIFLORA*, Roxb. Chittagong (W.). Singapore (Jack.).  
*T. cordifolia*, De Can.

Leaves broadly ovate, angular-lobed, more or less hairy.

- T. SMILACIFOLIA*, Kz. Ava.

Leaves ovate-oblong, remotely toothed, glabrous, peltate at base.

#### Order BIGNONIACEÆ.

*Flowers* hermaphrodite irregular. *Calyx* tubular to bell-shaped, truncate, toothed or laterally split. *Corolla* elongate or rarely short and bell shaped, 5-lobed, the lobes spreading, often arranged in 2 lips, variously imbricate or rather induplicate, valvate

in bud. *Fertile stamens* 2 or 4 (rarely also the fifth rudimentary one developed), in pairs inserted in the tube. *Anthers* 2-celled, the cells divaricate, or rarely parallel, dehiscing longitudinally. *Ovary* usually 2-celled, with 2 distinct placentas in each cell, attached to the dissepiments and either contiguous or separated by a considerable interval, or the dissepiment discontinued between the placentas, and the ovary appearing 1-celled. *Ovules* several or numerous to each placenta. *Style* filiform, with two short stigmatic lobes. *Fruit* a capsule, often very elongated, opening loculicidally or septifragally in 2 valves, leaving the dissepiment free. *Seeds* transverse, usually flattened, winged, or wingless. *Albumen* none. *Embryo* straight, or rarely curved, with flat or fleshy cotyledons, the radicle next the hilum. Trees or shrubs, often climbing, very rarely herbs. *Leaves* opposite, or rarely scattered, compound or rarely simple, the leaflets usually opposite. *Stipules* none. *Flowers* often showy, solitary, and axillary, or more usually in racemes or panicles.

\* *Seeds in a single row, along the edges of the septum.*

‡ *Septum continuous, flat.*

STENOLOBIUM, D. Don.

*Calyx* more or less distinctly 5-ribbed and 5-toothed, marcescent-persistent. *Leaves* unpaired pinnate, with serrate-cut leaflets.

\* S. STANS, Seem. E.S.

An American shrub, now cultivated.

All parts glabrous. *Leaves* variable, from 1-3 foliolate to unpaired pinnate. Leaflets in 1 to 2 pairs, almost sessile. Capsule 6 inches long, glabrous.

‡‡ *Septum more or less corky-medullary, jointed.*

STEREOSPERMUM, Chamisso.

*Calyx* net-ribbed, marcescent-persistent. *Seeds* spuriously 2-celled. *Leaves* pinnate.

× *All parts and the inflorescences quite glabrous.*

S. CHELENOIDES, D.C.

Ava. Chittagong. Pegu.

Tha-khwöt-hpyu (Kurz), or Tha-kut-hpyu.

Flowers yellow, rather small, septum of capsule terete.

Wood close-grained, soft, elastic, durable, and takes a good polish (Kurz).

S. SERRULATUM, D.C.

Ava.

Leaflets only about an inch long, serrulate, septum of capsule compressed.

× × *Younger parts and inflorescences variously pubescent.*

S. NEURANTHUM, Kz.

Pegu Range.

Than-deh (Kurz).

Flowers pale lilac or bluish-white with dark purple veins, inflorescence and calyx simply pubescent. Seeds and septum as in *S. chelonoides*.

Wood greyish or reddish-brown, close-grained, heavy, soft. Weight 33-36 lbs. (Kurz). There is some confusion here, as a wood of 36 lbs. to the cubic foot cannot be termed heavy. A wood under 40 lbs. may be termed light (W.T.).

S. SCABEOLENS, D.C.

Martaban.

Flowers 2-lipped, uniformly lilac or purple, the lobes crenulate-undulate, inflorescence viscid-pubescent.

S. FIMBRIATUM, D.C. Tree forests of Martaban and Tenasserim up to 3000 feet.

Than-that (Kurz).

Flowers funnel-shaped, uniformly pale lilac, the lobes long-fimbriate, inflorescences glandular pubescent.

\*\* *Seeds in 2 or more imbricated rows, along the edges of the continuous septum.*

† *Calyx more or less circumsciss-deciduous.*

× *Leaves ternately bipinnate, or decomposed.*

RADLEMACHERA, Zollinger.

*Calyx* urceolate, obsoletely 5-toothed. *Filaments* inserted at the constriction of the tube. *Anther-cells* divaricate.

R. (SPATHODEA) AMENA, D.C.

Ava.

All parts glabrous, leaves tripinnate on an almost terete petiole, 3-4 inches long. Corolla more than an inch long, funnel-shaped, streaked yellowish-brown inside at the bottom. Septum compressed, bearing along each border a single row of long-winged seeds.

R. LOBBII, Miq.

Tree forests of Kamorta.

MAYODENDRON, Kurz.<sup>1</sup>

*Calyx* spathaceous, slit to about its middle. *Filaments* adnate up to about the middle of the corolla. *Anther-cells* almost parallel.

M. (SPATHODEA) IGNEUM, Kz.

Ava and Martaban up to 3000 feet.

Leaves ample, resembling those of *Acrocarpus*, the lower pinnae 2-pinnate, the upper ones gradually simply pinnate, glabrous. *Calyx* 6-7 lines long, shortly puberulous, green or purplish-green. Corolla glabrous; inside at the tube puberulous, 2 inches or more long. Pods thin, slender, cylindrical, 1½ inch long, glabrous.

× × *Leaves unpaired-pinnate.*

SPATHODEA, P. Browne.

*Calyx* spathaceous, slit to the base. *Filaments* inserted at the constriction of the tube. *Anther-cells* divaricate.

\* *Corolla white, tubular-funnel-shaped. Seeds corky, winged.*

S. RUEDEI, Wall.

The Pegu Range, Tenasserim, the Andamans and Katchall.

Tha-khwöt or Tha-khut.

All parts, and the calyx, glabrous. Leaves up to a foot long. Flowers very large, white, usually forming a poor raceme at the end of the young branchlets. *Calyx* nearly an inch long, smooth, green.

\*\* *Corolla yellow or brownish-yellow, campanulate-funnel-shaped, abruptly constricted, on a rather short tube. Seeds membranously winged.*

S. STIPULATA, Wall.

Ava. Pegu Range and Martaban.

*S. serrulata*, Brandis.

Ma-lwā.

Leaves entire, unpaired-pinnate, 1 to 1½ feet long. Bark ½ an inch thick, resembling that of teak. *Calyx* 1¼ inch long, tawny-villous. Corolla somewhat inflated above the constricted short tube, quite glabrous. Capsules narrow, lanceolate, 1-1½ feet long. Seeds elongate-winged, nearly 2 inches broad.

Of this tree Mason remarks: "A common flowering tree is a species of *Bignonia* that bears a long twisted pod. It is common at Maulmain, and the flowers are often seen in the Bazaar, where they are sold for food. The tree enters into the *Materia medica* as affording a cure for *Psora*."

S. VELUTINA, Kz.

Ava. Pegu.

Leaves serrulate, else as the last. *Calyx* tawny, velvety.

<sup>1</sup> "In honorem viri nobilissimi Mayo, proregis infansti, Indiae Orientalis dictum."—Kurz, J.A.S.B. Part ii. 1873, p. 91.

† † *Calyx persistent, or marcescent-persistent.*

× *Leaves unpaired-pinnate.*

HETEROPHRAGMA, *De Candolle.*

*Calyx* 2-3-lobed, without ribs. *Capsule* rather flat, not winged.

H. SULPHUREA, Kz.

Prome and the Pegu Range.

Thit-leng-dā (Kurz).

Corolla funnel-shaped, yellow, pods rather flat, without ribs, villose-tomentose.

H. ADENOPHYLLA, Scem.

Ava. Pegu. Tenasserim and the Andamans.

Hpet-thān (Kurz).

Corolla campanulate-funnel-shaped, dull brown, pods rather cylindrical, ribbed, scurfy-tomentose. Wood pale yellowish-brown. Weight 53 lbs. Excellent for furniture (W.T.).

PAYANELIA, *De Candolle.*

*Calyx* 5-winged, 5-toothed. *Capsule* flat, winged.

P. MULTIJUGA, D.C. *E.T.*

The Pegu Range, Tenasserim and the Andamans.

Kyoung-tonk (Kurz).

All parts glabrous. Leaves  $1\frac{1}{2}$  to 3 feet long, with an angular rachis. Leaflets in 10-12 pairs, with an odd one. *Calyx* nearly an inch long. Corolla 2-3 inches across the lobes. Capsules flat, obovate-lanceolate,  $1\frac{1}{2}$  feet long by 3 inches broad, broadly winged, glabrous. Heart wood brown, rather close-grained.

× × *Leaves ternately 2-pinnate or decompose, capsules flat.*

OROSYLVUM, *Ventenat.*

*Calyx* truncate. *Corolla* campanulate-funnel-shaped. *Fertile stamens* 5.

O. (BIGNONIA) INDICUM, L.

All over Burma and the Andamans.

Kyoung-ya-pen (Kurz).

All adult parts glabrous. Bark an inch thick, grey, smooth, but not even. Leaves ample, 2-3 feet in diameter; leaflets unequal at the rounded or obtuse base, 2-3 inches long. Chartaceous glabrous above, minutely puberulous below. Flowers large, showy, purplish with a yellow tube, on short and very thick pedicels.

Wood coarse-grained. Weight 23 lbs. Worthless.

MILLINGTONIA, *Linnaeus.*

*Calyx* obsoletely 5-toothed. *Corolla* salver-shaped. *Petiole-stamens* 4, one of the anther-cells spurred.

M. HORTENSIS, L. f. *E.T.*

Ava. Martaban. Tenasserim.

Ay-ka-yit (Kurz).

Bark an inch thick, dark grey, corky-fissured. Leaves 2-3 feet long. Flowers showy, white, fragrant, on short puberulous pedicels. *Calyx* 1-2 lines long, almost truncate. Seeds nearly an inch across, surrounded by a pellucid tender wing. Bark used as a substitute for cork.

CALOSANTHES, *Blume.*

C. INDICA, Bl. (M.).

Kyoung-chā.

BIGNONIA, *Tournef.*

B. ADENOPHYLLA, Wall. (M.).

B. FIMBRIATA, Wall. (M.).

- B. SUBEROSA, Roxb. (M.) Pegu. Ava.  
 B. CORONARIA, McClell. (M.).  
 B. SPATHOIDIA, McClell. (M.).  
 B. CRISPA (M.).

Mason in addition to the above enumerates several vernacular names of various *Bignonias*, Thān-thit, Thu-gai-ni, Sain-bhā, and in Sgau-Karen Kywai-tha.

#### Order GESNERACEÆ.

*Corolla* more or less bilabiate, hypo-, peri- or epigynous; lobes 5, imbricate. *Stamens* usually 4, didynamous. *Anthers* often cohering. *Disk* annular or unilateral. *Ovary* 1-celled, superior. *Placentas* two, parietal, many-ovuled. *Fruit* a berry or capsule. *Seeds* minute. *Embryo* straight, albuminous or not. Herbs, rarely shrubs. *Leaves* usually opposite or whorled, exstipulate.

##### EPITHEMA, *Blume*.

- E. CARNOSUM, D.C. (K.). Kamorta. Maulmain (P.).  
 E. Zeylanicum, Gard.

##### CYRTANDRA.

- C. ACUMINATA, Wall. (?)

##### RHYNCOGLOSSUM.

- R. INTERMEDIUM. (P.).

##### CHIRITA.

- C. HAMOSA. (P.).

##### ÆSCHYNANTHUS, *Jack*.

- Æ. (INCARVILLIA) PARASITICUS, Wall. (P.).  
*Trichospermum grandiflorum*, Don.

A parasitical plant with crimson and yellow flowers, resembling those of the Fox-glove (*Digitalis purpurea*). Stem succulent, with enlarged joints, giving out fibrous roots.

##### LOXOTIS, *Brown*.

- L. INTERMEDIA, Benth. (M.).

#### Order OROBANCHEÆ.

*Corolla* bilabiate, lobes imbricate. *Stamens* 4, didynamous. *Disk* fleshy. *Ovary* 1- rarely 2-celled. *Placentas* parietal, many-ovuled. *Capsule* bivalvate. *Embryo* minute in fleshy albumen. Parasitic leafless herbs.

##### ÆGINETIA, *Linnaeus*.

- Æ. INDICA, Roxb. (M.).

#### Order UTRICULAREÆ.

*Corolla* bilabiate, lobes imbricate. *Stamens* 2, included. *Anthers* 1-celled. *Ovary* 1-celled. *Placenta* globose, basal, many-ovuled. *Stigma* bilabiate. *Fruit* capsular. *Embryo* straight, undivided, exalbuminous. Scapigerous herbs, often floating. *Leaves* radical, entire or capillary and multilid.

##### UTRICULARIA, *Linnaeus*.

- U. DIANTHA, Roem and Schult. (K.). Kamorta, in a stream East of Enaca.  
 U. FASCICULATA, Roxb. (M.). -  
 U. PUNCTATA, Wall. (M.). Maulmain (P.).

U. AFFINIS, Wight (M.).

U. BIFIDA, L. (M.).

U. RACEMOSA, Wall. (M.).

U. FILICAULIS, Wall. (M.).

U. ORBICULATA, Wall. (M.).

Sir J. Hooker records a curious use made of the leaves of a genus of this order: "*Pinguicula* leaves, whether fresh or dry, are used by the Lapps to thicken fresh still warm milk, which neither curdles nor gives cream thereafter, but forms a delicious compact tenacious mass, a small portion of which will act similarly on another quantity of fresh milk."

#### Order SCROPHULARINEÆ.

*Corolla* often bilabiate, lobes imbricate or folded. *Stamens* 4, didynamous, or 2. *Ovary* 2-celled. *Placentas* on the septum. *Style* simple. *Stigmas* 1 or 2. *Ovules* definite or many. *Fruit* a capsule, rarely a berry. *Embryo* straight or curved, albuminous. *Herbs*, very rarely shrubs or trees. *Leaves* opposite alternate, or whorled, simple.

#### Sub-order RHINANTHIDEÆ.

*Corolla* imbricate in æstivation, the two lateral lobes, or one of them, placed outside all the others, the posterior never. *Inflorescence* usually indefinite.

#### GERARDIEÆ.

*Leaves* all or the lower only opposite. *Inflorescence* centripetal, racemose. *Stamens* approximate in pairs. *Anthers* 2-celled, cells often spurred, equal, or one empty.

#### CENTRANTHERA, R. Brown.

C. HISPIDA, R. Br. (K.).

Kamorta.

C. BRUNNONIANA, Wall. (M.).

#### BUCHNERIEÆ.

*Leaves* all or the lower only opposite. *Inflorescence* centripetal, racemose. *Stamens* approximate, in pairs. *Anthers* dimidiate, 1-celled.

#### STRIGA, Linnaeus.

S. HIRSUTA, Bth. (K.).

Kamorta.

With yellow flowers.

#### SIBTHORPIEÆ.

*Leaves* alternate or fascicled, with the flowers at the nodes, rarely opposite, not connate. *Floral leaves* similar or upper smaller. *Flowers* rarely cymose.

#### SCOPARIA, Linnaeus.

S. DULCIS, L. (M.).

Kamorta and Katchall (K.).

#### Sub-order ANTIRRHINIDEÆ.

*Corolla* imbricate in æstivation, bilabiate, the posterior or upper lip placed outside the lower. *Inflorescence* completely indefinite or mixed.

#### GRATIOLIEÆ.

*Corolla* tubular, not saccate, nor spurred. *Capsule* 2-valved, rarely indehiscent. *Inflorescence* centripetal, uniform (composite in *Manulea*). *Calyx-lobes* imbricate.

BONNAYA, *Link and Otto.*

- B. VERONICEFOLIA, Spreng. (M.).  
 B. VERBENEFOLIA, Spreng. (M.).  
 B. TENUIFOLIA, Spreng. (M.).  
 B. PARVIFLORA, Benth. (M.).  
 B. BRACHIATA. (P.).

DOPATRIUM, *Ham.*

- D. JUNCEUM. (P.).

HERPESTIS, *Gaertner, f.*

- H. MONNICRIA, Kuth. (M.).  
*H. procumbens*, Spreng.

LIMNOPHILA, *R. Brown.*

- L. HIRSETTA, Bth. Kamorta (K.).  
 var. *scaberrima*.

TORENIA, *Linnaeus.*

- T. CORDIFOLIA, Roxb. Maulmain (P.). Kamorta (K.).  
 T. ASIATICA. Maulmain (P.).  
 T. FLAVA. Maulmain (P.).

VANDELLIA, *Linnaeus.*

- V. SCABRA. (P.).  
 V. CRUSTACEA. (P.).

LINDENBERGIA, *Lhm.*

- L. MACROSTACHYA. Zwa-ka-bin (P.).  
 L. URTICEFOLIA.

## ERINUS.

- E. BILABIATUS. (P.).

## CHELONIEÆ.

*Corolla tubular, not saccate nor spurred. Capsule 2-4-valved, rarely an indehiscent berry. Inflorescence composite. Calyx imbricate.*

PENSTEMON, *Michaux.*

- P. LEVICAUDATUM, Mich. (M.).

RUSSELLIA, *Jacq.*

- R. FLORIBUNDA, Kth. (M.).  
 R. JUNCEA, Zuc. (M.).

## ANTIRRHINEÆ.

*Corolla tubular, often saccate, or spurred. Capsule dehiscing by pores. Leaves, lower or all, opposite or whorled. Inflorescence centripetal, uniform.*

LINARIA, *Tournef.*

- L. RAMOSISSIMA, Wall (M.).

This Order (*Scrophularineæ*) yields few useful products. It embraces some familiar flowers and plants, ornamental to our gardens, or once held in repute for their medicinal properties, as *Calceolaria*, Snapdragon (*Antirrhinum*), Eye-bright (*Euphrasia officinalis*), from which an eye-water is prepared; Toad-flax (*Linaria vulgaris*), once esteemed in jaundice and skin diseases; and some possessing bitter and febrifuge qualities, as the Indian *Herpestis amana* and *Picrorhiza leeta*. But the most useful in

its medicinal effects is the Fox-glove (*Digitalis purpurea*), which owes its energetic action to the presence of a peculiar bitter principle, *Digitaline*, which possesses the power of lowering the pulse, and is hence of extreme value in certain forms of heart disease.

\*\* *Flowers usually regular.*

#### SOLANALES.

*Corolla* monopetalous, hypogynous, regular or oblique. *Stamens* as many as the corolla-lobes, epipetalous, equal or unequal. *Ovary* 2-celled, syncarpous. *Cells* very numerous, and very numerous ovuled. *Leaves* alternate or geminate, rarely opposite exstipulate. Herbs, rarely shrubs or trees.

#### Order SOLANÆÆ.

*Flowers* regular, or nearly so, hermaphrodite. *Calyx* 5- rarely 5-10-toothed, lobed or cleft, rarely almost entire and truncate, persistent, or rarely circumsciss-deciduous, beyond the base, often enlarging in fruit. *Corolla* from rotate to funnel-shaped, plaitedly 4- (rarely 4-10-)lobed or cleft, imbricate or twisted in bud. *Stamens* as many as corolla-lobes, and alternating with them. *Filaments* usually very short and connivent, either parallel or more usually tapering upwards, and forming a cone round the style, opening in apical pores or transverse slits, rarely dehiscing along their whole length, usually without any prominent connective between the cells. *Ovary* entire (or rarely consisting of 2-30 distinct carpels), 1-6-celled, each cell with 1 or many ovules. *Style* and *stigma* simple, or with as many lobes as there are ovary-cells. *Fruit* either a drupe with a 1-6-celled putamen (or rarely the drupes distinct with a 2-celled and 2-seeded putamen), or more usually a pulpy berry or a septically opening, 2-valved or at the summit circumsciss-opening capsule. *Seeds* compressed. *Albumen* copious fleshy. *Embryo* curved to spiral, rarely straight, with half cylindrical cotyledons, the radicle terete. Herbs, shrubs, or rarely soft-wooded trees with alternate simple lobed or pinnate leaves. *Stipules* none. *Flowers* solitary or in centrifugal cymes or unilateral racemes usually at first terminal, but becoming lateral from the elongation of the shoot, rarely axillary. *Bracts* and bractlets usually none.

#### SOLANÆÆ.

*Berry* 2- or more seeded, placentation central. Rarely a capsule without valves.

\* *Fruit a berry.*

‡ *Fruiting calyx enlarged or not, supporting the berry.*

+ *Ovules and seeds very numerous.*

#### SOLANUM, *Linnaeus*.

*Anthers* opening by apical pores.

× *Corolla more or less pubescent or tomentose outside.*

‡ *Glabrous or only very thinly sprinkled with minute stellate hairs.*

*S. TRILOBATUM*, L.

Tree forests of Arakan and Pegu.

The 3-lobed nightshade.

Scandent under shrub, armed with recurved prickles, leaves slightly lobed. Berries the size of a pea, edible, though rather bitter.

‡ ‡ *All parts more or less densely stellate-tomentose.*

+ *Flowers in a true cyme.*

*S. TORVUM*, Swartz.

All over Burma and introduced into the Andamans.

Prickly, leaves more or less lobed, pubescent.

*S. VERBASCIFOLIUM*, L.

All over Burma.

Unarmed. Leaves entire, thickly tomentose. Berries edible.

++ *Flowers in a raceme, often much reduced, rarely solitary.*

† *Berries free, not inclosed, but only supported by the calyx.*

\* *S. FEROX*, L. Pegu Range and Tenasserim, and introduced into the  
Hsyn-ka-de (Kurz). Andamans. Cultivated by the Karens.

Prickly armed, flowers in very short racemes. Berries 1 to 1½ inch thick, globular, hirsute, or puberulous.

var. *Trongum*, Poir.

More thickly stellate-tomentose, the flowers more frequently solitary, berries somewhat larger, losing their hairiness, and becoming glossy and sparingly pubescent.

*S. INDICUM*, N.E. All over Burma.

Prickly armed, flowers racemose, berries globular, the size of a pea.

× × *Corolla quite glabrous.*

† *Calyx 6-merous.*

*S. SPIRALE*, Roxb. Ava.

A glabrous shrub, flowers in long racemes, about ¾ of an inch across, leaves entire.

\* *S. TUBEROSUM*, L. (M.). Capable of being cultivated in the drier parts of Pegu.  
Common Potato.

*S. RUBRUM*, Willd. (M.).

\* *S. MELONGENA*, L. Cultivated.

Kha-yan. Brinjal. Egg-plant.

This well-known plant produces one of the most esteemed vegetables in the East, of which there are many varieties. It is much improved by careful cultivation, requiring a rich soil and plenty of water. Dr. Mason gives the following vernacular names for different species of *Solanum*: Kha-yan-kyen, Ta-byeh, Neh-pu-kha-yan, Kha-yan-gywôt, Kha-yan-pa-meh.

*LYCOPERSICON*, *Tournef.*

\* *L. ESCULENTUM*, Wall. (M.).

Kha-yan-mya-phung. Tomato.

*PHYSALIS*, *Linnaeus.*

\* *P. PERUVIANA*, L. Cultivated.

Pung-ben.

Cape or Brazil country gooseberry or cherry, so called, apparently on the *lucus a non lucendo* principle, from bearing not the slightest resemblance in look or flavour to either fruit. The fresh fruit is very wholesome, and makes an excellent preserve. The seeds of *P. flexuosa* are used to coagulate milk, for cheese, and a decoction of its leaves as a febrifuge, and similar properties seem to be present in all the species, due to the presence of a bitter principle named *Physaline*, whose flavour may often be detected, when first the fruit is put into the mouth. The plant abundantly repays careful cultivation.

++ *Ovules and seeds solitary in the cells.*

*GARDNERIA*, *Wallich.*

*Anthers* almost sessile. *Ovary* 2-celled, the solitary ovules springing laterally from the septum. *Seeds* concave.

*G. OVATA*, Wall. E.S.S. Ava.

All parts quite glabrous. Flowers rather small, white, or greenish-white, on filiform ½ inch long pedicels minutely 2-bracteolate at the middle, usually by threes on a filiform peduncle, arising from the axils of the leaves. Berries 2-seeded, the size of a pea.

CAPSICUM, *Tournef.*\* *C. ANNUM*, L.

Cultivated.

*C. grossum*, Willd.*C. frutescens*, L.*C. baccatum*, L.*C. minimum*, MacClet.

The above are a few of the varieties or races which have been educed by cultivation from the wild plant. *C. minimum* is the dwarf variety, known as 'bird's eye Chillies,' but the properties of all are alike, the fiery pungency of the plant attaining its maximum development in a Trinidad variety, appropriately named 'Devil's pepper.' Its uses as a condiment are too well known to require recording, and it is said to form one of the principal ingredients in Perry Davis's 'Pain-killer,' a familiar panacea, wherever the American Baptist missionaries have effected a lodgment.

## DATURIEÆ.

*Capsule or berry incompletely 4-celled: primary septum bearing a placenta on each side, either on its centre, or near the parietal angle.*

SOLANDRA, *Swz.**S. GRANDIFLORA*, Swz. (M.).DATURA, *Linnaeus.**D. FASTUOSA*, Wall. (M.).*D. METEL*, L. (M.).*D. alba*, Rumph.

Pa-daing-hpyu. The Thorn-apple.

The thorn-apple is a common weed round villages in India and Burma, and its seeds are used as narcotics by 'Thugs' and other robbers, mixed with curry or sweetmeats. The active principle is an alkali, *Datura*, which is present in both the seeds and leaves. Its use causes dilatation of the pupil and in poisonous quantities delirium, coma and death. After even a dose which does not kill, the patient often takes some days to recover his faculties. The leaves smoked in a pipe, or in the form of a cigar, are a valuable remedy for asthma, but the drug should be discontinued if it produces vertigo.

## NICOTIANIÆ.

*Capsule 2-celled, septoidally 2-valved.*

NICOTIANA, *Tournef.*\* *N. TABACUM*, L.

Tobacco is a plant of America, but now largely cultivated in Asia. An excellent tobacco is grown in Upper Burma and the Shan states, but care and knowledge are wanted in its growth and manufacture to insure a first-class article, and this is not likely to be, till the industry attracts European attention and capital.

There are few Orders more important to man than this, embracing as it does the potato and tobacco, the food and solace of millions. Equally valuable to millions of Asiatics is the capsicum, whose warm stimulating fruit either fresh or dried is invaluable in the insipid dietary of those whose food is mainly rice. The species of *Solanum* all contain a narcotic alkaloid, and are more or less poisonous when it is present in considerable quantity, as in the 'deadly nightshade.' Tobacco owes its peculiar soothing power to two powerfully poisonous principles, one an uncrystallizable oil, *Nicotine*, the other a concrete volatile oil. The action of either of these substances resembles that of *Digitalis*, producing a general lowering of the vital powers, paralysis and death. The moderate use of tobacco, however, is thought by some authorities to act as a preventive of malarious fever (Waring), and, as is the case with other vegetable poisons, the system becomes habituated to its use, and the unpleasant

results are therefore unknown to the hardened smoker, which are so distressing to the novice. In the potato the tubers are the only edible part of the plant, as the leaves and fruit contain a narcotic alkaloid, *Solanine*. Other species contain powerful alkaloids used in pharmacy. *Atropa belladonna* yields *Atropine*, used in asthma, rheumatism and neuralgia, and also (from its causing dilatation of the pupil) in many diseases of the eye. The same plant yields also another alkaloid, *Belladonnine*. Henbane (*Hyoscyamus niger*) is another valuable plant in medicine, its powers depending on the presence of the alkaloid *Hyoscyamine*; and lastly several species of *Datura* (*D. stramonium*, *D. tatula* and *D. metel*) yield an alkaloid, *Daturine*, and are all extremely efficacious in asthma, and some other complaints.

## POLEMONIALES.

*Corolla* hypogynous, monopetalous, regular. *Stamens* as many as the corolla-lobes, and inserted on the tube. *Filaments* usually exerted. *Ovary* 1- to 5-celled, syncarpous (except *Dichondrea* and *Nolanea*). *Cells* 1- to 2-, very rarely many-ovuled. *Embryo* albuminous. *Leaves* alternate or none, exstipulate. Herbs, rarely shrubby below.

## Order BORAGINÆÆ.

*Flowers* usually hermaphrodite, regular, or nearly so. *Calyx* free, 5- (rarely 4- or 6-)cleft or toothed, or rarely irregularly slit. *Corolla* salver-shaped, with a longer or shorter tube, 5- (rarely 4- or 6-)lobed, imbricate or induplicate in bud. *Stamens* as many as corolla-lobes, and alternating with them, or very rarely fewer, inserted in the corolla-tube. *Anthers* 2-celled, dehiscing longitudinally, or rarely with apical pores. *Ovary* superior, entire or 4-lobed, either 4-celled, with a solitary ovule in each cell, or 2-celled and the cells 2-ovuled (in both cases the ovary consists of 2 carpels only), the ovules laterally attached, ascending or pendulous. *Style* terminal or between the lobes. *Fruit* either a drupe, with the endocarp entire, or separating into 2 or 4 pyrenes, or dry, and separating into 4 or rarely 2 nuts. *Albumen* none or scanty. *Embryo* straight, with flat and rather thick or rarely folded cotyledons, the radicle short. Herbs or perennials usually rough, from coarse hairs, or shrubs and trees, which are glabrous, or with a softer investment, with alternating or very rarely opposite leaves, simple, or very rarely deeply lobed. *Flowers* in 1-sided spikes or racemes, circumnately rolled back when young, and often forked or dichotomous, or rarely in irregularly branched panicles or solitary. *Bracts* and bractlets often wanting.

## BORAGINÆÆ.

*Ovary* of two 2-celled or 2-partite carpels. *Style* ventral or basal. *Fruit* 2-4-partite. *Albumen* none.

## TRICHODESMA, Brown.

T. INDICUM, Br. (M.).

T. PERFOLIATUM, Wall. (M.).

## HELIOTROPIÆÆ.

*Ovary* several-celled. *Style* terminal, simple. *Fruit* dry, entire, or separating into cocci. *Albumen* scanty or none. *Cotyledons* flat.

## HELIOTROPICUM, Tournef.

\* H. PERUVIANUM, L. (M.).

H. BREVI-FOLIUM, Wall. (M.).

## EHRETIEÆ.

*Ovary* undivided. *Style* terminal, 2-lobed. *Fruit* indehiscent, 1-seeded. *Albumen* none. *Cotyledons* flat.

EHRETIA, *Linnaeus*.

*Calyx* deeply cleft into 5 segments. *Corolla* more or less rotate, with a short tube, imbricate in bud. *Stamens* inserted in the tube. *Anthers* exserted, or rarely almost included. *Ovary* 2-celled, with 2 ovules in each cell, or 4-celled, with solitary ovules. *Fruit* a drupe, the endocarp forming two 2-seeded or four 1-seeded pyrenes.

× *Leaves entire. Pyrenes* 4, 1-seeded.

E. ASPERA, Roxb.

Ava.

Leaves, especially beneath, pubescent.

E. LEVIS, Roxb.

South Andaman.

Leaves glabrous.

Mason gives as the name for *Ehretia*, Yen-yai myouk-myi.

## CORDIEA.

*Ovary* undivided. *Style* terminal (rarely none), twice forked. *Fruit* indehiscent, usually fleshy, 4-seeded. *Cotyledons* longitudinally folded. *Albumen* none.

CORDIA, *Linnaeus*.

*Style* twice forked. *Calyx* more or less tubular, forming a cup under the drupe.

\* *Leaves beneath and calyx densely tomentose.*

C. FRAGRANTISSIMA, Kz.

Martaban and Upper Tenasserim.

Ka-la-mat (Kurz).

*Calyx* about 4 lines long. Adult leaves smooth above and white-dotted. *Ovary* with a sessile stigma.

Wood very fragrant (Kurz).

C. POLYGAMA, Roxb.

Martaban up to 2000 feet.

*Calyx* about  $2\frac{1}{2}$  lines long. Leaves above very scabrous, from short hairs, and minutely white-dotted.

\*\* *Leaves glabrous or pubescent beneath. Calyx glabrous or puberulous.*

× *Flowers small, white. Corolla-tube as long as or shorter than the calyx.*

C. MYXA, L.

Chittagong and all over Burma.

Tha-nāt, or Toung-tha-nāt (Kurz).

Glabrous-leaves without white dots on the upper side. Drupes the size of a cherry, acuminate.

var. *genuina*. Branchlets silvery grey, leaves usually smaller and more repand-crenate, more coriaceous. Berries about  $\frac{1}{2}$  to 1 inch in diameter.

var. *brunnea*, Kz. Branchlets brown, the young shoots densely brown-pubescent. Leaves larger, of a more chartaceous texture; especially while young, covered with a soft appressed brown pubescence. Drupe about an inch long.

Wood valueless, save for fuel.

The leaves of a species of *Cordia*, called 'Mhay-ā,' are used as envelopes for the common Burmese cheroots, made of chipped tobacco, rolled up into a conical cigar.

C. GRANDIS, Roxb.

Chittagong, Ava, and Pegu.

Tha-nāt.

Leaves white-dotted above. Drupe the size of a pea, blunt, with a mucro.

× × *Flowers large and showy, orange or brick-red. Corolla-tube long-exserted.*

C. SUBCORDATA, Lamk. S.

Kamorta and Nankowry.

Corolla-limb nearly an inch in diameter, crumpled. Drupe the size of a cherry, crowned by the calyx-tube.

var. *a genuina*, the leaf-buds, inflorescence, and calices minutely tawny-puberulous.

var. *β glutinosa*, the same parts quite glabrous and sticky, or rarely the calyx minutely puberulous.

\*\*\* *Leaves sharply serrate. Pyrenes two, 2-seeded.*

*E. SERRATA*, Roxb. *E.T.*

Chittagong and Ava Hills.

Calyx and corolla-lobes very blunt.

*RHABDIA*, *Martin*.

*Calyx* 5- (very rarely 6-) parted, the lobes equal or nearly so. *Corolla* bell-shaped with a short tube, the limb 5- (rarely 6-) cleft. *Stamens* 5. *Anthers* oblong, basifixid. *Drupe* with 4 (rarely 6) 1-seeded pyrenes.

*R. VIMINEA*, Dalz.

All over Burma.

Leaves cuneate-oblong, on a very short pubescent petiole, or almost sessile,  $\frac{1}{2}$  to 1 inch long, glabrescent. Flowers reddish-lilac.

*TOURNFORTIA*, *Linnaeus*.

*T. ARGENTEA*, L. (K.).

Katchall. Trice. Track.

*T. (TETRANDRA) GLABRA*, Miq. (K.).

Katchall. Kamorta.

*T. OVATA*, Wall. (M.).

Several species of this Order furnish examples of the doctrine of signatures, whereby our ancestors thought they discovered the medicinal powers of plants, from certain marks or signs impressed on them. For example: Lung-wort (*Pulmonaria officinalis*), having white-spotted leaves, was supposed to be an effectual remedy in tubercular disease of the lungs; Viper's bugloss (*Echium vulgare*), having seeds like vipers' heads, was regarded as being an antidote for the bite of vipers; and Gromwell (*Lithospermum officinale*), on account of its hard pearly nucules, was held to be an excellent medicine for dissolving calculus in the bladder.

#### Order CUSCUTEÆ.

*Corolla-lobes* 4 or 5. *Stamens* inserted on the corolla-tube, with often as many fimbriate scales below their insertion, included. *Disk* none. *Ovary* 2-celled. *Styles* 2, free or connate. *Ovules* 2, erect in each cell. *Capsule* 2-celled, circumsciss at the base. *Embryo* spiral in copious fleshy albumen. Leafless parasitic filiform twining herbs.

*CUSCUTA*, *Linnaeus*.

*C. SULCATA*, Roxb. (M.).

The 'Dodders' or Devil's-guts, as they are forcibly termed in England, are filamentous parasitical plants, often seen in Burma overwhelming hedges with their long yellow thread-like stems. In Europe *C. minor* lives on clover, lucerne, thyme, broom and heath, *C. densiflora* infests flax, whilst *C. major* attacks and drains the juices of nettles, hops and the vine.

#### Order DICHONDREÆ.

*Corolla-lobes* 5, valvate. *Stamens* inserted on the corolla. *Ovary* apocarpous. *Carpels* 2 or 4, 2-ovuled. *Styles* basal. *Ovules* erect. *Utricles* 2, 1-seeded. *Embryo* curved, cotyledons crumpled, in scanty albumen. Small herbs, erect or prostrate.

*DICHONDRA*, *Forster*.

*D. REPENS*, Forst. (M.).

A slender creeping perennial herb, rooting at the nodes, hoary with a minute, often silky, pubescence.

## Order CONVULVULACEÆ.

*Flowers* regular. *Calyx* of 5 sepals much imbricated in bud, rarely 5-toothed or lobed. *Corolla* bell- or funnel-shaped, rarely rotate or salver-shaped, the limb 5-lobed or angular, folded or very rarely imbricate in bud. *Stamens* 5, inserted in the corolla-tube and alternating with the corolla-lobes. *Anthers* versatile or nearly erect, 2-celled, the cells opening lengthwise. *Ovary* free, 2- 3-4-celled, rarely divided into 2-4 distinct carpels, with 1 or 2 erect or ascending ovules in each cell or carpel, or 1-celled with 2 or 4 ovules. *Style* simple, or more or less divided into 2 entire or 2-cleft branches or styles. *Fruit* either a capsule opening in as many or twice as many valves as there are cells and leaving the dissepiments attached to the axis, or opening transversely or irregularly, or an indehiscent berry. *Seeds* erect with a membranous or coriaceous testa. *Albumen* scanty or none. *Cotyledons* usually much folded, rarely straight or wanting. Shrubs or herbs, usually twining or creeping (rarely trees or leafless parasitic twiners) with usually milky juice. The milky juice of most species is strongly purgative. Scammony is derived from *Convolvulus scammonia*, and a similar product comes from *Ipomœa tuberosa*, *Pharbitis cathartica*, *piptostegia* and others. The best sort of jalap is obtained from *Eragonium purga*, and there are many other species, Indian as well as American, the roots of which yield an inferior sort of jalap. The active principle is volatile, hence the powdered drug soon becomes inert. *Convolvulus dissectus* is rich in prussic acid. Edible roots are also produced by species of this Order, and more especially by *Batatas edulis*, the common sweet potato, and *B. jalapa*.

## ERICIBIÆ.

*Fruit* baccate. *Carpels* connate, into a 1-celled ovary, with a sub-sessile 5-lobed stigma. *Embryo* with distinct cotyledons.

\* *Corolla-lobes* 2-cleft. *Stigma* almost sessile.

ERICIBE, Roxburgh.

*Ovary* 1-celled, 4-ovuled. *Stigma* large, globose. *Fruit* a berry.

\* *Flowers* clustered.

E. GLOMERATA, Wall. E.S. Upper Tenasserim.

Leaves strongly and prominently nerved and veined.

\*\* *Flowers* in cymes, arranged in raceme-like elongate panicles.

× *Leaves* glossy on both sides, not glaucescent.

E. CORIACEA, Wall. E.S.S. Chittagong and Upper Tenasserim.

Leaves very coriaceous, the lateral nerves faint, the transverse venation absent or obscure.

E. PANICULATA, Roxb. E.S.S. Ava. Tenasserim. Kamorta. Car Nicobar.

Leaves thin-coriaceous, the lateral nerves and net-venation thin but conspicuous.

× × *Leaves* opaque, on both sides glaucescent.

E. GLAUDESCENS, Wall. Tree forests of Upper Tenasserim.

Panicle and sepals sparingly silk-hairy, glabrescent.

## CONVOLVULIÆ.

*Carpels* connate. *Style* simple. *Embryo* with distinct cotyledons.

*Fruit* a capsule, with a thin or hard pericarp, valvately opening, or berry-like, and the pericarp very thin and rupturing irregularly.

+ *Bracts* and branches deciduous, often small.

† *Style* simple, the stigmas capitate to filiform.

‡ *Sepals* not, or but little enlarged in fruit, capsule 2-4-celled.

*Ipomœa*, *Linnaeus*.

*Ovary-cells* 2 or 1-ovuled. *Stigma* globose, or bi-globose. *Capsule* 2-4-valved, rarely opercleed, or irregularly bursting. Creepers.

\* *Flowers* salver-shaped, white, *stamens* exerted.

*I. BONANOX*, L. All over Burma.

Nweh-ka-sun-a-hipyoo (Kurz).

Seeds glabrous; the 2 outer sepals abruptly subulate.

*I. YOMLE*, Kz. The Pegu Range.

Seeds velvety-tomentose. Sepals all acute and nearly conform.

\*\* *Corolla* bell- or funnel-shaped.

× *Corolla* rose-coloured.

*I. CAMPANULATA*, L. Chittagong, the Andamans, and Kamorta.

Branches terete, pubescent, seeds shortly brown-tomentose.

× × *Corolla* white.

*I. TURPETHUM*, R. Br. All over Burma. Katchall.

Branches 3-cornered and 3-winged. Seeds glabrous.

× × × *Corolla* yellow.

*I. XANTHANtha*, Kz. Prome, Pegu and Martaban.

U-men (Kurz).

Glabrous, calyx scarious. Seeds softly pilose-fringed.

*I. VITIFOLIA*, Sw. (P.). Burma. Kamorta, Nankowry and Great Nicobar (K.).

Kya-hin-ka-lac-nweh (Kurz).

Spreadingly yellowish-hairy. Calyx hirsute. Seeds glabrous.

*I. PES-CAPIE*, Sw. All the Nicobars. Burma.

Pyn-leh-ka-zwōn.

Mason observes, "This large red-purple flowered species is abundant on the sands of the sea-shore."

*I. SEPIARIA*, Koch. (K). Kar Nicobar.

A form with narrow, almost sagittate and angular leaves.

*I. NICOBARICA*, Kz. Tree forests of Kamorta.

Flowers rather large, white. Calyx-lobes  $3\frac{1}{2}$ -4 lines long, mucronate. Corolla infundibuliform, glabrous,  $1\frac{1}{2}$  inch long. Capsules chartaceous, glabrous, with  $\frac{3}{4}$  to 1 inch pedicels. Seeds smooth, black. The leaves resemble those of *I. obscura* and *I. denticulata*, but are much larger.

*I. DENTICULATA*, Choisy (K.). Kamorta. Katchall. Great Nicobar.

*I. LINIFOLIA*, Bl. (K.). Kamorta.

*I. GANGETICA*, Voigt. (M.).

*I. TRIDENTATA*, Roth. (M.).

*I. FILIFORMIS*, Voigt. (M.).

*I. STRAMINEA*, Wall. (M.).

*I. PILEATA*, Roxb. (M.).

*I. BARBATA*, Choisy (M.).

*I. HISPIDA*, Voigt. (M.).

*I. STRIATA*, Pers.

*I. OBSCURA*, Ker. (M.).

*I. DENTATA*, Willd. (M.).

*I. HEPTAPHYLLA*, Voigt. (M.).

*I. PES-TIGRIDIS*, L. (M.).

*I. PETALOIDES*, Choisy (M.).

From the mainland of Burma Kurz only enumerates 6 species, to which the above 13 recorded by Mason are additional.

The generic name for *Ipomœa* in the vernacular is U-men.

†† Sepals all, or 3 of them, much enlarged, and wing-like in fruit. Capsule 1-celled and 1-seeded.

PORANA, *Linnaeus*.

Ovary 2-celled, the cells 2-ovuled. Style entire or 2-cleft. Stigma capitate.

\* Style 2-cleft. All the 5 sepals enlarged in fruit and stellately spreading. Corolla small.

P. VOLUBILIS, Burm. (K.).

Tenasserim (probably).

Panicles without floral leaves. Sepals about 2 lines long, oval, blunt. Capsule mucronate, smooth, brown, the size of a small pea. Flowers small, white.

\*\* Style simple. Only 3 of the sepals fairly enlarged, erect, or erect-spreading. Flowers white.

P. PANICULATA, Roxb. (K.).

Ava.

Corolla about 2 lines across. Fruiting sepals 1-nerved.

P. SPECTABILIS, Kz. E.S.

Tree forests of Martaban.

Corolla-limb about an inch in diameter. Fruiting sepals 5-nerved at the base, further up 3-nerved.

P. RACEMOSA (M.).

++ Bracts leafy, enlarged in fruit, conspicuous.

NEUROPELTIS, *Wallich*.

Corolla deeply 5-lobed. Styles 2. Capsule 4-8-valved, adnate to near the centre of the bract. Scandent shrubs.

N. RACEMOSA, Wall. (K.).

Eastern slopes of Pegu Range and Tenasserim.

All parts glabrous. Leaves elliptical, entire, coriaceous, on a glabrous petiole  $\frac{1}{2}$  to 1 inch long. Stamens 5, the filaments inserted, with a villous base, at the sinuses of the lobes. Capsules ovoid-globose, the size of a small pea.

N. OVATA, Wall. (M.).

EVOLVULUS, *Linnaeus*.

E. LINIFOLIUS, L. (K.).

Kamorta.

With white flowers.

E. ALSINOIDES, L. (M.).

CALONYCTION, *Choisy*.

\* C. SPECIOSUM, Choisy. (M.).

C. ROXBURGHII, G. Don. (M.).

Nweh-ka-zwōn-hpyu.

BATATAS, *Rumphius*.

\* B. FULVIS, Rumph. (M.).

Ka-zwōn.

B. PANICULATA, Choisy (M.).

QUAMOCLIT, *Tournef.*

\* Q. PENNATUM, Voigt. (M.).

Myat-leh-mi.

"This beautiful little plant (remarks Mason), which the French call Red jasmine, the English China-creeper, and the botanists *Quamoclit*, or Dwarf bean, is quite naturalized throughout the Province."

BLINKWORTHIA, Choisy.

B. LYCROIDES, Choisy (M.).

LEPISTEMON.

L. FLAVESCENS (M.).

BREWERIA, Brown.

B. ROXBURGHII, Choisy (M.).

B. ELEGANS, Choisy (M.).

SKINNERIA, Choisy.

S. CÆSPITOSA, Choisy (M.).

HEWITIA, Wight.

H. BICOLOR, Wight (M.).

ARGYREIÆ.

*Fruit indehiscent, coriaceous, or sub-baccate. Carpels connate. Style simple. Embryo with distinct cotyledons.*

\* \* *Corolla-lobes entire or retuse, style longer or shorter, simple or 2-cleft, or the styles distinct.*

× *Fruit an indehiscent berry.*

ARGYREIA, Loureiro.

*Ovary* 4-celled, the cells 1-ovuled. *Stigma* globose, didymous or 2-globose.

A. (IPOMÆA) ZEYLANICA, Gaertn.

Ava and Pegu Range.

O-na-kop-nweh (Kurz).

Braets up to  $\frac{1}{2}$  inch long, persistent during flowering. Flowers pink. Seeds glabrous.

var. *populifolia*, all parts nearly glabrous.

var. *hirsuta*, Thw., all parts nearly glabrous.

var. *peduncularis*. Leaves not or barely cordate at the base, more elliptic, the petiole often longer than the blade.

A. TILLEFOLIA, Wight.

All over Burma.

Toung-ka-zun-kyee (Kurz).

Braets small and deciduous. Flowers white or pale purplish. Seeds densely brown-puberulous, hairy round the hilum. A creeper with twisted and buttressed stems, 3 inches thick.

A. CAPITATA (P.).

LETTSOMIA, Roxburgh.

*Ovary* 2-celled, the cells 1-ovuled. *Stigmas* 2, linear.

L. CAPITATA, Bth. et H. f.

All over Burma.

All parts tawny-appressed hirsute, the flower-heads spreadingly so. Corolla an inch deep.

L. AGGREGATA, Roxb.

Ava. Tenasserim.

Nweh-ni.

All parts greyish, or whitish tomentose. Corolla about  $\frac{1}{2}$  an inch deep.

L. SETOSA, Roxb. (M.).

A large red-flowered creeper, seen during the rainy season, says Mason, on almost every hedge.

## Order HYDROLEACEÆ.

*Corolla* hypogynous, lobes 5, imbricate. *Stamens* inserted on the corolla-tube. *Filaments* slender, exserted. *Disk* none. *Ovary* 1- or 2-celled. *Styles* 2, distinct. *Ovules* many. *Capsule* 2-valved. *Seeds* minute. *Embryo* straight in scanty albumen. Herbs.

*Hydrolea*, *Linnaeus*.

*H. ZEYLANICA*, Vahl. (M.).

The leaves beaten to a pulp are used for dressing foul ulcers.

## GENTIALES.

*Corolla* mono-, rarely sub-poly-petalous, hypogynous. *Stamens* equalling the corolla-lobes, or fewer, always inserted on the corolla, and usually included in its tube. *Ovary* usually syncarpous, and 2-celled. *Leaves* very rarely alternate or stipulate. Herbs, shrubs or trees.

## Order GENTIANEÆ.

*Flowers* hermaphrodite. *Calyx* persistent, consisting of 4 or 5, rarely more, lobes or segments, much imbricate. *Corolla* usually regular, with 4 or 5 (rarely more) lobes, twisted or otherwise imbricate, or induplicate in bud. *Stamens* usually as many as corolla-lobes and alternate with them, usually inserted in the tube or at the throat of the corolla. *Filaments* usually free. *Anthers* versatile, the cells parallel, opening longitudinally or by terminal pores. *Ovary* 1-celled, but with the 2 parietal placentas projecting into the cavity, so as to partially divide it into 2 or 4 cells, or rarely completely 2-celled, with numerous ovules in each cell. *Style* simple, entire, or with 2 short stigmatic lobes. *Fruit* a capsule opening septicidally in 2 valves, or rarely indehiscent, or a succulent berry. *Seeds* small. *Albumen* fleshy or horny. *Embryo* small, straight, axile, with short cotyledons. Usually herbs or under shrubs, rarely trees, erect, or climbing, with opposite (very rarely alternate) simple leaves. *Stipules* none. *Flowers* usually in cymes or corymb-like panicles, rarely clustered or solitary.

The tonic properties of several species of *Gentiana* are due to the presence of a peculiar bitter principle, *Gentianine*, in the roots. In India various species of *Ophelia* supply the place of Gentian, and are in high esteem under the name of Chiretta. American Calumba root is produced by *Frazeria Walteri*.

*Fagraea*, *Thunberg*.

*Calyx* 5-parted, the lobes blunt, imbricate. *Corolla* funnel-shaped, the tube cylindrical or widened upwards, the limb 5-cleft (very rarely 6 or 7) the lobes oblique and almost twisted, imbricate in bud. *Stamens* 5, inserted in the tube of the corolla. *Filaments* filiform. *Anthers* incumbent. *Ovary* 1- or 2-celled, with numerous anatropous ovules attached to the thick, almost 2-lobed placentas. *Style* filiform. *Stigma* peltate.

\* *Flowers* large, above an inch long, solitary, or by threes or fives in a short peduncled corymb.

× *Corolla-tube* long, exserted above the middle, or at the summit dilated into the limb.

*F. CARNOSA*, Jack. *E.S.*

Upper Tenasserim.

All parts glabrous. Leaves entire, with recurved edges, on a compressed petiole, with a short reflexed point, smooth and fleshy. Flower large, dull yellowish-white.

× × *Corolla-tube* short or from the base funnel-shaped, dilated.

*F. ATRECLARIA*, Jack. *E.S.*

Tenasserim (probably).

*Calyx* about an inch long or longer. Leaves thick-coriaceous, the lateral nerves distinct, but thin and immersed on the under surface.

F. OBOVATA, Wall. *E.T.*

Tree forests all over Burma.

Nyoung-kyap (Kurz).

Calyx only about  $\frac{1}{2}$  an inch long. The nerves beneath the leaves not or barely visible.

\*\* *Flowers small, up to an inch long or somewhat longer. Erect trees.*

F. RACEMOSA, Jack. *E.T.*

Andamans. Kamorta and Great Nicobar.

Flowers clustered, or in small cymes, forming a terminal peduncled raceme.

Leaves penninerved.

F. FRAGRANS, Roxb. *E.T.*

Tenasserim.

A-nān.

Flowers in terminal or axillary, long-peduncled, many-flowered, corymbs. Nerves of leaves beneath very obsolete and immersed. Berries ovoid, reddish, the size of a pea.

Wood yellow or light brown, white-streaked, very strong and tough. Said to be imperishable if exposed to water, and unassailed by *Teredo* (Kurz).

F. CRASSIFOLIA, Wall. (M.).

F. GLOBOSA, L. (M.).

#### GELSEMIUM, *Jussieu.*

*Calyx* 5-parted, imbricate in bud. *Corolla* funnel-shaped, the limb 5-lobed, imbricate. *Stamens* 5, adnate to the base of the corolla. *Anthers* 2-celled, the connective terminating in a mucro. *Ovary* 2-celled, very shortly stalked, with numerous amphitropous 2-seriate ovules along the ventral placentas. *Style* filiform. *Stigmas* 2, 2-cleft. Scandent shrubs with opposite leaves.

G. ELEGANS, Bth. *E.S.S.*

Khakycen Hills.

All parts glabrous. Calyx minutely pubescent.

#### EXLEUCUM, *Linnaeus.*

E. PTERANTHUM, Wall. (M.).

#### CAUSCORA, *Lam.*

C. PARISHII, Hook. f. (P.).

C. DIFFUSA, Brown (P.).

C. SCHULTESII, Wall. (M.).

Mason refers the *chirata* to *Agathodes chirayta*, but says he has never seen the plant growing, whilst Hooker indicates several species of *Ophelia* as furnishing the drug.

#### GENTIANA, *Tournef.*

G. CRASSA, Kurz.

Martaban.

G. NUDICAULIS, Kurz.

Martaban.

#### PHYLLOCYCLUS, *Kurz.*<sup>1</sup>

*Calyx* campanulate, inflated. *Corolla* sub-regular, with imbricated lobes, often basally bimaculate. *Stamens* 4, the lower pair longer, exerted, fertile and covered with red pollen; the upper pair shorter, sub-inclosed, infertile. *Ovary* 1-celled. *Style* deciduous. *Stigma* bilobed. *Capsule* 1-celled, bivalved. *Seeds* numerous, minute, immersed in spongy placentas.

P. (CAUSCORA) HELPERIANA, Wall. MS.

Tenasserim.

P. (CAUSCORA) PARISHII, Hook.

<sup>1</sup> Kurz remarks: "Genus *Causcora* inter alia differt: Corollae lobi 2 inferiores approximati a medio tali modo replicati, ut plicis arete approximatis, quasi lobum singulum mentient, indeque corollam primâ facie 3-lobum immittent. Stamina 4, quorum unum tantum fertile, et multo longius in plicâ loborum interiorum receptum, cætera, multo minora effecta sunt."—J. A. S. B. ii. 1873, p. 236.

## Order ASCLEPIADEÆ.

*Flowers* regular, hermaphrodite. *Calyx* free, deeply 5-parted, or the sepals distinct, often glandular at the base inside, imbricate in bud. *Corolla-limb* 5-toothed or lobed, twisted-imbricate or valvate in bud, the throat with or without scales or appendages alternating with the lobes. *Stamens* 5, inserted at or near the base of the corolla. *Filaments* short, connate or rarely free. *Anthers* united in a tube (called gynostegium) inclosing the style, 2- or by division of the cells more or less completely 4-celled, the cells opening inwards, the connective terminating in a short appendage, or more frequently in an inflexed membrane. *Staminal corona* consisting of variously shaped glandular, membranous, or fleshy appendages, attached to the back of the filaments, or the anthers sometimes united in a ring or cup, very rarely wanting. *Pollen* consolidated into 1 or 2 masses in each anther-cell, attached in the opened anther in pairs, or in fours (1 or 2 from each of the adjoining anthers) to small processes of the stigma, between the anthers, and ultimately detached from the stigma. *Ovary* of 2 distinct carpels, each with numerous, or at least several, ovules attached to the inner angle. *Styles* united immediately above the carpels, and thickened with the anther-tube into an angular body (the so-called stigma), the apex in the centre, either truncate or more or less conical, or elongate and beak-like, entire or 2-lobed. *Follicles* paired, or solitary by abortion. *Seeds* usually pendulous, compressed, often margined with a long silky tuft of hairs at the hilum, the testa smooth or rough. *Albumen* scanty. *Embryo* straight, with leafy cotyledons, the radicle short and superior. Under shrubs or shrubs often twining or scandent, rarely herbs or trees, usually abounding in milky juice. *Leaves* simple, usually opposite. *Stipules* none or obsolete. *Flowers* often small, in racemes or cymes often reduced to umbels, axillary or lateral from between the opposite petioles. *Bracts* small. *Bractlets* none or very minute.

## Sub-order STAPELEÆ.

*Filaments* connate. *Anthers* usually terminated by a simple membrane. *Pollinia* 10, ascending or erect, fixed in pairs to the stigmatic process. Twining plants or fleshy herbs.

## CEROPEGIÆÆ.

† *Pollen-masses pellucid at the lip or side.*

HOYA, *R. Brown.*

- |                             |                    |
|-----------------------------|--------------------|
| H. HOOKERI, Wight. (K.).    | Kamorta. Katchall. |
| H. CARNOSA, Br. (M.).       |                    |
| H. PARVIFLORA, Wight. (M.). |                    |
| H. ORBICULATA, Wall. (M.).  |                    |
| H. LACUNA, Buch. (M.).      |                    |

DISCHIDIA, *R. Brown.*

- |                              |                                   |
|------------------------------|-----------------------------------|
| D. BENGALENSIS, Coleb. (K.). | Kamorta. Katchall on cocoa palms. |
| D. NUMMULARIA, R. Br. (K.).  | Kamorta. Katchall.                |
| D. CUNEIFOLIA, R. Br. (M.).  |                                   |

CEROPEGIA, *Linnaeus.*

- C. LUCIDA, Wall. (M.).  
 C. ARNOTTIANA, Wight. (M.).  
 U-ta-lung.

CARALLUMA, *R. Brown.*

- C. FIMBRIATA, Wall. (M.).

BOXCEROSIA, *Wight and Arnott.*

- B. CRENULATA, Wight (M.).

WATTAKAKA.

W. VIRIDIFLORA, Haask. (K.).

Nicobars.

BIDARIA, Endlicher.

B. sp. (K.).

Great Nicobar.

"Much resembles *B. tingens*, Dene., but has the leaves much larger and the pods 6-8 inches long, and narrowed into a stalk" (Kurz).

PERGULARIÆ.

†† Pollen-masses opaque at both ends.

SARCOLOBUS.

S. GLOBOSUS, Wall. (K.).

Great Nicobar.

S. CARINATUS, Wall. (M.).

GYMHEMA, R. Brown.

*Corolla* very small, nearly rotate, with scales between the lobes. *Staminal crown* none, or reduced to 5, scarcely prominent glands, at the base of the gynostegium.

G. ACUMINATUM, Wall. E.W.C.

Chittagong and Upper Tenasserim.

*Calyx* 5-parted, the lobes erect. Anthers terminating in a membrane. Bark spongy, deeply cracked. Leaves chartaceous, glabrous, except along the puberulous nerves, and petioles puberulous.

G. MOLLE, Wall. (M.).

G. TINGENS, Spreng. (M.).

G. LATIFOLIUM, Spreng. (M.).

††† Pollen-masses horizontal or erect.

MARSDENIA, R. Brown.

*Corolla* without appendages between the lobes. *Staminal crown* of 5 segments, adnate to the base with a short, erect, free or adnate point. *Calyx* 5-parted. Anthers terminating in a membrane.

M. TINCTORIA, R. Br. E.W.C.

Prome.

Adult parts all glabrous. Corolla glabrous, densely bearded at the throat.

M. TENACISSIMA, Wight et Arn.

Chittagong. Ava.

All softer parts more or less tomentose. Corolla pubescent, not bearded.

PERGULARIA, Linnaus.

Characters of *Marsdenia*, but segments of the staminal crown, with a compressed appendage inside at the top.

\* P. ODORATISSIMA, L. (K.).

Ava and elsewhere in gardens.

Cowslip creeper.

Corolla tube 3·5-4 lines long, villous within, the lobes 2 lines long.

P. PALIDA, W. A. (K.).

Ava.

Corolla-tube 1-1·5 lines long, quite glabrous within, the lobes linear, usually nearly twice the length of the tube.

TYLOPHORA, R. Brown.

T. VOMITORIA, Voigt. (M.).

Sub-order EUASCLEPIADEÆ.

*Filaments* coherent. Anthers 2-celled. Pollen-masses 10, fixed in pairs to the prominence of the stigma, separated by a longitudinal furrow.

## ASCLEPIADIEÆ.

Throat of *corolla* naked. *Staminal crown* of 5 segments. *Segments* concave or hooded, inserted at the base, rarely at the top of the gynostegium, with often a ligulate appendage on the inner face, or thickened in the middle, and then toothed at the side.

ASCLEPIAS, *Linnaeus*.

\* A. CURASSAVICA, L. (M.).

Cultivated.

American wild Ipecacuanha.

## SARCOSTEMMIEÆ.

Throat of *corolla* naked. *Staminal crown* usually double, outer short, inner of 5 segments, fleshy, ligulate or tumid.

× × Pollen-masses 2 to each anther.

† Pollen-masses pendulous.

CALOTROPIS, *R. Brown*.

*Staminal crown* double, the outer one shortly wavy-lobed, the inner one of 5 linear-oblong lobes. *Corolla* almost bell-shaped, angular, the limb 5-cleft.

C. GIGANTEA, R. Br.

Pegu and Upper Tenasserim. Also cultivated.

Ma-yo (*Mudar*, Hind.).

Flowers about an inch or more in diameter, *staminal crown* as long as the *corolla*-lobes.

Yields the 'Mudar' root. The fibre is strong and the charcoal excellent for gunpowder. The bark of the roots is a good substitute for Ipecacuanha. "The bark<sup>1</sup> of the root of this plant is the best and most useful part for medicinal purposes, and it should be selected from the oldest plant, because the older it is, the more active is its bark. If the bark be powdered by simply drying it, as is generally done, it requires to be used in much larger doses, to produce its proper effects. The thick rough and spongy epidermis which it is covered with, and which is quite inert, should be scraped off with a knife before it is powdered. The powder prepared with this precaution is white, and bears a great resemblance to the flower of rice, has an acrid and nauseous smell and bitterish taste." The dose of this powder is from 40 to 50 grains, and it is an excellent substitute for Ipecacuanha, especially in dysentery, combined with tincture of opium.

C. PROCERA, R. Br.

All over Ava and Prome.

Ma-yo.

Flowers a third smaller than the last. *Staminal crown* much shorter than the *corolla*-lobes.

C. WALLICHII, Wight (M.).

C. HETEROPHYLLA, Wall. (M.).

ONYSTELMA, *R. Brown*.

O. WALLICHII, Wight (M.).

O. ESCULENTUM (P.).

RAPHISTEMMA, *Wallich*.

R. PULCHELLUM, Wall. (P.).

## CYNOSTONIEÆ.

Throat of *corolla* naked. *Staminal crown* simple, cup-shaped or tubular. *Mouth* sub-entire or lobed.

<sup>1</sup> Dr. Moodeen Sheriff's Report, Madras Monthly Journal of Medical Science, 1870, p. 121.

CYNOCOTYLM, *Decaisne*.

C. WALLICHII, Dene. (K.). Kamorta.

HOLOSTYLLA, *R. Brown*.

H. FRAGRANS, Wall. (M.).

Sub-order SECAMONEÆ.

\* *Filaments wholly connate. Pollen-masses smooth. Corolla-lobes usually twisted-imbricate.*

× *Pollen-masses 4 to each anther.*

TOXOCARPUS, *Wight et Arnott*.

*Staminal crown* of 5 scales at the back of the anthers with internal appendages. *Calyx* 5-parted. *Corolla* rotate with a very short tube, 5-cleft. *Pollen-grains* 20, very small. Climbers.

T. LAURIFOLIUS, Wight. E.S. Tree forests of the Pegu Range.

All parts glabrous, the branches corky-tubercled.

\*\* *Filaments upcurved or entirely free. Pollen-masses granular.*

× *Corolla without a corona. Anthers terminated by a thick oblong bearded appendage. Woody climbers.*

PENTANURA, *Blume*.

*Calyx* small 5-cleft, 5-glandular at the base inside. *Corolla* rotate or campanulate, deeply 5-cleft, naked at the throat. *Stamens* attached to the base of the corolla.

P. KHASIANA, Kz. Ava Hills.

Leaves lanceolate, acute at the base on a slender petiole up to  $\frac{1}{3}$  inch long, coriaceous, glabrous when adult.

× × *Corolla with a corona of free or connate scales, variously inserted.*

FINLAYSONIA, *Wallich*.

*Corolla* rotate; at the throat 5-callous, the callosities terminating in an erect filiform appendage, curved at the apex. *Pollen-masses* 4.

F. OBOVATA, Wall. E.W.C. Tree forests of Pegu and Tenasserim.

All parts glabrous. Leaves opposite, acuminate at the base, on a petiole  $\frac{1}{2}$  to 1 inch long, entire, fleshy-coriaceous. Flowers small, pale-coloured, foetid.

STREPTOCALON, *Wight et Arnott*.

*Corolla* rotate, with 5 blunt scales in the throat. *Pollen-mass* 1.

S. TOMENTOSUM, Wight. E.W.C. From Ava to Tavoy.

All soft parts tomentose. Follicles smooth. Leaves rounded at the narrowed base, on a puberulous petiole  $\frac{1}{3}$  to  $\frac{1}{2}$  inch long.

S. EXTENSUM, Wight. All over Burma.

Glabrous or pubescent; follicles with numerous longitudinal membranous wings.

var. *genuina*. Leaves puberulous, especially beneath.

var. *paniculata*, Griff. Leaves glabrous or nearly so.

CRYPTOLEPIS, *R. Brown*.

*Corolla* almost funnel-shaped to rotate, with 5 membranous scales, adhering to the anthers, in the swollen middle part of the tube.

C. BUCHANANI, Roem. et Schult. W.C. Ava and Tharawaddy.

*Calyx* turbinate, 5-cleft, with 5 crenulate glands within. *Stamens* 5. All parts glabrous, leaves on a slender petiole 3-4 lines long.

HEMIDESMUS, *R. Brown.*

II. WALLICHII, Wight (M.).

MYRIOPTERON, *Griffith.*

M. PANICULATUM, Griff. (M.).

This Order is not a very useful one to man. Most species abound in an acrid, milky juice sufficiently virulent in some species to be used for poisoning arrows, hence the names Wolf's-bane, Dog's-bane. In *Gynema lactiferum*, however, or the Ceylon Cow-plant, the juice is innocuous and potable. Some species of the Order are purgative and emetic; but the most important medicinally is *Hemidesmus Indicus*, the root of which forms an esteemed substitute for sarsaparilla. Some species yield a good caoutchouc. *Marsdenia tinctoria* yields a blue dye, and several species of *Marsdenia*, *Orthanthera*, and *Calotropis* yield excellent fibre. The powdered bark of the root of *Calotropis gigantea* is an excellent substitute for ipecacuanha, and is so used in the Bengal Pharmacopœia. The milk and other parts of the plant are also esteemed for skin complaints and leprosy, and in early stages of that complaint have been considered beneficial (Waring). No more effectual remedy, however, for this dread disease appears to have been hit upon, than the one sometimes adopted in India when the leper gets himself bitten by a cobra, a plan which never fails to arrest the disease—so unamenable to less heroic treatment.

It is from a plant of this Order, *Sarcostemma acidum* or *riminale*, that the celebrated Soma juice, so lauded in the Vedas, was extracted according to some writers, though it is by no means clear if the original Vedic plant is now known, and the use of other plants in lieu thereof is now sanctioned in India, one of them being *Casalpinia bonduë*. Of the 'Soma' De Gubernatis remarks: "*Soma* enivre réellement les dieux au ciel, en renouvelant sans fin le triomphe de la lumière; le sacrifice terrestre du soma n'est qu'une pâle, naïve et grotesque reproduction de ce miracle divin; de même qu'on Grèce, au lieu de statues, on offrait à Héraclès de petits Héraclès de pâte, de même aussi peu-être, dans les temps védiques et postérieurs, en chantant les louanges du soma divin, on présentait aux dieux pour la forme quelque breuvage économique, que personne ne buvait, non pas seulement parce qu'il était réservé aux immortels, mais très-probablement aussi parce qu'aucun mortel n'en aurait voulu. Dans l'histoire des sacrifices, on trouverait un grand nombre de substitutions de cet genre."—*Mythologie des Plantes*, vol. ii. p. 351.

Without, however, attaching much importance to modern identifications of the Vedic 'Soma' plant, the high esteem in which, for symbolical or other reasons, it was held, is a curious and undoubted fact; and yet in those remote days, some three centuries before the birth of Christ, there were not wanting acute minds, which pierced deeper into the mystery of being than the vulgar herd of mankind has ever done, or probably aspired to do, and in the Mahabharata the 'soma' sacrifice is spoken of as suited rather to man's spiritual ignorance than as essentially worthy of respect. As a splendid exposition of a noble pantheism which will cause many a chord to vibrate responsively even in the Christian breast, the passage here quoted, wherein the 'soma' is alluded to, is probably unsurpassed. It is addressed as a doctrinal exposition of Divine truth by Krishna to Arjun:

"I, whose form no eye beholdeth, I stretched out this mighty whole;  
In me live and move all creatures, of all life the living soul.  
Through my care live birds, beasts, fishes, through my care are rocks and trees.  
All this changeful world of being still revolveth as I please.  
But the sons of darkness scorn me, wearing thus a human frame,  
Blind with idle pride of knowledge, swoll'n with idle lust of fame.  
I pour forth the gladdening sunshine, I withhold and give the rain,  
I am that which is, and is not, I am nectar, I am bane.  
Those who reverence the three Vedas and who pour the *Soma* wine,  
By me led to Indra's heaven, drink their fill of joys divine,  
But when spent their stock of merit, down they fall again to earth,  
This the fate of Veda lovers, ceaseless death and ceaseless birth.

But whoe'er with mind enlightened plants his faith on me alone,  
Firm, all other gods rejecting, him I cherish as my own.  
Blind are those who in my essence all the Godhead fail to see;  
Worshipping the Host of Heaven, yet they only worship me.  
For me only smoke their altars, unto me their knees they bend;  
But by unbelief distracted, to the lower worlds descend.  
Those who seek to me for refuge, though conceived and born in sin,  
Base mechanics, slaves, and women find a home my arms within."

(*Tarney's translation.*)

The mixture in some other passages, too, of Pantheistic, and what may be almost designated as Christian ideas is curious in the extreme, and may be briefly glanced at, as showing how little our actual knowledge of the deepest problems which can occupy the mind of man has advanced in three thousand years. I will quote but two passages of this splendid poem, which convincingly show that the Pantheism of Vayása (author of the Mahábhárata) by no means excluded the Messianic idea of an incarnate Saviour, and was not opposed to an estimate of Faith, as a religious duty, sufficiently exalted to please a modern evangelical, whilst inculcating at the same time the value of good works in a manner which some of our modern evangelicals might ponder with advantage. Who, when reading the first passage now given, can help reflecting on the words of another, "Verily, before all worlds, I am"?

Krishna speaks:

"Many births hast thou beheld here, many too have been my lot;  
All are from thy memory faded, I alone have not forgot.  
Though unborn, and never dying, though Almighty Lord of all,  
By my mystic power engendered, I descend at Duty's call.  
Oft as justice is in danger, and the wicked rule the earth,  
I forsake my lofty station, and in human form take birth.  
Wreak on evil-doers vengeance, rescue the down-trodden saint.  
Thus from age to age appear I, virtue to preserve from taint.  
*He who knows my birth and working sets himself for ever free*  
*From the bonds of Transmigration, and dwells undisturbed in Me."*

Surely if we can divest ourselves of the prejudice inculcated from our infancy in favour of a personal immortality, which, by the way, is for the majority of Adam's children to be one of misery, we must admit that the longing for incorporation with Deity which prompted the above lines, is a noble and elevating one!

The second passage is equally interesting, as instancing what may be regarded as a Law, the necessity which all religious teachers lie under of advocating as the first of all virtues—Faith in the doctrine taught. For this the philosopher will make due allowance. Vayása, however, did not relegate good works to that low and ignoble position to which they are consigned by some Evangelicals. Says Krishna:

"Neither in this world nor yonder can such Hero ever fail.  
None that doeth righteous actions ever sees the realm of bale.  
He shall dwell for countless ages in the blissful worlds on high,  
But, through want of true Devotion, must again be born and die.  
In some family of Bráhmans, or of kings appears on earth,  
Or perchance of holy hermits (hard to win that glorious birth).  
With such virtues as he ended, he begins once more the race,  
Towards the goal of high perfection, setting resolute his face.  
For the night of former habits speeds him onward like the wind,  
Leaving slavish text-adorsers, letter-worshippers behind.  
So through many births aspiring, purified at length from sin,  
He attains the wished-for mansion, and in peace doth enter in.  
Penance yields to high devotion. Better be devout than wise.  
Better such than virtuous action, then, do thou devotion prize.  
First of devotees I hold him who doth choose the better part,  
And in humble Faith adoring, clings to Me with perfect heart."

## Order APOCYNÆÆ.

*Flowers* regular, hermaphrodite. *Calyx* free, 5-parted, or the sepals distinct, imbricate in bud, bearing occasionally small glands or scales inside at the base. *Corolla-lobes* 5, spreading, twisted imbricate, or rarely valvate in bud, the throat sometimes closed with a corona of scales, and often hairy. *Stamens* 5, inserted in the tube and alternating with the corolla-lobes. *Anthers* erect, turned inwards, 2-celled, the cells opening by longitudinal slits, either free and included in the usually swollen part of the corolla-tube, or sometimes exerted and connate, or connivent in a cone or ring round the style. *Pollen* not collected in masses, but the auricles at the base of the anthers, or the tips occasionally without pollen. *Ovary* 2-celled, with axile placentas, or more, usually the 2 carpels distinct, and with parietal placentas, the cells or carpels with few to numerous ovules, in 2 or more rows, attached to the placentas. *Styles* 1 or 2, distinct at the base, but united upwards. *Stigma* usually thickened, mitre-like, membranous or bulbous at the base, terminating in a short entire or 2-cleft point. *Fruit* either a single drupe or berry, or more frequently each or 1 of the carpels forms a follicle, opening along the inner edge. *Seeds* pendulous, or rarely ascending, or peltately attached, usually albuminous, often bearing a tuft of hairs at one or both ends. *Embryo* straight, with flat or rarely convolute cotyledons. Trees or shrubs, often climbing, rarely alternate, simple, with or without gland-like small interpetiolar stipules. *Flowers* usually cymose or cymose-panicled, axillary or terminal. *Bracts* usually very small, rarely larger and coloured, deciduous. *Bractlets* usually none.

## Series I. GYMNOSPERMÆ.

*Seeds* naked, i.e. without a deciduous tuft of hairs at their extremities, sometimes persistently hairy-fringed all round, more so at the extremities. *Anthers* free.

\* *Corolla valvate in bud.*

## STRYCHNÆÆ.

*Ovary entire, 2-celled, with axile placentas.*

STRYCHNOS, *Linnaeus*.

*Corolla-throat* naked or bearded. *Berry* corticate or sappy, the seeds imbedded in pulp. *Albumen* horny. Trees or scandent shrubs.

\* *Erect trees, without tendrils.*

× *Corolla glabrous at the throat, the tube long.*

S. NUX-VOMICA, L.

All over Burma up to 2000 feet.

Kha-boung. (Kuchla in India.)

Corymbs peduncled, terminal or terminating axillary shoots; berries the size of an orange or smaller, many-seeded, the pericarp thick and corky.

The strychnos-tree is about the size of an apple-tree, and the fruit, which has a hard rind, closely resembles an orange in appearance. On breaking into it, the round flat seeds are seen imbedded in an orange pulp, which, though somewhat bitter, is edible, and is largely consumed by hornbills, whence, in India, these birds are named Kuchla-kai, or 'strychnos-eaters.'

× × *Corolla villous at the throat.*

S. POTATORUM, L.

Panicle very short, axillary. Corolla-tube about 2 lines long. Berries 1-seeded, the pericarp coriaceous.

The seeds are used to clarify water. A seed is rubbed over the inside of an earthen water-pot, whose rough surface abrades the albuminous fleshy body of the seed. On water being now agitated in the pot, the albumen becomes dissolved, and on standing forms a flocculent deposit, which carries down with it any floating impurities, and the clear water can then be decanted. A little alum is, however, more commonly used for clarifying purposes.

The powdered *testa* of the seeds is, according to Dr. Moodeen Sheriff,<sup>1</sup> the best vegetable emetic in India, and a good substitute for *Ipecacuanha* in dysentery. The dose is grs x to xx, with one or two grains of opium to form a pill, to be given every three, four, or six hours.

*S. WALLICHIANA*, Stend.

Khaboung stream of the Pegu range (so named from the *Khaboung* or strychnos-tree).

Panicle brachiate, large, terminal. Corolla-tube 4-5 lines long.

\*\* *Scandent shrubs with woody, 2-cleft hook tendrils.*

*S. LACRINA*, Wall.

Tenasserim.

Corolla-tube  $1\frac{1}{2}$  line long, bearded at the throat. Berry oblong, 1-seeded, the pericarp membranous.

*S. ACUMINATA*, Wall. *E.T.* Coasts of the Andamans, Tenasserim and Nankowry.

Corolla consisting of 5 free glabrous petals. Berry globular, 1- (or 2-?)seeded, the pericarp coriaceous.

Kurz describes the wood of *S. nur-vomica* as close-grained and hard, and fit for fancy cabinet work, and 52 lbs. in weight. Brandis says much the same. But my experience is that the wood is coarse and inferior. *S. potatorum* is described as durable and taking a beautiful polish.

The species of *Strychnos* contain in the bark of the root and the seeds 2 alkaloids, *Strychnine* and *Brucine*, which are powerful poisons, inducing tetanus and death by asphyxia, through the rigidity which ensues of the muscles of the chest. These alkaloids are the active ingredient in the 'curare' or arrow-poison of the aborigines of South America. The use of Strychnine to destroy domestic or other animals should be discouraged as needlessly brutal, from the shocking tetanic spasms induced, a ball through the brain, or a charge of shot, if the animal is small, being much more humane. Where recourse to firearms cannot be had, a little hydrocyanic acid poured down the throat is instantly and painlessly fatal. Very young animals, like kittens, are most humanely and easily destroyed by dashing with some force on the earth, the shock causing instant death.

*MITREOLA*, *Linnaeus*.

*M. ODENALANDIODES*, Wall. (M.).

*MITRAGYNE*, *Korth*.

*M. CAPILLARIS*, Wall. (P.).

\*\* *Corolla twisted-imbricate in bud.*

*CARISSIÆ.*

*Ovary entire, 2-1-celled, with axile or parietal placentas.*

\* *Ovary 1-celled, with 2 parietal placentas.*

× *Fruit an indehiscent drupe or berry.*

*WILLUGHBEIA*, *Roxburgh*.

As preceding, but seeds without albumen. Scandent shrubs.

*W. EDULIS*, Roxb. *E.S.S.*

Chittagong. Burma (P.).

Inflorescence shortly peduncled. Berry ovate, smooth. Yields an inferior caoutchouc.

*W. MARTABANICA*, Wall.

Upper Tenasserim.

Flower clusters sessile or nearly so. Berry globular, wrinkled.

<sup>1</sup> Madras Monthly Journal of Medical Science, 1870, p. 121.

× × *Fruit a dehiscent capsule.*

ALLAMANDA, *Linnæus.*

*Corolla-throat* with scales, the anthers included in the tube. *Albumen* scanty. Erect shrubs, with showy 5-merous flowers.

\*\* *Ovary 2-celled, with axile placentas.*

\* A. CATHARTICA, L.

Cultivated all over Burma.

Pha-young-ben.

The leaves are strongly purgative.

× *Corolla-throat furnished with 5 or 10 scales or appendages. Disk none.*

THEVETIA, *Linnæus.*

*Calyx* many-glanded inside. *Drupe* unequally 2-celled, not pulpy. Trees or shrubs, with large flowers.

\* T. NERIIFOLIA, Juss.

Cultivated about Prome.

*Cerbera thevetia*, L.

The yellow oleander. An ornamental shrub. The bark is reckoned a febrifuge.

× × *Corolla-throat naked.*

CARISSA, *Linnæus.*

*Corolla* salver-shaped, hairy within. *Style* short or filiform. *Ovary-cells* 1-4, rarely many-ovuled, the ovules in 2 rows. *Berry* 3-1-celled, sappy. *Albumen* fleshy. Shrubs or trees, usually spiny-armed.

\* *All parts glabrous.*

\* C. CARANDAS, L.

var. *a* in the dry forests of Prome. Car Nicobar.

*Ovary-cells* 4-ovuled. Berries the size of a plum. Leaves usually blunt or retuse.

var. *a genuina.*

var. *β congesta*, Wight. Leaves almost obicular, cymes short.

var. *γ paucinervia*, Wight. Leaves linear-lanceolate.

Cultivated for its fruit in Burma (P.).

C. DIFFUSA, Roxb.

Termoklee Island. Andamans. Car Nicobar.

*Ovary-cells* 2-ovuled. Berries the size of a pea or somewhat larger. Leaves usually acute.

\*\* *All parts, especially while young, shortly and softly puberulous.*

C. MIRSUTA, Roth.

Ava.

*C. villosa*, Roxb.

*Ovary-cells* 2-ovuled. Berries the size of a pea.

WINCHIA, *De Candolle.*

Apparently like preceding, but the style deeply 2-cleft and the ovules in numerous rows. Unarmed, with ternary leaves.

W. CALOPHYLLA, D.C.

Upper Tenasserim.

Panicle glabrous.

W. (CHILOCARPUS) ATROVIRIDIS, Bl.

Tavoy.

*Hunteria atroviridis*, Wall.

Panicle minutely puberulous.

Probably not sufficiently distinct from the preceding species (Kurz).

PLUMERIEÆ.

Ovary consisting of 2 more or less distinct carpels, each with a single placenta.

\* Fruit-carpels indehiscent, not follicular.

× Calyx gamosepalous.

RAUWOLFIA, *Linnaeus*.

Calyx toothed. Corolla elongate, funnel-shaped. Disk cupular or annular. Drupes sappy, usually connate at the base or up to the middle. Albumen fleshy. Herbs, under-shrubs, or shrubs.

R. (OPHIOXYLON) SERPENTINA, Willd. Chittagong and all over Burma.

The root is used in medicine as a tonic and febrifuge, and to cure snake bites.

OCHROSIA, *Jussieu*.

Calyx toothed or lobed. Disk none or obsolete. Drupes usually paired, fleshy-fibrous. Trees or shrubs.

O. SALUBRIS, Bl.

Tropical forests of the Andamans.

Cerbera oppositifolia, Lamk.

Kamorta, Trice and Track.

× × Sepals free, reflected.

CERBERA, *Linnaeus*.

Calyx glandless inside. Disk none. Drupes usually single by abortion, fibrose-woody. Trees.

C. ODALLAM, Gaertn.

Arakan. Tenasserim. Andamans. Kamorta. Katchall.

C. MANGHAS, L.

Ka-lwā.

The Burmese extract an oil for burning from the seeds, which are said to be emetic and purgative. Wood worthless.

\*\* Fruit-carpels follicular, dehiscing along the ventral suture; rarely indehiscent. Corolla-throat naked.

× Seeds in no way winged nor hairy-fringed.

† Seeds not imbedded in pulp.

‡ Albumen none.

CALPICARPUM, *G. Don*.

Follicle broad, obliquely truncate, slowly dehiscing, 1-seeded. Shrubs.

C. ROXBURGHII, *G. Don* (P.).

Tropical forests in Martaban and Tenasserim.

Kopsia vineaeflora, Bl.

Generally planted all over Burma.

K. fruticosa, D.C.

Sa-lāt.

‡ ‡ Albumen present.

VINCA, *Linnaeus*.

Follicle elongate-linear, continuous, many-seeded. Albumen fleshy. Erect shrubs or under-shrubs.

\* V. ROSA, L.

V. Guillemi Waldemarii, Klotzsch.

Them-ban-mā hnyo-ben.

A South-American plant much cultivated in villages all over the country, and sometimes domesticated in rubbishy places.

GYNOPOGON, *Forst.*

*Follicle* elongate, moniliformly-contracted between the seeds. *Albumen* horny, homogeneous. Shrubs, more or less twining.

G. (ALYXIA) STELLATUM, Roem. et Schult.

Rocky coasts of Tenasserim and  
Naukowsy. The Andamans.

*Alyxia odorata*, Wall.

Corolla-tube nearly  $\frac{1}{2}$  an inch long.

G. BREVIFLORUM, Kz.

Tropical forests of Upper Tenasserim  
and Taoo table land at 2000 feet.

Corolla-tube only about 2 lines long.

HUNTERIA, *Roxburgh.*

As preceding, but albumen ruminant.

H. LANCEOLATA, Wall.

Tavoy.

Unknown to me. Can it be the same as my *Gynopogon breviflorum*? (Kurz).

† † *Seeds imbedded in pulp.*

TABERNEMONTANA, *Plumier.*

*Follicles* continuous, several-seeded. *Albumen* none. *Disk* none. Erect shrubs.

\* *Bractlets persistent, conspicuous, longer than the pedicels.*

T. RECURVA, Roxb.

Tropical forests of Chittagong, the Pegu  
Range and Upper Tenasserim.

*T. gratissima*, Ldl.

Corolla-tube longer than the tube. Calyx lobes 2-3 lines long, linear-lanceolate.

T. CALYCINA, Wall.

Tavoy.

Perhaps the same as the last (Kurz).

\*\* *Bracts and bractlets very deciduous and small, or persistent and minute.*

× *Calyx-lobes acute or acuminate. Follicles tapering at the base, but not stalked, without an appendage (usually cylindrical, with 6 longitudinal lines, often raised).*

+ *Cymes branched from the base and the branchings usually recurved or horizontal.*

° *Flowers large, showy, the corolla-lobes as long as the tube.*

\* T. (NERIUM) DIVARICATA, L.

Planted all over Burma.

*T. coronaria*, R. Br.

Corolla about an inch across, the lobes as long as the tube; all parts glabrous.

° ° *Flowers small, the corolla-lobes only  $\frac{1}{2}$ — $\frac{2}{3}$  the length of the tube.*

T. OPHIOGONIZOIDES, Kz.

Hills of Martaban at 3000 and 5000 feet.

Glabrous. Calyx-lobes acute. Corolla-tube hardly  $\frac{1}{2}$  inch long.

T. ROSTRATA, Wall.

Segain.

Glabrous, very like the preceding. Calyx-lobes rather acute. Corolla-tube nearly an inch long. Follicles long-beaked.

++ *Cymes brachiate, longer or shorter peduncled, more or less erect.*

° *Calyx-lobes broad, leafy, 3-4 lines long.*

T. ALTERNIFOLIA, L.

Coasts of the Andamans.

*T. crispa*, Roxb.

Glabrous. Corolla-lobes nearly as long as the tube.

× × *Calyx-lobes narrow, small.*

T. MEMBRANIFOLIA, Kz.

Tropical forests of Toukyegat, East of Toung-ngoo.

Glabrous, the cymes short-peduncled. Calyx-lobes subulate-acuminate. Corolla-

tube slender,  $\frac{3}{4}$  in. long, the lobes half as long or shorter. Anthers inserted below the middle of the corolla-tube.

Probably identical with the next species.

*T. GRACILIFLORA*, Wall.

Tenasserim.

Glabrous, leaves as in preceding. Cymes long-peduncled. Calyx-lobes said to be ovate, rather blunt.

*T. MICROCARPA*, Wall.

Ava. Taong-doung.

Glabrous. Peduncle 3 times as long as the 4-5 lines long petioles. Calyx-lobes ovate, acute.

× × × *Calyx-lobes rounded. Follicle long-stalked, with a coriaceous acuminate dorsal appendage.*

*T. SUBCAPITATA*, Wall. (P.).

Martaban. Tavoy.

Glabrous. Cymes small, longer or shorter peduncled.

Kurz adds:

*T. CRISPA*, Roxb.

The Nicobars.

var. *Nicobarica*, Liebm.

× × *Seeds winged or hairy-fringed.*

*PLUMIERIA*, Tournef.

*Disk* none or fleshy, and adnate to the calyx. *Follicles* oblongate, many-seeded. *Seeds* winged. *Albumen* none. Fleshy trees.

\* *P. ACUTIFOLIA*, Poir.

Planted about villages.

*P. acuminata*, Ait.

*ALSTONIA*, R. Browne.

*Corolla* salver-shaped. *Anthers* included. *Seeds* fringed all along the borders, more so at both extremities. *Albumen* scanty. Trees or shrubs.

*A. SCHOLARIS*, R. Br. (P.).

Chittagong. Prome. Tenasserim.

Inflorescence densely pubescent.

*A. SPECTABILIS*, R. Br.

Andamans. Katchall.

Peduncles glabrous, the calyx and pedicels minutely puberulous. Hardly separable from the last. The wood yields a powerful bitter tonic.

*A. MACROPHYLLA*, Roxb.

$\alpha$  and  $\beta$  in Tropical forests of Kamorta

var.  $\beta$  *acuminata*, Miq.

and Car Nicobar.

Series COMESPERMÆ.

*Seeds* furnished at one or both ends with a deciduous tuft or crown of long silky hairs. *Anthers* usually cohering in a cone.

*ECHITIDIÆÆ.*

\* *Corolla-throat* naked, without scales. *Seeds* comose at the apex only or rarely fringed all round.

× *Disk* annular, cupular, or consisting of 5 free or connate scales. Scandent shrubs.

+ *Ovary* entire, 2-celled.

† *Anthers* included.

*BEAUMONTIA*, Wallich.

*Calyx-segments* leafy. *Disk-glands* 5, free or connate. *Albumen* fleshy. *Flowers* large and showy.

*B. (ECHITES) GRANDIFLORA*, Roxb.

Chittagong.

†† *Anthers more or less exerted.*

VALLARIS, *Burmamn.*

*Calyx* small. *Corolla* almost rotate-bell-shaped. *Disk* 5-lobed. *Albumen* scanty. *Flowers* rather showy.

V. HEYNEI, Spreng.

Prome.

*Echites dichotoma*, Roxb.

*Pentandra solanacea*, Roth.

PARSONSIA, *R. Brown.*

*Calyx* small. *Disk-scales* 5, free or connate. *Filaments* often spirally twisted. *Flowers* small.

P. SPIRALIS, R. Br.

Pegu. Maulmain. Katchall and Car Nicobar.

*P. oblonga*, Wall.

*Heligme Rheedii*, Wight.

++ *Ovary-carpels* 2, distinct.

† *Anthers exerted, cohering in a cone round the stigma.*

POTTISIA, *Hooker et Arnott.*

*Disk* 5-lobed. *Flowers* small, panicled.

P. CANTONIENSIS, Hook. et Arn.

Mergui.

*Euthodon paniculatus*, Griff.

P. HOOKERIANA, Wight (M.).

†† *Anthers included in the corolla-tube. Disk* cupular or 5-cleft.

° *Corolla* induplicate-valvate.

URCEOLA, *Roxburgh.*

*Corolla* urceolate or globose. *Calyx* glandless inside. *Disk* entire or 5-lobed. *Flowers* small.

U. (CHAYANNESIA) LUCIDA, D.C.

Pegu and Tenasserim.

*C. esculenta*, D.C.

°° *Corolla* twisted-imbricate.

† *Seeds* narrowed at apex into a long slender neck.

§ *Follicle* moniliform.

PARAMERIA, *Bentham.*

*Corolla* salver- or almost bell-shaped. *Calyx* many-glanded inside. *Flowers* small.

P. (ECDYSANTHERA) GLANDULIFERA, D.C. (P.).

Tenasserim and the Andamans.

*E. Griffithii*, Wight.

*E. barbata*, Miq.

§§ *Follicle* continuous, not moniliform.

ECDYSANTHERA, *Hooker et Arnott.*

*Corolla* almost urceolate, the lobes sinistrorsely twisted. *Disk* entire or 5-lobed. *Flowers* small.

E. BRACHIATA, D.C.

Khakyen Hills.

E. MICRANTHA, A. D.C. (P.).

ANODENDRON, *De Candolle.*

*Corolla* salver-shaped, the lobes narrow. *Disk* truncate or 5-lobed. *Follicle* woody-coriaceous. *Seeds* albuminous. *Flowers* small.

A. PANICULATUM, A. D.C.

Pegu, Tenasserim, the Andamans, and Kamorta.

This is the plant selected according to Mr. Humfray by the Andamanese to form the strings of their powerful bows.

CERCOCOMA, *Miq.* (non Don).

*Corolla* salver-shaped, the lobes broad. *Disk* 5-lobed. *Follicle* coriaceous. *Albumen* none. *Flowers* rather showy.

C. (RHYNOSPERMA) WALLICHII, D.C. Ava. Pegu range (rare).  
*Echites rhyncosperma*, Wall. Tenasserim.

ICHNOCARPUS, *R. Brown.*

I. FRUTESCENS, BROWN.  
 I. OVALIFOLIUS, A. D.C.

†† *Seeds not contracted into a long neck.*

§ *Ovary carpels more or less immersed in the fleshy disk.*

AGANOSMA, *G. Don.*

*Calyx* large and leafy, divided almost to the base. *Disk-lobes* short. *Anthers* appendaged. *Flowers* large and showy.

A. CALYCINA, D.C. Tavoy.  
*A. Wallichii*, Don.

*Calyx-lobes* nearly an inch long, tawny-velvety. *Nerves* of leaves impressed.

A. (ECHITES) MARGINATUM, Roxb. (P.). Chittagong and all over Burma.  
*A. macrocarpa*, D.C.

*Calyx-lobes* only 2-3 lines long, glabrous. *Nerves* of leaves prominent beneath and uniting towards the margin.

Kurz adds:

A. ACUMINATUM, Don. Tenasserim. Car Nicobar.  
*A. culoba*, Miq.

Kyct-boung-hpyu. Tenasserim Caoutchouc-creeper.

EPIGYNUM, *Wight.*

*Corolla* salver-shaped. *Disk-lobes* epigynous round the ovary and almost connate.

E. GRIFFITHIANUM, Wight. Mergui. Tavoy (P.).

§§ *Ovary entirely superior.*

CHONEMORPHA, *G. Don.*

*Corolla* very large, salver or funnel-shaped, the lobes twisted. *Follicle* woody. *Albumen* scanty.

C. (ECHITES) MACROPHYLLA, Roxb. Maulmain (P.). The Andamans (K.).  
*C. mollis*, Miq.

× × *Disk none, or rudimentary. Trees.*

HOLARRHENA, *R. Brown.*

*Corolla* salver-shaped. *Stamens* included. *Seeds* comose at the apex only. *Albumen* none.

H. ANTIDYSENTERICA, Wall. Chittagong and all over Burma.

*H. cordata*, C. Don.

*H. pubescens*, Wall.

Let-touk (*fide* Parish).

\*\* *Corolla-throat with a corona of scales or fringes. Disk none.*

× *Anthers included in the corolla-tube. Seeds comose at the apex.*

NERIUM, *Linnaeus.*

*Corolla-tube* with 5 lacinate-toothed scales. *Seed* albuminous. *Erect trees* or shrubs.

\* *N. ODORUM*, Sol.

Cultivated.

All parts of this plant are very poisonous, especially the roots of the wild varieties. It is supposed, even, to impart deleterious properties to honey. De Gubernatis says,<sup>1</sup> "Dans l'Inde, le *Karavira* ou *Nerium odorum* passe pour une fleur funéraire, c'est pourquoi, dans le drame *Mriçhakatikâ*, le jeune Çârudatta place une couronne d'oléandre sur sa tête, en allant à la mort," and adds many other curious particulars, too long to reproduce here, of European superstitions and proverbs connected with the same plant.

× × *Anthers exerted, united or cohering in a cone round the stigma. Seeds comose at the hilum.*

STROPHANTHUS, *De Candolle.*

*Corolla-lobes* elongate or caudate, bordered by membranous lobes or scales, each produced into 2 longer or shorter segments. Shrubs, usually scandent.

\* *Corolla-lobes acute or acuminate, but not produced into long tails.**S. BREVICAUDATUS*, Wight.

Mergui (probably).

Floral bracts ovate, acute, stiff, only  $1\frac{1}{2}$  lines long.\*\* *Corolla-lobes produced into tails 2 or more inches long.*× *Floral bracts and the conform calyx-lobes stiff, linear-subulate.**S. GRIFFITHII*, Wight.

Upper Tenasserim.

*S. pentaphyllus*, Griff.*S. Horsfieldianus*, Miq.

Corolla (without the tails) about an inch long.

*S. LONGICAUDATUS*, Wight.

Southern Tenasserim.

Corolla (without the tails) about  $\frac{1}{2}$  in. long.× × *Floral bracts and the conform calyx-lobes flaccid, reflexed, linear.**S. (ECHITES) CAUDATUS*, Burm.*S. dichotomus*, D.C.Tenasserim (*vide* Parish).Corolla about  $\frac{2}{3}$  in. long. Bristles twice as long as the anthers.WRIGHTIA, *R. Brown.*

Corona of *corolla* consisting of 5 or 10 erect scales either distinct or united, or rarely the throat naked. Trees or erect shrubs.

\* *Throat of corolla furnished with scales or fringes.*× *Corolla-throat fringed with a ring of branched long filiform scales.**W. (NERIUM) TINCTORIA*, Roxb.Burma (*vide* Mason).

All parts glabrous. Corolla white, the lobes linear-oblong.

× × *Scales of corolla-throat thick and fleshy, entire or lobed.**W. MOLLISSIMA*, Wall.

All over Burma up to 2000 feet.

*W. Walliehii*, D.C.

All parts, especially the leaves, shortly and densely pubescent. Corolla-lobes broad, the scales of the throat cuncate, 2-3-lobulate.

*W. (NERIUM) COCCINEA*, Roxb.

Chittagong Hills.

All parts glabrous. Corolla red, the lobes broad, the scales large, rounded, obsoletely crenate.

<sup>1</sup> *Mythologie des Plantes*, vol. ii. p. 257.

\*\* *Corolla-throat quite naked.*

W. (ECHITES) RELIGIOSA, Teyssm. et Binn. Tenasserim and Siam.

Glabrous, the leaves small and narrow. Pedicels filiform. Corolla small, white.

W. ZEYLANICA, R. Brown (M.).

W. *antidysenterica*, R. Brown.

W. TOMENTOSA, Sch. (M.).

This Order produces some useful products. The milky juice of several species of the following genera yields India-rubber: *Collophora*, *Willughbeia*, *Faba*, *Hancornia*, *Ureola* and *Landolphia*. Some species are highly poisonous, as *Tonghinia veneniflua* and *Cerbera alonui*. Others yield dyes—*Willughbeia tinctoria*, a blue dye, and *W. tomentosa*, a yellow dye; and some yield edible fruits, as *W. edulis* and *Ureola elastica*, *Carissa carandas*, *C. edulis*, *Carpodium duleis*, *Ambelania Pacouria*, and *Tabernaemontana utilis*. Some species are used as medicine, as *Allamanda cathartica*, *W. Zeylanica* (*antidysenterica*), *Carissa xylopicron*, *Plumiera alba*, and *Alstonia scholaris* as a tonic.

Dr. Mason adds the following vernacular names for sundry *Apocynæ*: Sch-yeh, Meh-tu, and in Sgau-karen, Tha-peh-khan-du-den, Nor-thë-ch, Ka-thi-khlu, Hsau-ka-htau.

#### Order JASMINEÆ.

*Flowers* regular, hermaphrodite or unisexual. *Calyx* free, usually small, 4-5-, rarely more, toothed or lobed, or rarely truncate and entire. *Corolla* with a longer or shorter tube, 4- or 5-, rarely more, lobed, or divided to the base into 4 petals, rarely 2-petalled, or wanting altogether. *Stamens* 2, rarely 4, adhering to the base of the corolla. *Filaments* usually short. *Anthers* 2-celled, the cells opening by longitudinal slits. *Ovary* 2-celled, the cells with 2, rarely 1 or 3, ovules, in the young state attached laterally, but becoming pendulous or ascending, according to the growth of the ovary. *Fruit* succulent or capsular, entire or 2-lobed, 2-celled, or reduced to a single cell and seed. *Seeds* with or without albumen. *Embryo* straight. Trees or shrubs often climbing, very rarely herbs, with opposite or very rarely alternate simple or pinnate leaves. *Flowers* in axillary or terminal panicles, sometimes reduced to short racemes or clusters.

#### Sub-order OLEACEÆ.

*Stamens* 2 only, situated between a pair of corolla-lobes.

#### JASMINEÆ.

*Corolla-limb* 5-12-lobed. *Ovules erect.*

\* *Fruit a dry compressed capsule.*

NYCTANTHES, *Linnaeus.*

*Corolla* twisted in bud. *Albumen* none. Scabrous trees, with simple leaves.

N. ARBOR-TRISTIS, L.

Tenasserim and Pegu (where rare).

A dye is extracted (in Ceylon) from the corolla-tube of this plant, which Thwaites says is used by the Buddhists for dyeing their clothes yellow.

\*\* *Fruit a 2- or by abortion 1-lobed drupe.*

JASMINUM, *Linnaeus.*

*Corolla* twisted in bud. *Albumen* none. Shrubs usually scandent, rarely trees. *Leaves* simple or compound.

#### SERIES UNIFOLIOLATÆ.

*Leaves* simple, with a jointed petiole.

\* *Bracts* minute or short and filiform, rarely wanting.

× *Calyx-lobes* short, or the calyx almost truncate.

+ *Flowers* corymbose.

J. EXTENSUM, Wall.

Ava.

Glabrous. Pedicels 2-5 lines long. Calyx 5-cornered, almost truncate.

J. DECUSATUM, Wall.

Tropical forests of Upper Tenasserim up to 3000 feet.

Pubescent. Flowers sessile. Calyx-teeth as long as the calyx-tube.

++ *Flowers in poor axillary racemes. Pedicels  $\frac{1}{2}$ -1 inch long. Calyx-teeth distinct.*  
 † *Corolla-lobes blunt, glabrous.*

J. SUBGLANDULOSUM, Kz.

Tropical forests of the Southern Pegu Range,  
Tenasserim and South Andaman.

Nerves conspicuous on both sides, usually with a gland in the axils. Corolla-lobes usually 8, rarely 5-7.

J. ATTENUATUM, Wall.

Nat-toung in Martaban at over 5000 feet.

Nerves thin and obsolete, without glands. Corolla-lobes usually 5.

†† *Corolla-lobes acuminate.*J. LAURIFOLIUM, Roxb. var.  $\beta$  tropical forests of Kliakyen Hills and Tenasserim.

Glabrous. Leaves more or less narrow, very long acuminate. Corolla-lobes 9-12.

var.  $\beta$  *brachylobum*, calyx-lobes as long or a little longer than the calyx-tube, more or less recurved.× × *Calyx-lobes longer than the calyx-tube, subulate.*

J. SAMBAC, Ait.

Cultivated all over Burma. Said to be wild in Prome.

*J. quinqueflorum*, Heyne.

Sa-bē, Ma-li.

Small shrub, almost erect. Branchlets puberulous. Leaves penninerved.

J. ANASTOMOSANS, Wall.

Tropical forests of the Pegu Range and Tenasserim.

Twining, glabrous. Leaves 3-nerved.

\* \* *Bracts leafy, conspicuous, shorter or longer than the calyx.*× *Bracts longer than the calyx, leafy, white-discoloured.*

J. ROTTLEIANUM, Wall.

Tropical forests of the Khaboung stream Pegu.

More or less pubescent, especially the branchlets. Corolla-tube about  $\frac{1}{2}$  inch long or longer.

J. COARCTATUM, Roxb.

Chittagong. The Pegu Range and  
Hills East of Toung-ngoo.

Glabrous when adult, tufted-hairy in the nerve-axils beneath. Corolla-tube about an inch long.

× × *Bracts shorter than the calyx. Calyx-lobes subulate. Pedicels 1-2 lines long.*

J. (NYCTANTHES) HIRSUTUM, L.

Bhamo. Pegu.

*J. multiflorum*, Andr. (non. Roth.).*J. pubescens*, Willd.

More or less pubescent. Corolla- and calyx-lobes each 6-9 in number, the latter 4-5 lines long, pubescent.

J. SCANDENS, Vhl.

All over Burma.

*J. syringifolium* and *latum*, Wall.

Glabrous or puberulous. Corolla- and calyx-lobes each 6-7 in number, the latter only a line long, more or less pubescent.

## Series FOLIOLATE.

*Leaves* unpaired-pinnate or pinnately 3-foliolate, rarely occasionally 1-foliolate.

*J. GRANDIFLORUM*, L. Burma (*fide* Mason).

*Glabrous*. *Leaves* unpaired-pinnate. *Calyx*-lobes subulate, about 3-4 lines long.

Kurz adds from the Nicobars:

*J. ACUMINATISSIMUM*, Bl. (K.). Kamorta and Nankowry.

Mason adds the following vernacular names for species of *Jasmine*:—Tham-bauma-li, Myat-la, Then-khwa. The flowers of various species of *Jasminum* exhale a most delicious fragrance, especially after sunset, when the cool air of a garden where many jasmine bushes are in flower, seems loaded with the perfume. The flowers are used to make garlands of for the person, and also to scent oil by steeping them therein, or alternate layers of jasmine flowers and sesamum seeds are arranged, and after some time the scented seeds are put in a press and the oil extracted, with the acquired scent of the flowers. The European method is somewhat different. A number of perforated trays are arranged one above the other in a closed case, and these trays are filled alternately with jasmine (or other flowers it is wished to extract the perfume of) and fresh, sweet, and finely chopped suet. In twelve hours or so the flowers are removed, and perhaps fresh ones substituted, and eventually the suet is washed with ether, which dissolves out the volatile perfume, leaving sufficient aroma in the suet to enable it to be made the basis of a delightful pomade, and this process might be easily put in practice with various Indian flowers.

## OLEE.E.

*Corolla* 4-lobed, rarely 6-8-cleft or wanting, with or without a tube. *Ovules* pendulous or attached laterally near the summit of the cell.

\* *Corolla*-lobes twisted in bud. *Ovules* pendulous. *Fruit* a dry capsule or samara.

## SCHREBERA, Roxburgh.

*Corolla* salver-shaped. *Ovary* 2-celled, with 3-4 ovules in each cell. *Capsule* 2-valved. *Seeds* winged. *Albumen* none. Trees or shrubs, the leaves pinnate or rarely simple.

*S. SWIETENIOIDES*, Roxb. var. *a* Pegu and Martaban.

var. *a genuinum*. All parts glabrous, also the inflorescences, calyxes and corollas. Capsules 2 inches long.

var. *β pubescens*, Kurz. All younger parts and inflorescence softly pubescent.

*Calyx* densely and minutely tomentose. *Corolla* sparingly puberulous outside. Capsules much smaller.

\*\* *Corolla*-lobes valvate in bud or nearly so, rarely imbricate. *Fruit* drupaceous or berry-like. *Leaves* simple.

× *Corolla*-lobes induplicate-valvate.

## CHIONANTHUS, Linnæus.

*Petals* usually elongate, free or very shortly united at the base. *Seeds* with or without albumen. Trees. Inflorescence various.

\* *Petals* or *corolla*-lobes very narrow, involute.

*C. MINUTIFLORUS*, Kz. Hills East of Toung-ngoo.

*Glabrous*. Nerves prominent beneath. *Petals*  $\frac{1}{2}$  line long.

\*\* *Petals* or *corolla*-lobes broader, flat or concave, but not involute.

× *Veins* visible between the strong lateral nerves. *Leaves* 3-6 inches long.

*C. PALEMBANICUS*, Miq. The Andamans. Nankowry. Great Nicobar.

*Panicle* ample, leafy-bracted. Nerves impressed on the upper side of the leaves. *Drupes* 1-1½ inches long.

- C. (LINOCIERA) MACROPHYLLUS, Wall. Ava, Pegu and Upper Tenasserim.  
*L. attenuata*, Wall.  
*L. picrophloja*, F. Muell.

Panicles rather small, with minute bracts. Nerves prominent on both sides. Drupes 1-1½ inch long.

×× No visible veins between the nerves. (Leaves 6-10 inches long.)

- C. MONTANUS, Bl. Hills East of Toung-ngoo up to 2000 feet.  
 Panicle minutely puberulous. Petals linear. Drupes about an inch long.

#### OLEA, Tournef.

Ovary-cells 2-ovuled. Seeds albuminous. Panicles axillary or terminal. Trees or shrubs, erect.

\* Corolla almost rotate, the limb spreading. Inflorescence axillary, or at the same time terminal. (Olea, L.)

× Petals only a line long or thereabouts.

- O. DENTATA, Wall. Tree forests about Rangoon and Upper Tenasserim.  
 Leaves rigidly coriaceous, the nerves prominent. Panicle glabrous.  
 O. BIOICA, Roxb. Chittagong and Arakan range (fide Theobald).  
 Leaves thin-coriaceous, the nerves prominent. Panicles glabrous.

×× Petals about 3 lines long.

- O. TERNIFLORA, Wall. Chittagong, Pegu and Tenasserim.  
*O. linoceroides*, Wight.

Leaves veinless between the nerves. Drupes nearly ½ inch long.

\*\* Corolla funnel-shaped, with a longer or shorter tube. Panicles all terminal. (Ligustrum, Tournef.)

- O. (PHILLYREA) ROBUSTA, Roxb. Chittagong. Ava. Taong-doung. Pegu and Upper Tenasserim.  
 Panicles glabrous or pubescent. Drupe 3-4 lines long.

#### MYXOPYRUM, Blume.

Flowers minute, in axillary panicles. Seeds albuminous. Woody climber, with sharply 4-cornered branches.

- M. (CHONDROSPERMUM) SMILACIFOLIUM, Wall. Chittagong. Tropical forests of Martaban, the Andamans and Cocos.

var. *α genuinum*. Leaves more or less entire or remotely and minutely spinescent-toothed. Panicle ample, slender, as long as or longer than the leaves.

? var. *β ilicifolium*. Leaves somewhat narrower and stronger nerved and veined, strongly and crowdedly spinose-serrate. Panicles rather contracted, not above 2 inches long, axillary and leaf-opposed, rarely terminal, the peduncle and branchings strong and 4-cornered.

#### Sub-order SALVADORACEÆ.

Corolla 4-parted, without tube. Stamens 4, alternating with the corolla-lobes. Ovules erect.

#### AZIMA, Lamk.

Petals free, linear. Stamens free. Ovary 2-celled, the cells 2-ovuled. Shrubs, spiny-armed.

- A. TETRACANTHA, Lamk. Ava and Prome.  
*Monetia barlerioides*, L'Her.  
*Eugonia montana*, Miq.

## EBENALES.

*Corolla* mono- or mono-poly-petalous, hypogynous or epigynous, rarely perigynous. *Stamens* usually many more than the corolla-lobes, if equalling them, then alternating (except in *Sapoteæ*). *Ovary* 2- to many-celled. *Cells* usually few-ovuled. *Leaves* alternate, exstipulate. Shrubs or trees.

## Order STYRACEÆ.

*Flowers* regular, hermaphrodite, rarely polygamous. *Calyx-tube* more or less adnate to the ovary, or free, the limb 5-, rarely 4-7-lobed, toothed or almost truncate. *Corolla* deeply divided into as many or twice as many lobes as there are calyx-lobes, imbricate or almost valvate in bud. *Stamens* usually numerous, rarely as many or twice as many as corolla-lobes, inserted in a single row or more at the base, or in the short tube of the corolla, those of the outer series usually alternating with the corolla-lobes. *Filaments* filiform or flat. *Anthers* 2-celled, opening by longitudinal slits, the cells either short and almost half-oval or elongate and linear. *Ovary* inferior or half-inferior, rarely wholly superior, 5-2-celled, the cells with 2-4, rarely a single ovule, suspended from the inner axial angle or the upper ones, erect. *Style* filiform. *Stigma* simple or more or less capitate, or 5-2-lobed. *Fruit* either a more or less succulent or dry drupe, containing a 5- or fewer-celled nut, or a capsule opening by valves. *Seeds* usually solitary, pendulous, the testa thin. *Albumen* fleshy. *Embryo* straight or curved, axile with a long radicle, the cotyledons short and flat. *Stipules* none. *Flowers* usually small or middling-sized, usually in axillary spikes, racemes or clusters, rarely solitary. *Bracts* minute, often scale-like.

STYRAX, *Linnaeus*.

*Calyx* somewhat enlarged and inclosing the fruit for one half. *Corolla* slightly twisted or almost valvate in bud. *Stamens* 10, the anthers elongate. *Drupe* dry, sometimes valvately dehiscent.

\* *All parts more or less tomentose, the under-surface of the leaves particularly so.*

S. RUGOSUM, Kz.

Hills between the Tsittoung and Salween.

Leaves white-tomentose beneath. *Calyx* slit spathe-like, conspicuously subulate-toothed.

\*\* *Younger parts more or less tomentose. Leaves sparingly and minutely stellate-puberulous, glabrescent and green.*

S. SERRULATUM, Roxb.

Khakyen Hills. Chittagong. Tenasserim.

S. floribunda, Griff.

*Calyx* 5- or 6-toothed. *Corolla*-lobes narrow-oblong, about 4 lines long. Leaves serrulate.

S. VIRGATUM, Wall.

Ava (probably).

S. grandiflorum, Griff.

*Calyx* truncate and minutely toothed. *Corolla*-lobes ovate, nearly  $\frac{3}{4}$  inch long. Leaves remotely and minutely toothed.

SYMPLOCOS, *Linnaeus*.

*Calyx* wholly or nearly wholly adnate to the ovary. *Corolla*-lobes imbricate in bud. *Stamens* numerous, indefinite, the anthers short. *Drupe* more or less succulent, crowned by the calyx-limb.

\* *Ovary* 3-celled. *Drupe*s oblong or elliptical, 3-celled. *Embryo* straight.

× *Drupe*s sulcate-ribbed.

S. SULCATA, Kz.

Martaban at 3000 to 6000 feet. var.  $\beta$

Daunat pass, Upper Tenasserim.

Young parts more or less rusty-pubescent. Flowers sessile, or nearly so, in simple tomentose spikes.

× × *Drupes smooth and terete.*

† *Racemes or spikes not glabrous.*

*S. LUCIDA*, Wall. Nat-toung in Martaban over 5000 feet.  
Glabrous. Flowers sessile, in compound puberulous spikes.

*S. RACEMOSA*, Roxb. All over Burma up to 2000 feet.  
*S. Hamiltoniana* and *rigida*, Wall.

Young shoots more or less pubescent. Flowers shortly pedicelled, in simple or branched villous-tomentose racemes.

† † *Racemes quite glabrous.*

*S. LEIOTACHYA*, Kz. Tenasserim. Kamorta.

Glabrous. Petioles and rib beneath sparingly hairy. Racemes slender.

\*\* *Ovary 2- rarely 3-celled. Drupes more or less turbinate or obversely pear-shaped, by abortion usually 1-seeded, the endocarp often intruding so as to cause the seed to be more or less curved. Embryo curved.*

× *Stamens in 2 or more series, not fascicled.*

† *Flowers sessile, in simple or compound spikes.*

○ *Drupes ribbed or torulose.*

*S. (DICALYX) JAVANICA*, Bl. Tenasserim.

*S. ferruginea*, Roxb.

*S. rubiginosa*, Wall.

*S. Horsfieldiana*, Miq.

Young shoots, spikes, and leaves beneath more or less rusty pubescent or tomentose. Drupes ribbed.

*S. SPICATA*, Roxb. Tenasserim.

Glabrous. Spikes glabrous. Drupes torulose-ribbed.

If *Myrtus laurina*, Retz. Obs. iv. 27, is really the same as Roxburgh's plant, the specific name will have to be changed in favour of Retz's (Kurz).

○ ○ *Drupes terete and smooth.*

*S. POLYCARPA*, Wall. Martaban and Tenasserim (Nat-toung and

*S. attenuata*, Wall. Taipo) at 4000 to 5000 feet.

Glabrous, also the spikes. Drupes ovoid-turbinate.

† † *Flowers pedicelled, in simple or compound racemes. Drupes terete.*

*S. PEDICELLATA*, Kz. Toungyagat, East of Toung-ngoo.

Glabrous. Racemes compound, minutely appressed pubescent, stout. Drupes ovoid-turbinate (unripe).

*S. CAUDATA*, Wall. Chittagong. Upper Tenasserim.

Glabrous. Leaves caudate acuminate. Racemes simple, slender, pubescent. Drupes ovoid-turbinate.

× × *Stamens collected into 5 bundles. Flowers white.*

*S. LEUCANTHA*, Kz. Swamp forests of the doāb of the Iilein and Irrawaddy.

Racemes shortly tomentose, short. Pedicels very short and thick.

*S. CRATÉGOIDES*, D. Don. Nat-toung in Martaban (*vide* Mason).

Racemes appressed pubescent, forming slender panicles. Pedicels long, filiform.

Mason gives Keun-la and Kain-tha-lipyu-gyi as the vernacular names of species of *Symplocos*.

Several species of *Symplocos* yield yellow dyes, and can be used as a substitute for tea. Storax and Benzoin are two balsams containing Benzoic acid, the former produced by *Styrax officinale*, the latter by *S. Benzoin*, a tree of the Moluccas, which Mason includes with doubt in his list.

#### Order EBENACEÆ.

*Flowers* regular, usually dioecious, rarely hermaphrodite. *Calyx* 3- to 7-lobed, persistent, in the females usually enlarging. *Corolla* gamopetalous, deciduous, 3-7-lobed, the lobes always sinistrorsely convolute-imbricate in bud. *Stamens* in the females either none, or as many as corolla-lobes, distinct, and inserted at the base of the corolla-tube; in the males 6 or more, usually 16 distinct or often united by pairs, inserted at the base of the corolla-tube, or rarely hypogynous, or partly inserted in the corolla, partly on the torus, the inner series usually shorter or wanting. *Filaments* short, usually pilose and ligulate. *Anthers* basifixed, 2-celled, opening by longitudinal slits. *Ovary* 3-14-celled, the cells with a solitary or 2 collateral ovules, suspended from the summit of the inner angle. *Styles* half the number of the cells, and 2-lobed or as many as cells, and simple. *Berry* often by abortion few-celled and few-seeded, fleshy or coriaceous, the rind sometimes rupturing into as many valves as calyx-lobes. *Seeds* pendulous, usually solitary in the cells, often compressed, the testa smooth coriaceous. *Albumen* horny, homogeneous or ruminant. *Embryo* axile or somewhat oblique, straight or curved at the apex. The cotyledons leafy, nearly as long as the superior cylindrical radicle. Trees or shrubs, rarely under shrubs, with alternate or very rarely almost opposite simple leaves, the juice watery. *Stipules* none. *Flowers* in axillary or rarely terminal cymes, the females usually larger and turning solitary by abortion of the lateral flowers.

The fruits of several species of *Diospyros* are edible when perfectly ripe, but their chief utility is as a tanning material, and dressing for fishermen's nets and lines, especially *D. embryopteris*, which coats them with a glistening varnish. Dr. Mason remarks, "The celebrated Shan vegetable black dye is made from the fruit of a species of ebony, which is said to grow on the mountains that separate the province of Tavoy from the Siamese territories. Isolated plants may be seen in the gardens of Tavoy and Maulmain, but I have never seen one in flower or fruit." This is *D. mollis*. The ebony of commerce is the heartwood of more than one species of *Diospyros*, the best being yielded by the Mauritian *D. reticulata*, and the next best by *D. ebenum*. All species, however, do not possess black heartwood.

† *Ovary-cells with 2 ovules.*

MABA, Forster.

*Calyx-* and *corolla-lobes* usually trimerous. *Ovary-cells* usually as many as corolla-lobes.

\* *Ovary 6-celled, the cells 1-ovuled.*

M. MERGUIENSIS, Hiern.

Mergui.

Glabrous or nearly so. *Ovary* glabrous.

I separate the species with 1-ovulate and 2-ovulate ovary-cells, and from this point of view the above species, which has 1-ovulate ovary-cells apparently twice as numerous as the floral parts, cannot be a true *Maba*, but may be referable to *Diospyros*. I have seen no specimens of it (Kurz).

\*\* *Ovary 3-celled, densely pubescent.*

M. BUXIFOLIA, D.C.

Tenasserim.

M. NEILGHERRENSIS, Wight.

M. EBENUS, Wight.

Leaves small, glabrous. Berries globular, the size of a pea.

M. (MARCFRIGLIA) ANDAMANICA, Kz. The Andamans. Tillangchong. Nicobars.

Leaves large, hirsute along the nerves beneath. Berries oblong, more than an inch long.

†† *Ovary-cells 1-ovuled.*  
 × *Anthers opening by longitudinal slits.*

GUNISANTHUS, *De Candolle.*

*Calyx- and corolla-lobes* usually 4, rarely 6. *Ovary-cells* usually as many. *Male and female flowers* all solitary. *Calyx* of males divided to the base, the lobes narrow, membranous.

G. (DIOSPYROS) PILOSULUS, Wall. Tropical forests of the Pegu Range and the Andamans.

Not flowering branchlets sparingly pubescent. Leaves glabrescent. Calyx-tube half the length of the corolla-lobes.

G. (DIOSPYROS) MOLLIS, Kz. Tropical forests of hills East of Toung-ngoo.

Not flowering branchlets densely villous. Leaves beneath permanently softly pubescent. Calyx-tube a little shorter than the corolla-lobes.

Very near to the last species.

DIOSPYROS, *Linnaeus.*

*Calyx- and corolla-lobes* usually 4-6. *Male flowers* clustered or cymose, the females solitary, or rarely in cymes or panicles. *Calyx* of males gamosepalous.

Sub-genus AMUXIS, Hiern.

*Calyx* in bud globular and closed, the lobes connate but afterwards bursting irregularly into 2 or 3 lobes. *Corolla* tubular, 5-lobed. *Ovary-cells* as many as corolla-lobes.

D. TOPOSIA, Ham.

Chittagong.

*D. racemosa*, Roxb.

Glabrous. Leaves coriaceous and elegantly net-veined. Corolla conspicuous, about 4 lines long, very coriaceous.

Sub-genus EU-DIOSPYROS, D.C.

*Calyx* toothed or lobed, rarely truncate. *Ovary-cells* often twice as many as corolla-lobes.

\* *Calyx* in males short and truncate-toothed, in females large, deeply-lobed. *Corolla urceolate*, the lobes notched. *Anthers* 30-50.

D. EMBRYOPTERIS, Pers.

Tenasserim and Martaban.

*Embryopteris glutinifera*, Roxb.

Glabrous. Leaves coriaceous.

\*\* *Calyx* toothed or lobed. *Corolla-lobes* not notched. *Anthers* about 20 or fewer.

× *Corolla urceolate*, in bud globular or conical, the tube short and inflated, the lobes usually rounded and short.

+ *Flower-buds* globular. *Corolla* quite glabrous. *Flowers* small, hardly a line long.

D. CHARTACEA, Wall.

Tropical forests of Martaban.

Leaves thin chartaceous, with strong prominent nerves, the net-venation distinct, lax. Ovary glabrous.

D. EHRETIoidES, Wall.

All over Burma.

Ouk-chin-zā.

Leaves thin-coriaceous, the nerves strong, the net-venation inconspicuous. Ovary tawny-villous.

++ *Flower-buds* conical, acute, but never elongate.

† *Ovary* pubescent or villous. *Leaves* quite glabrous and glossy.

D. RAMIFLORA, Roxb.

Tropical forests of Arakan.

Flowers rather large, clustered, from the older branches.

*D. OLIVIFOLIA*, Wall.

Tropical forests of Martaban.

Leaves glaucous-green when dry, almost polished, the nerves very inconspicuous and impressed. Peduncles 4-5 lines long. Nearly 5-6 lines long, axillary.

*Leaves more or less rigid, quite glabrous, glossy.*

†† *Ovary glabrous or nearly so.*

*D. KURZII*, Hiern.

The Andamans. Katchall. Kamorta. Nankowry.

Marble wood. One of the handsomest ornamental woods in the East.

Leaves drying blackish, the nerves and net-venation thin but prominent. Flowers small, axillary, the males cymose. Berries globose, the size of a cherry. Albumen homogeneous.

††† *Leaves membranous, at least while somewhat young, more or less puberulous or pubescent.*

° *Berries sessile or nearly so.*

*D. MOLLIS*, Griff.

Khakyen Hills and Martaban 2000 to 4000 feet.

Calyx-lobes of males acute. Leaves more or less acuminate. Berries the size of a cherry. Albumen homogeneous.

° *Berry rather long-peduncled.*

*D. MONTANA*, Roxb.

All over Burma.

*D. heterophylla*, Wall.

Leaves glaucescent, glabrescent. Berries the size of a cherry. Albumen homogeneous. Spiny-armed tree.

A variety of this (var. *cordifolia*) is frequent in the mixed forests of Pegu. It has the leaves much larger (3-4 inches long), but offers (in fruit only) no tangible characters for specific separation. I rely upon the rumination of seeds as little in *Diospyros* as in *Calamée*.

×× *Corolla salver-shaped, elongately (very rarely shortly) conical, the tube not or hardly widened, the lobes as long or nearly as long as the tube.*

+ *Borders of the calyx-lobes of female flowers reflexed or revolute, at least at the base, and often appearing somewhat auricled.*

† *Corolla in bud short-conical (Otogyne, D.C.).*

*D. BURMANICA*, Kz.

Ava, Pegu, and Martaban.

Tē.

All younger parts tawny or greyish tomentose. Leaves coriaceous, glabrescent above. Flowers usually 5- (4-6)-merous. Albumen ruminant.

†† *Corolla in bud elongate conical, 4-angular. Flowers 4-merous.*

° *Flowers (both sexes) forming tomentose bracted usually compound cymes. Berries globular.*

*D. DENSIFLORA*, Wall.

Arakan and Tenasserim.

Peduncles long, the cyme often compound. Net-venation of leaves obsolete.

*D. HORSFIELDII*, Hiern.

Tenasserim.

Cymes large, corymb-like, fuliginous-velvety. Net-venation strong but lax.

° *Flowers short-peduncled or sessile, axillary.*

*D. FLAVICANS*, Hiern.

Tenasserim.

Flowers short-peduncled, clustered. Net venation indistinct. Berries elliptical. Heter's No. 3632 (not seen by me) from Tenasserim or the Andamans is referred by Hiern to *D. Moonii*, Thw. (*D. hirsuta*, L.). I fear there is a mistake (Kurz).

*D. UNDIATA*, Wall.

Tropical forests of Tenasserim, the Andamans and Nankowry.

Flowers sessile or nearly so. Net-venation lax but distinct. Berries globular, rusty-pubescent. Albumen homogeneous.

*D. SAPOTOIDES*, Kz.

Tropical forests on the Khaboung and Choungmeneh streams.

As preceding, but ovary glabrous.

++ *Borders of the calyx-lobes in female flowers plain, not reflexed nor recurved.*

† *All parts, except the very young shoots, quite glabrous. Flowers almost sessile.*

*D. LANCEFOLIA*, Roxb.

Maulmain.

Flowers rusty-tomentose. Calyx short, the lobes acute. Leaves strongly net-veined. Berries tawny-tomentose. Corolla 4-cornered in bud.

*D. PYRRHOCARPA*, Miq.

var.  $\beta$  The Andamans, probably a distinct species.

Male calyx bell-shaped, the lobes short, rounded, tomentose. Leaves strongly net-veined. Berries rusty-tomentose. Corolla terete in bud.

var.  $\beta$  *Andamanica*. Leaves oblong to narrow-oblong, the lateral nerves faint and numerous, net-venation more lax.

*D. VARIEGATA*, Kz.

Pegu and Martaban up to 1000 feet.

Calyx ample, puberulous, the lobes rounded. Male cymes very short and stout. Leaves strongly net-veined. Corolla terete in bud.

†† *All parts, especially the leaves, more or less pubescent or otherwise hairy. Male flowers in cymes. Berries glabrous.*

*D. STRICTA*, Roxb.

Chittagong.

Leaves not cordate, softly pubescent beneath. Calyx-lobes and bracts acute. Flowers 4-merous.

*D. BRANDISIANA*, Kz.

Khakyen Hills. Tenasserim.

Leaves not cordate, adult almost glabrous and chartaceous. Calyx-lobes linear-lanceolate. Cymes branched, arising from the stem and older branches. Flowers 5-merous.

*D. DASYPHYLLA*, Kz.

Taipo Hills. Martaban at 4000 feet.

Leaves with cordate base, softly pubescent. Calyx-lobes and bracts rounded. Cymes short, stout. Flowers 4-merous.

Dr. Mason also adds:

\* *D. KAKI*, L. (M.). 'The Chinese date.'

Most species of *Diospyros* yield a strong serviceable timber, but only the heartwood of some species constitutes the ebony of commerce. *D. Kurzii*, a common species in the Andamans, yields one of the handsomest woods marbled in black and white known, and it would no doubt find a ready market in Europe.

#### Order SAPOTACEÆ.

*Flowers* regular, hermaphrodite. *Calyx* 5, rarely 4-8-parted or lobed, the lobes in 2 (rarely 3) series. *Corolla* divided into as many (or rarely twice as many) lobes as calyx segments, imbricate in bud. *Perfect stamens* as many or twice as many as calyx-lobes. *Anthers* 2-celled, dehiscing by longitudinal slits. *Staminodes* alternating with the corolla-lobes or the perfect stamens; rarely wanting. *Ovary* free, superior, 2- or more-celled, the cells with a solitary ovule, erect, suspended or laterally attached; *style* simple, with an entire or very slightly lobed stigma. *Fruit* a drupe or berry, usually indehiscent by abortion, often few-celled. *Albumen* fleshy, oily, or none. *Stipules* none. *Flowers* axillary, solitary or clustered, rarely in panicles. All the Burmese species are trees, some yielding valuable timber.

## ISOMERI.

*Calyx-lobes equal in number to the corolla-lobes.*

\* *Calyx segments uniseriate.*

× *Staminodes entirely absent.*

CHRYSOPHYLLUM, *Linnaeus.*

*Flowers* 5-, rarely 6-7-merous, with as many ovary-cells and stamens.

C. ROXBURGHII, G. Don. *E.T.*

Tropical forests North of Rangoon.

*C. acuminatum*, Roxb.

Than-kyá-pen (Kurz).

\* C. CAINITO, L. (M.).

Cultivated.

The star-apple.

× × *Staminodes as many as stamens and usually alternating with them.*

SIDEROXYLON, *Linnaeus.*

*Flowers* 5-merous. *Ovary-cells* 5-2. *Stamens* 5. *Seeds* albuminous.

Sub-genus OLIGO THECA, D.C.

*Calyx-lobes* acuminate or acute. Young shoots and under-surface of leaves more or less villous-tomentose.

S. TOMENTOSUM, Roxb.

Prone.

Thit-cho (Kurz).

Unarmed; calyx-lobes acuminate.

Sub-genus ET-SIDEROXYLON.

*Calyx-lobes* rounded or blunt.

\* *Berries* 1-2-seeded.

S. ATTENUATUM, D.C. *E.T.*

Tropical forests of Tenasserim. The Andamans. Kamorta. Great and Car Nicobar, and Narkondam.

Younger parts coppery or rusty-silk hairy; leaves coriaceous.

\*\* *Berries* several, 5-10-seeded.

S. GRANDIFOLIUM, Wall.

Hills between the Beeling and Tsittoung rivers, Tree forests of the Andamans and Kamorta.

*S. regium*, Wall.

Taw-tha-pwot-pen.

Glabrous. Leaves chartaceous.

The seeds of this species are albuminous.

SARCOSPERMA, *Hooker, f.*

*Flowers* 5-merous. *Stamens* and *ovary-cells* 5 each. *Seeds* without albumen. *Stipules* caducous.

S. (SIDEROXYLON) ARBOREUM, Ham.

Namyoon in Upper Burma.

\*\* *Calyx-segments* in 2 distinct series.

× *Stamens* as many as petals and alternating with as many staminodes.

ACHRAS, *Linnaeus.*

*Flowers* 6-merous. *Stamens* 6. *Ovary-cells* 12.

\* A. SAPORA, L. *E.T.*

Introduced from America and planted along roads.

Twot-ta-bat.

× × *Stamens* twice as many as petals, or numerous. *Staminodes* none.

ISONDRA, *Wight.*

*Flowers* 4-merous. *Stamens* 8. *Seeds* with albumen. *Ovary-cells* 4.

Sub-genus APOBASSIA, D.C.

*Flowers* 4- or 6-merous. *Seeds* without albumen.

\* *Flowers* 4-merous.

I. CALONEURA, Kz.

Tropical forests of the Andamans.

Leaves chartaceous, strongly nerved.

*Dichopsis* and *Isonandra* differ in the number of floral parts and in the absence or presence of a rather scanty albumen. This species, however, has 4-merous flowers and no albumen, and hence I fear that the character derived from the albumen is of the same value as in *Linociera*, etc., amongst *Oleaceæ* (Kurz).

\*\* *Calyx* 6-parted, the 3 outer segments valvate (*Dichopsis*, Thw.).

I. (BASSIA) POLYANTHA, Wall.

Tropical forests of Boronga Island at over 500 feet.

Leaves coriaceous, glaucous beneath, the nerves obsolete. Filaments as long as the anthers, densely villous.

I. OBOVATA, Griff.

Tenasserim.

Leaves coriaceous, glaucous beneath, the nerves strong and parallel. Filaments long and slender.

#### ANISOMERI.

*Corolla-lobes* usually 2-3 times as many as *calyx-lobes*.

\* *Staminodes* none.

× *Ovary-cells* twice as many as *calyx-segments*.

PAYENA, A. De Candolle.

*Calyx-lobes* 4. *Corolla-lobes*, *stamens*, and *ovary-cells* 8 each.

Sub-genus EU-PAYENA.

*Calyx* 4-parted.

\* *Anthers* glabrous.

P. LUCIDA, D.C.

Burma (and Malacca?).

*Ceratophorus Wightii*, Hassk.

*Isonandra polyandra*, Wight.

Connective of anthers produced into a broad blunt beak. Sepals blunt or nearly so. Nerves somewhat irregular. Petiole about  $\frac{1}{4}$ – $\frac{1}{2}$  inch long.

P. PARALLELENEURA, Kz.

Tropical forests of Tenasserim.

Connective terminating in a bristle. Sepals acute. Nerves thin, parallel. Petiole about an inch long, slender.

× × *Ovary-cells* as many as *calyx-segments*.

BASSIA, Koenig.

*Calyx-lobes* and *ovary-cells* 4 or 6. *Corolla-lobes* 8-14. *Stamens* about 2 or 3 times as many as *corolla-lobes*, in 1-3 series.

\* *Anthers* aristate, included, on very short filaments or almost sessile.

B. VILLOSA, Wall.

Ava. Taong-doung.

*Corolla-lobes* as long as the tube. *Anthers* in 2 rows. Berries unknown.

\*\* *Staminodes* 6 or 8.

MIMUSOPS, Linnaeus.

*Calyx-lobes* and *ovary-cells* 6 or 8 each. *Corolla-lobes* 2 or 3 times as many.

*M. littoralis*, Kz. *E.T.*  
*M. Indica*, Kz., And. Report.

Tenasserim and the Andamans. Katchall.

Kap-pa-lee (Kurz). Bullet-wood.

Leaves rounded or retuse. Flowers solitary, rather small. Anthers blunt (?). Berries the size and shape of a wood-apple, 5-6 seeded.

Wood close-grained, strong and durable.

\**M. ELENGI*, L.

Tropical forests of Tenasserim, South Andaman and Katchall, and cultivated all over Burma.

Khou-ya. Kha-ya-gung.

Leaves bluntish acuminate or apiculate. Flowers clustered, conspicuous. Anthers very acuminate. Berries oval, usually 1-seeded.

The most valuable tree of this Order in Burma is *Mimusops littoralis*, which yields an excellent and durable timber. The genus *Bassia*, which embraces the trees which yield the so-called vegetable butters, also belongs to this Order, of which the African *B. Parkii*, which yields the Shea butter, is best known. In the Himalayas, *B. butyracea* yields a solid expressed oil from its kernels, of a pure white, and the consistency of hard tallow. It is an extremely bland oil, not readily turning rancid, and would probably prove valuable in Indian medicine, as not subject to the objections which natives entertain for animal fats, and is moreover an elegant material. It is common in the Almora bazaar. *B. latifolia*, the Mowa of Bengal, is another valuable tree, which would probably (if introduced) thrive in Northern Prome. The fleshy calices are rich in saccharine matters and are eaten fresh, or dried, when they somewhat resemble 'sun raisins,' and yield by distillation a good 'arrack,' with a flavour almost as nauseous (to the uninitiated) as whisky, and doubtless as wholesome. The flowers of *Mimusops elengi* yield a fragrant essence, the seeds an oil, and the bark, in common with that of *Achras* and *Burmelia*, is astringent and febrifuge. The valuable substance Guttapercha is furnished by a Malayan tree, *Isonandra gutta*, which would probably thrive if introduced into Southern Tenasserim.

#### PRIMULALES.

*Corolla* regular, hypogynous, rarely epigynous; mono-, rarely poly-petalous. *Stamens* equalling the corolla-lobes and opposite to them, or if more, one series always opposite to them; hypogynous or epipetalous. *Ovary* 1-celled, with free local placentation. *Leaves* rarely opposite, exstipulate. Herbs or shrubs, rarely trees.

#### Order MYRSINÆÆ.

*Flowers* regular, hermaphrodite, polygamous or dioecious. *Calyx* 5-, or rarely 4- or 6-lobed or toothed, free, or rarely adnate to the ovary, the lobes contorted or very rarely valvate in bud. *Corolla* tubular, bell-shaped, or rotate, more or less divided into as many lobes, or rarely distinct petals, as there are divisions to the calyx, usually imbricate, and often contorted. *Stamens* as many as corolla-lobes, and opposite to them, all fertile, or rarely alternating with as many staminodes. *Filaments* usually very short, free, or rarely connate. *Anthers* 2-celled, the cells opening by longitudinal slits, or rarely on the summit, sometimes chambered. *Ovary* free, or adnate to the calyx, 1-celled, the cells with several (usually ovoid or turbinate) ovules, attached to or immersed in a central placenta, which is usually quite free, thick, and globular. *Style* simple, with a simple capitate or rarely lobed stigma. *Fruit* an indehiscent berry or drupe, or very rarely splitting lengthwise on one side. *Seeds* several or usually solitary, with a thin testa. *Albumen* horny or almost fleshy, or rarely none. *Embryo* filiform, usually curved, the radicle longer than the semi-convex cotyledons. Trees or shrubs, rarely under shrubs, sometimes scandent, the soft parts often marked with resinous dots, with alternate simple leaves. *Stipules* none. *Flowers* small, in axillary clusters, racemes, or panicles, or rarely in terminal panicles.

## Sub-order EU-MYRSINEÆ.

*Fruit* an indehiscent berry or drupe. *Seeds* with albumen.

## ARDISIEÆ.

*Staminodes* none. *Anthers* not transversely chambered. *Ovary* inferior to superior.

\* *Ovary* inferior or half-inferior (*Masea*).

## MESA, Forskahl.

*Corolla* bell-shaped or nearly so, imbricate in bud. *Calyx* 2-bracted. *Drupe* crowned by the calyx-limb, globular. Erect shrubs or trees.

\* *All parts, also the inflorescence, quite glabrous.*

× *Inflorescence* very short (hardly as long as the petioles).

M. ANDAMANICA, Kz.

Tropical forests of South Andamans.

*M. verrucosa*, Scheff.

Branchlets verrucose. Leaves minutely and remotely callus-toothed.

× × *Inflorescence* very much longer than the petioles.

† *Leaves* entire.

M. RAMENTACEA, Roxb.

All over Burma, the Andamans, and Kamorta.

*M. glabra*, Roxb.

*M. Sumatrana*, Scheff.

Racemes compound, shorter than the leaves.

† † *Leaves* coarsely serrate.

M. INDICA, D.C.

Chittagong. Khakyen Hills. Pegu Range. Tenasserim up to 3000 feet.

Racemes compound, shorter than the leaves. *Calyx* only  $\frac{1}{2}$  line long.

M. PANICULATA, A. D.C.

Tavoy.

Racemes compound, very slender, as long as or longer than the leaves. *Calyx* nearly a line long.

\*\* *Inflorescence, and more or less also the sinuate-toothed leaves and softer parts, pubescent or otherwise hairy.*

M. MOLLISSIMA, A. D.C.

Khakyen Hills. Pegu Range and Maitaban.

*M. permollis*, Kz.

Leaves softly pubescent, especially beneath. Panicles or racemes dense, rusty pubescent, shorter than the petiole. Bracts minute.

M. MUSCOSA, Kz.

Ava (probably).

Leaves glabrous, midrib beneath sparingly hairy. Panicles densely rusty-hairy and mossy, much longer than the petioles. Bracts about as long as the pedicels.

Mason gives M. LANCEOLATA, Voight, which is probably one of the above species.

\*\* *Ovary* superior. *Drupe* glabrous (*Ardisia*).

× *Flowers* pedicelled, clustered, lateral or axillary.

## MYRSINE, Linnaeus.

*Corolla* gamo- or rarely poly-petalous, imbricate or valvate. *Flowers* often polygamously dioecious. *Ovules* few. Erect trees or shrubs.

\* *Stigma* 2-3 lobed, usually fringed.

× *Style* longer or shorter. *Leaves* more or less serrate, especially towards the apex.

M. SEMISERRATA, Wall.

Hills East of Toung-ngoo at 6000 feet.

Pedicels thick, 1-2½ lines long.

× × *Stigma almost sessile. Leaves entire.*

*M. AVENIS*, D.C.

Hills East of Toun-goo at 4000 to 7000 feet.

Leaves exactly those of *M. capitellata*. Pedicels thick, shorter than the flower or drupe. Stigmas small.

I am not sure whether the Burmese tree is Blume's species, which I have not seen. Scheffer's *M. avis*, from Banca, is hardly the same as Blume's (Kurz).

\*\* *Stigma simple, linear and usually thick. Leaves entire.*

*M. CAPITELLATA*, Wall.

Ava. Prome and Nat-toung in Martaban

*M. lucida*, Wall.

(*vide* Mason). Kamorta (K.).

Flowers almost sessile or shortly pedicelled, densely clustered; lateral nerves thin, usually distinct.

Of this species there are two forms, or more likely two distinct species,—the genuine one, represented also in Burma, which has clustered sessile or almost sessile flowers, and the nerves of which are thin but pretty distinct,—and the pedicellate form, the flowers of which rest on short thick pedicels, and this also has the lateral nerves very obsolete (Kurz).

× × *Flowers in racemes or panicles.*

SAMARA, *Linnaeus*.

Corolla of 5 or 4 free petals imbricate in bud. Anthers as long as or shorter than the filaments. Ovules few. Climbers.

\* *Inflorescence terminal, or terminal and axillary. Filaments short and thick.*

× *Leaves glabrous.*

*S. (EMBELIA) RIBES*, Burm.

var. *a* Chittagong and Tenasserim.

Branchlets and inflorescence greyish or tawny velvety or puberulous. Pedicels terete.

*S. SESSILIFLORA*, Kurz.

Karen hills (probably).

As preceding, but the velvety pubescence always greyish. Flowers sessile.

Probably only a sessile-flowered variety of the preceding species.

*S. (EMBELIA) FLORIBUNDA*, Wall. Nat-toung in Martaban, at 6000 to 7200 feet.

*E. garciniaefolia*, Miq.

All parts, also the inflorescence, quite glabrous. Pedicels 4-cornered.

\*\* *Inflorescences axillary only. Filaments longer than the anthers, slender and filiform. Young shoots more or less pubescent.*

× *Leaves beneath more or less pubescent (at least the nerves). Flowers 5-merous.*

† *Leaves on long petioles.*

*S. (EMBELIA) ROBUSTA*, Roxb.

var. *β* all over the Pegu Range and Tenasserim.

*E. picta*, D.C.

*E. villosa*, Wall.

Leaves 3-5 inches long. Racemes elongate. Pedicels short.

The extreme forms of *Embelia robusta* and *E. villosa* look very different, but they offer no characters for a safe distinction. The length of the pedicels and of the bracts and the thickness of the rachis of the racemes vary as much as the indumentum. The stripe on the drupes of *E. robusta* are not always present (Kurz).

*S. (EMBELIA) VESTITA*, Roxb.

Along streams in the Pegu Range.

*E. nutans*, Wall.

Leaves 2-2½ inches long. Racemes short. Pedicels very long and slender.

†† *Leaves almost sessile.*

S. (EMBELIA) PARVIFLORA, Wall.

Khakyen hills.

Leaves  $\frac{1}{2}$ –1 inch long, distichous, not pellucid-dotted, only the midrib puberulous. Racemes very short and almost umbel-like.

×× *Leaves quite glabrous. Flowers 4-merous.*

S. (MYRSINE) MYRTILLUS, Hook.

Leaves  $\frac{1}{2}$ –1 inch long, serrately 3-toothed at the apex, conspicuously gland-dotted beneath. Racemes very short and almost umbel-like.

Kurz adds from the Nicobars:

S. (EMBELIA) MICROCALYX, Kz.

Tropical forests of Kamorta.

Allied to *E. canesceus*, Jack.

ARDISIA, Sw.

*Corolla* gamopetalous, usually rotate, twisted in bud. *Anthers* longer than the filaments, free. *Ovules* numerous. Trees, shrubs, or under shrubs.

\* *Panicles irregularly branched and compound, terminal, or accompanied by smaller ones in the axils of the upper leaves.*

+ *Pedicels much shorter than the calyx, or the flowers almost sessile.*

A. RIGIDA, Kz.

Tenasserim (or Andamans).

Leaves entire. Panicle stiff and stout, rusty puberulous. Calyx-lobes acute.

×× *Pedicels much longer than the calyx.*

† *Leaves entire.*

A. PANICULATA, Roxb.

Chittagong Hills.

Leaves coriaceous, decurrent on the strong petiole, the nerves arising at an acute angle. Panicle glabrous or nearly so. Peduncle angular.

A. ANCEPS, Wall.

Tropical forests of Tenasserim up to 3000 feet.

*A. Blumei*, D.C.

Leaves almost chartaceous, not decurrent, the nerves diverging almost rectangularly, numerous. Panicle slightly puberulous. Peduncle compressed.

Scheffer attributes black berries to the Blumean species, while the Roxburghian has them white when fully ripe (Kurz).

A. NERIFOLIA, Wall.

Ava Hills (probably).

Leaves chartaceous. Panicles rusty-puberulous, chiefly from the axils of the upper leaves. Calyx-lobes lanceolate.

†† *Leaves serrulate.*

A. SERRULATA, Kz.

Ava Hills (probably).

Habit of the preceding. Calyx-lobes linear.

\*\* *Flowers in racemes often contracted umbel-like, rarely the racemes or umbels simply compound, axillary, lateral or axillary and terminal.*

× *Umbels in small axillary corymbs or cymes (Pimelandra, D.C.).*

A. EUGENIIFOLIA, Wall.

Martaban at 4000 feet.

Nearly glabrous. Leaves thin coriaceous. Flowers minute. Cymes rusty velvety, of the length of the petiole.

×× *Umbels or racemes simple or compound.*

† *Umbels forming a simple terminal panicle.*

A. ANDAMANICA, Kz.

Tropical forests of the Andamans.

Very like *A. attenuata*, but umbels panicled. Leaves much dotted. Pedicels  $\frac{1}{2}$ –1 inch long.

So very near to *A. oblonga*, D.C., that the inflorescence only distinguishes it.

†† Umbels or racemes simple, very rarely slightly compound, axillary or lateral, rarely spuriously terminal, i.e. arising laterally from the summit of an axillary shoot.

° Leaves entire.

‡ Calyx-lobes acute or acuminate, lanceolate or narrow.

*A. GRANDIFOLIA*, D.C.

Tavoy.

Racemes almost terminal, umbel-like, puberulous.

‡‡ Calyx-lobes broad, rounded or blunt.

△ Young shoots, and often also the inflorescence or under surface of leaves, puberulous or pilose.

*A. AMHERSTIANA*, D.C.

Pegu and Tenasserim.

Kyet-ma-ōk.

Pedicels 8–10 lines long, recurved. Calyx-lobes a line long.

△△ Quite glabrous.

*A. POLYCEPHALA*, Wall.

Salween River above Murgye. var  $\beta$  Tropical forests of the Pegu Range and Martaban.

Pedicels  $\frac{1}{2}$  inch long. Leaves 5–10 inches long, obovate-lanceolate.

var.  $\beta$  *acuminata*. Leaves acuminate, the nerves strong and anastomosing within the margin of the leaves. Probably a distinct species.

*A. OBLONGA*, A. D.C.

Tropical forests of Tenasserim and the Andamans.

Pedicels about an inch long. Leaves 3–5 inches long. Corolla-lobes nearly  $2\frac{1}{2}$  lines long.

*A. HUMILIS*, Vahl.

Tropical forests of Arakan, Pegu, and Martaban.

*A. solanacea*, Roxb.

Leaves 3–5 inches long, obovate-lanceolate, the lateral nerves rather distant, thin but strong, irregular.

*A. LITTORALIS*, Andr.

Beach jungles of Tenasserim, the Andamans, and Nicobars.

*A. obovata*, Bl.

*A. umbellata*, Roxb.

*Climacandra obovata*, Miq.

Very similar to the above, but the leaves more coriaceous, the lateral nerves rather crowded, straight, thin, and often obsolete.

°° Leaves more or less serrate or crenate (at least towards the apex).

‡ Inflorescence peduncled, simple.

△ Calyx-lobes bluntish.

*A. WALLICHII*, D.C.

All over Pegu and Tenasserim.

Glabrous or the young shoots and slender-bracted racemes puberulous. Leaves acute.

*A. BRANDISIANA*, Kz.

Salween River near Tounng-yit-seik.

Glabrous. Leaves blunt. Racemes umbel-like, puberulous or glabrous, somewhat shorter than the leaves.

△△ Calyx-lobes acute.

*A. HELPERIANA*, Kz.

Tenasserim.

Rusty tomentose or pubescent. Leaves acuminate.

‡ ‡ *Racemes peduncled, simply compound.*

A. MEMBRANACEA.

Khakyen Hills.

Habit of *A. crispa*, but leaves larger and green. Callous, repand-toothed, gland-dotted beneath. Pedicels up to  $\frac{1}{2}$  inch long. Berries striate, the size of a pea.

A. VIRENS, Kz.

Racemes divaricately corymbose and spuriously terminal. Pedicels up to 2 inches.

‡ ‡ ‡ *Inflorescence umbellate, sessile, or at least the primary racemes sessile and the lateral ones peduncled.*

A. CRISPA, D.C.

Martaban at 4000 to 7000 feet.

*A. crenulata*, Lodd.

*A. crenata*, Roxb.

*A. lentiginosa*, Bot. Reg.

*A. densa* and *polysticta*, Miq.

*A. macrocarpa*, Wall.

Umbels sessile, like the leaves glabrous. Calyx-lobes a line long.

Thunberg's species has not only a different nervature, but is characterized also by the numerous conspicuous gland-dots. Khasi specimens (Hb. Hf. and Th. No. 41), however, seem identical with the Japan plant (Kurz).

A. VILLOSA, Roxb.

Var. *a* Tavoy and Taipo mountain in Martaban at 4000 feet.

Leaves beneath and the sessile umbels brownish or rusty tomentose. Calyx-lobes  $2\frac{1}{2}$  lines long.

var. *a Roxburghiana*. Leaves more or less rusty pubescent, at least on the nerves.

var. *β glabrata*, Bl. Leaves glabrous at least when full grown. Calyx glabrous or nearly so.

Mason gives the following names for various *Myrsineæ* in Sgau-Karen: Lac-kho-mau-thu, Lac-kho-mau-gchau, Lac-kho-mau-wā, and Lac-kho-mau-hpā-do.

Sub-order ÆGICEREÆ.

*Fruit a dry cylindrical follicle-like drupe rupturing irregularly. Seeds elongate, germinating while still on the tree. Albumen none. Anther-cells many-chambered.*

ÆGICERAS, Gaertner.

*Corolla* twisted in bud. *Filaments* connate at the base. *Flowers* in umbels. Trees.

Æ. (RHIZOPHORA) CORNICULATA, L. Tropical Coast forests of Arakan, Tenasserim,

*Æ. majus* and *minus*, Gaertn. the Andamans and Nicobars.

*Æ. fragrans*, Koen.

Bu-ta-yat.

Mason says "This large shrub, when in bloom, is covered with small white flowers, which seem to have great attractions for the fireflies. In moving up the streams near the sea-board on a dark night these trees are often seen illumined with myriads of waving brightning wings,

Retreating, chasing, sinking, soaring,

The darkness of the copse exploring.

and making them look in the deep gloom like superb candelabra hung with living lamps."

Order PRIMULACEÆ.

*Corolla* monopetalous, hypogynous, or rarely perigynous, or wanting, isostemonous, aestivation contorted or imbricate, very seldom none. *Stamens* opposite to the corolla-lobes. *Ovary* free, or very rarely inferior, 1-celled; placenta central, globose, many-ovuled. *Orules* fixed by their ventral face. *Fruit* a capsule. *Embryo* albuminous.

PRIMULÆÆ.

*Capsule quite free (not adnate to the base of the calyx), dehiscing usually by longitudinal valves.*

LYSIMACHIA, *Linnaeus*.

*Corolla* rotate or bell-shaped, with gibbose swellings at the throat. *Capsule* usually 5-valved. Erect or creeping simple or branched herbs. *Flowers* solitary and axillary, or in racemes or spikes.

\* *Flowers solitary or by pairs in the leaf-axils.*

L. LINEARIFOLIA, Griff.

Ava (probably).

Glabrous. Stem erect, terete. Leaves linear. Flowers slenderly pedicelled.

L. PEDUNCULARIS, Wall.

Ava. Taong-dong. Zwā-ka-hin (*vide* Parish).

Glabrous, erect, the stem 4-cornered. Flowers slenderly pedicelled. Leaves lanceolate.

\*\* *Flowers in terminal racemes.*

× *All parts glabrous.*

L. MULTIFLORA, Wall.

Bhamo.

Stamens shorter than the petals, narrowly bordered.

L. LOBELIODES, Wall.

Khakyen Hills.

Stamens exserted. Sepals broadly-white-bordered.

× × *Stems and racemes (glandular?) hairy.*

L. GRIFFITHIANA, Kz.

Ava (near Karmein).

Habit of *L. lobelioides*, corolla twice the length of the calyx.

Order PLANTAGINÆÆ.

*Corolla* monopetalous, hypogynous, generally isostemonous, aestivation imbricate. *Stamens* 4 (rarely 1), inserted on the corolla, or hypogynous. *Ovary* 1-4-celled. *Orules* peltate. *Fruit* a capsule or nucule. *Seeds* fixed by a ventral hilum. *Embryo* parallel to the hilum, albuminous, straight, or curved.

PLANTAGO, *Linnaeus*.

P. MAJOR, L.

Khakyen Hills.

var *β asiatica*, L.

Endlicher places *Plantaginææ* near *Plumbaginææ*, and I believe this to be the true affinity, for, with the exception of the stamens being alternate with the petals, the characters are all reducible to the Plumbaginaceous type (Kurz).

Order PLUMBAGINÆÆ.

*Flowers* hermaphrodite, regular. *Calyx* tubular, often enlarged and scarious, or petal-like at the apex, with 5 prominent ribs usually ending in as many teeth. *Corolla* of 5 petals free, or more or less united, twisted-imbricate in bud. *Stamens* 5, inserted at the base of the corolla or petals, opposite and often more or less adnate to them. *Anthers* versatile, 2-celled, the cells opening by longitudinal slits. *Ovary* 1-celled, with a solitary ovule suspended from a filiform placenta, erect from the base. *Styles* 5, distinct, or united at the base. *Capsule* 1-seeded, not, or irregularly dehiscing. *Sced* solitary, with a thin testa. *Albumen* rarely abundant, usually scanty or none. *Embryo* straight, with a superior radicle. Herbs or rarely under shrubs or small trees with radical or alternate entire or lobed leaves. *Flowers* in terminal heads, spikes, or panicles.

## STATICEÆ.

*Styles entirely, or at least at the summit, free. Fruit an utricle bursting at the base or circumsciss at the top.*

## ÆGIALITIS, R. Brown.

*Styles glabrous, free. Stigmas capitate. Petals coriaceous, jointed beyond the connate base. Fruit elongate, exserted. Albumen none. Small trees.*

Æ. ANNULATA, R. Br.

Chittagong, Tenasserim, and the Andamans.

Æ. rotundifolia, Roxb.

## PLUMBAGIÆ.

*Styles entirely connate. Pericarp more or less dehiscing into 2 valves.*

## PLUMBAGO, Linnæus.

*Calyx glandular-muricate. Fruit included in the calyx. Herbs.*

P. ZEYLANICA, L.

In rubbishy spots all over Burma.

Spikes glandular-pubescent. Corolla white. Bract ovate, leafy. Bractlets subulate.

\* P. ROSEA, L.

Ava. Pegu Range and Tenasserim.

P. coccinea, Boiss.

Ken-khyok-ni. (Red flowers.)

\* P. ZEYLANICA, L. (M.).

Ken-khyok-hpyu. (White flowers.)

\* P. CAPENSIS, Thunb. (M.).

The roots of Plumbago contain an acrid and vesicating juice, made use of by beggars to create sores.

## ERICALES.

*Corolla hypogynous. Stamens as many, or twice as many, as the corolla-lobes, epipetalous or hypogynous. Ovary 1- or many-celled, cells 1- to many-ovuled. Stigma simple, entire or lobed. Seeds minute.*

## Order EPACRIDÆ.

*Flowers regular, hermaphrodite. Calyx of 5, rarely 4, distinct sepals, much imbricate in bud. Corolla with a cylindrical bell-shaped or urceolate tube, the limb 5- rarely 4-lobed, valvate or variously imbricate, rarely the petals all distinct. Stamens as many as corolla-lobes or rarely fewer, hypogynous and free, or more or less adnate to the corolla-tube. Anthers versatile or rarely adnate, 1-celled (more or less perfectly 2-celled before dehiscence), opening by a single longitudinal slit into 2 valves, leaving no, or only a thin, slightly prominent longitudinal dissepiment. Hypogynous-disk annular or cupular, entire, lobed or consisting of 5 distinct scales, rarely wanting. Ovary superior, 5- or fewer (rarely 6-10)-celled, the cells with a solitary or several pendulous ovules. Style simple, terminal, or spuriously lateral, rarely almost basal. Stigma small, capitate or peltate, rarely slightly lobed. Fruit in the 1-ovuled genera indehiscent, and in the several-ovuled ones more or less drupaceous, capsular and loculicidally dehiscing. Embryo terete or nearly so, much shorter than the albumen, the radicle next the hilum.*

An almost exclusively Australian Order. A very few species have been found in the Indian Archipelago and Malaya.

## LEUCOPOGON, Linnæus.

L. MALAYANUS, Jack.

Tenasserim.

## Order VACCINIACEÆ.

*Corolla* monopetalous, epigynous, diplostemonous, aestivation imbricate. *Stamens* epigynous. *Anthers* of 2 bipartite cells, opening by 2 pores at the top. *Ovary* inferior, many-celled. *Ovules* anatropous. *Fruit* fleshy. *Embryo* albuminous. *Stem* woody.

\* *Calyx jointed with the pedicel.*

VACCINIUM, *Linnaeus*.

*Calyx* terete. *Corolla* various, from large and tubular and bell-shaped to small urn-shaped. *Anthers* 8 or 10, the tubes short or long.

Sub-genus AGAPETES, *Don*.

*Flowers* large, rarely small. *Pedicels* more than an inch long, thickened upwards and often cup-shaped-dilated at the apex. Epiphytical shrubs.

\* *Corolla* large,  $\frac{1}{2}$ –2 $\frac{1}{2}$  inches long, tubular to bell-shaped, slightly curved or straight.  
 ° *Filaments* more than  $\frac{1}{2}$  inch long.

V. MACROSTEMON, *Kz.*

Martaban at 4000 to 6000 feet.

*Anthers* short, connate. *Corolla* tubular, slightly curved. *Racemes* glabrous.

° *Filaments* thick and short, only 1–2 lines long.

× *Calyx* and *pedicels* glandular-hirsute.

V. (AGAPETES) VERTICILLATUM, *D. Don*.

var.  $\beta$  on Kambalu-toung on the Pegu Range at 2800 to 3000 feet.

*Corolla* glabrous, tubular or campanulate-tubular. *Anthers* without bristles between the tubes.

var.  $\alpha$  *Thibaudia obliqua*, *Griff.*

var.  $\gamma$  Tenasserim North of Tavoy at 4000 to 7000 feet.

*Flowers* in shortly peduncled umbel-like racemes.

var.  $\beta$  *Flowers* solitary or by twos or threes in the axils of the leaves.

var.  $\gamma$  *Corolla* 1 $\frac{1}{2}$  inch long.

× × *Calyx* and *pedicels* quite glabrous.

+ *Anthers* without a pair of reflexed or uncinate bristles between their tubes.

V. (AGAPETES) VARIEGATUM, *Don*.

Maulmain District.

*Thibaudia micrantha*, *Hook.*

*Ceratostemma variegatum*, *Roxb.*

*Anthers* exserted. *Nerves* of leaves uniting into a marginal nerve. *Corolla* 2 inches long or longer.

V. ROYLEI, *Kz.*

Martaban at 3600 to 5000 feet.

*Thibaudia variegata*, *Royle*.

As preceding, but *corolla* only half the size, scarlet.

V. (CERATOSTEMMA) MINIATUM, *Griff.*

Ava (probably).

*Anthers* included. *Nerves* of leaves not uniting within the margin.

++ *Anthers* with a pair of bristles between their tubes at the base or half-way up.

V. (CERATOSTEMMA) ANGULATUM, *Griff.*

Ava. Patkaye Ranges.

*Corolla* tubular, bell-shaped. *Calyx* toothed, the teeth subulate-lanceolate.

V. CAMPANULATUM, *Kz.*

Nat-toung in Martaban at 7000 feet.

*Corolla* bell-shaped, wide. *Calyx*-limb cupular, with sinuate acute teeth.

\*\* *Flowers* rather small or small,  $\frac{1}{2}$  inch to 2 lines only long, shortly or elongate-urn-shaped (*Corallobotrys*, *H. f.*).

V. (THIBAUDIA) AURICULATUM, *Griff.*

Taipo Hills, Martaban at over 4000 feet.

*Corolla*  $\frac{1}{2}$  inch long, elongate-urceolate. *Flowers* in peduncled terminal racemes.

V. (AGAPETES) ACUMINATUM, D. Don. Maulmain district.

Corolla 2 lines long, urn-shaped. Flowers in short umbel-like racemes arising laterally from the branches.

Sub-genus EPIGYNIUM, Klotsch.

Flowers small, urn-shaped or urceolate-campanulate. Pedicels short, slender, not or only at the very joint thickened. Racemes one-sided. Berries globose.

\* Epiphytical shrub. Bracts deciduous.

V. PUMILUM, Kz. Epiphytic on the Martaban Hills at 5000 to 6000 feet. var.  $\beta$  Taipo Hill at 4000 feet.

Branchlets pubescent. Corolla villous inside at the mouth. Anthers with 2 bristles at the tubes.

V. (THIBAUDIA) LORANTHIFLORA, Wall. (M.).

\*\* Terrestrial shrubs or trees. Bracts deciduous.

V. (EPIGYNIUM) DONIANUM, Klotzsch. Hills East of Young-ngoo at 3000 to 6000 feet.

All parts, also the pedicels, corolla, and calyx, glabrous.

V. EXARISTATUM, Kz. Martaban at 3000 to 6000 feet.

Young shoots and racemes (sometimes also the calyx) pubescent. Corolla glabrous. Possibly only an exaristate form of *V. Leschenaultii*, Wight. *V. Malaccense*, one of this vicinity, differs in the puberulous corolla (Kurz).

The succulent berries of different species of *Vaccinium*, as Bilberries, Whortleberries, Cranberries, are pleasant and acid, and valued as antiscorbutics.

§§ Corolla hypogynous or perigynous.

\* Flowers usually regular.

#### Order ERICACEÆ.

*Calyx* more or less deeply 5- or 4-lobed, or toothed, the tube adnate to the ovary, or quite free, sometimes very short. *Corolla* inferior or superior, the tube ovoid and globular to elongate, the lobes valvate or imbricate, very rarely as many as corolla-lobes, inserted within the corolla, but free from it. *Anthers*, 2-celled opening at the summit by 2 separate pores or oblong slits, or rarely by 2 longitudinal slits. *Hypogynous* disk very small or none. *Ovary* usually with as many cells as corolla-lobes, rarely more or fewer (3 or 2), the cells with 1 or several ovules attached to the axial placentas. *Fruit* either capsular, or succulent and indehiscent. *Albumen* fleshy. *Embryo* straight, often small. Shrubs or small trees, terrestrial or epiphytic, with simple, usually alternating penninerved or 3-nerved leaves. *Flowers* solitary and axillary, in short clusters or heads, or in terminal racemes or corymbs.

#### ERICIÆ.

*Corolla* deciduous or persistent. *Fruit* a capsule.

\* Capsule loculicidally 5-6-valved (*Andromedææ*).

#### GAULTHERIA, Linneus.

*Calyx* 2-bracted at the base. *Corolla* urceolate, the revolute limb 5-cleft. *Stamens* 10. *Anthers* 2-cleft, the cells terminating in 2 awns. *Hypogynous* scales 10, usually united at the base. *Calyx* fleshy or succulent in fruit.

G. PUNCTATA, Bl. vars.  $\beta$  and  $\gamma$  in the Martaban hills at 6000 to 7000 feet.

The forms here brought together vary greatly in the length of the petiole, the pubescence of the corolla inside, size of plant, etc., and require further study.

ANDROMEDA, *Linnaeus*.

*Corolla* globular to tubular-urn-shaped, the reflexed limb 5-toothed. *Stamens* 10, included. *Anther-cells* usually 1-awned. *Calyx* open in bud, dry in fruit.

*O. ovalifolia*, Wall.

Martaban hills at 5000 to 7000 feet.

The leaves of this plant poison goats.

\*\* *Capsule dehiscing septically from the apex (Rhododendriæ).*

RHODODENDRON, *Linnaeus*.

*Corolla* funnel- or bell-shaped, 5-cleft. *Stamens* 5 or 10, declinate. *Anthers* opening by terminal pores. *Capsule* 5-celled.

\* *Leaves shortly appressed tomentose or lepidote beneath. Calyx inconspicuous.*

*R. arborescens*, Sm.

Hills of Karen-ni (vide Mason).

Leaves beneath silvery and shortly tomentose beneath. Ovary rusty puberulous. Bracts of leaf-buds villous.

*R. formosum*, Wall.

var. *α* Nāt-toung in Martaban at 7200 feet. var. *β* Maulmain hill.

Leaves beneath and ovary and style rusty lepidote. Bracts of leaf-buds silky ciliate only.

var. *β* *Veitchianum*, Hook. Flowers nearly twice the size. Leaves not ciliate.

\*\* *Leaves glabrous and smooth.*

*R. moultmeinense*, Hook.

Tenasserim at 4000 to 7000 feet.

Ovary and style quite glabrous. Bracts of leaf-buds ciliate.

Near allied to *R. Javanicum*, from which it differs in its perfectly glabrous style and ovary and somewhat different nervation (the lateral nerves arising almost rectangularly from the midrib) (Kurz).

The *Rhododendrons* are too well known as ornamental trees to require notice, those of the Sikkim Himalayas, figured by Sir J. Hooker, being perhaps unsurpassed for beauty. Some species possess narcotic properties, and honey collected where they abound is sometimes unwholesome and stupefying. An elegant red jelly is however prepared from the flowers of a Himalayan species, *R. arborescens*. The leaves of *Andromeda* poison sheep and goats. *Gaultheria procumbens*<sup>1</sup> yields a pungent volatile oil called 'oil of winter green' (Hooker), and the bark of *Arbutus* is used for tanning.

## Series II. EPIGYNOUS.

## OVARY INFERIOR.

(Except in some *Goodeniaceæ* and *Brunoniaceæ*.)

## CAMPANALES.

*Flowers* generally irregular, rarely unisexual or collected into involucrate heads. *Stamens* as many as the corolla-lobes, or fewer. *Ovary* 2- to 6-celled, rarely 1-celled. *Style* simple. *Stigma* often indusiate. *Ovules* numerous in the cells, rarely solitary.

## Order CAMPANULACEÆ.

*Corolla* epigynous, monopetalous, regular, isostemonous, aestivation valvate. *Stamens* epigynous. *Ovary* 1- to many-celled, many-ovuled. *Stigma* without indusium. *Ovules* anatropous. *Fruit* capsular. *Embryo* albuminous.

<sup>1</sup> Prior (Popular Names of British Plants, p. 255) says the name 'Winter green' is applicable to a species of *Pyrola*, but that the rightful possessor of the name is the Ivy, "as being so conspicuously green, when the trees are most of them bare of leaf."

Sub-order *CAMPANULEÆ*.

*Corolla* regular, more or less bell-shaped to almost rotate. *Anthers* free. *Ovary* 2-3-5-celled.

\* *Capsule* opening by an apical opercle-like disk.

*SPIHENOCLEA*, Gaertner.

*Stigma* shortly 3-lobed. *Ovary* 2-celled. Glaucescous herbs. *Flowers* in dense spikes.

*S. ZEXLANICA*, Gaertn.

Wet fields all over Burma.

*S. pongutium*, D.C.

\*\* *Capsule* dehiscing by pores or valves.

× *Stigma* lobed.

+ *Fruit* a capsule. *Corolla* bell-shaped.

*WAHLENBERGIA*, Schrader.

*Capsule* dehiscing by 3-5 apical valves bearing the septa. Herbs.

*W. GRACILIS*, D.C.

Fallow lands in Prome.

*W. agrestis*, D.C.

*Campanula dehiscens*, Roxb.

++ *Fruit* a berry.

*CAMPANUMEA*, Fuchs.

*Corolla* bell-shaped. *Berry* supported by the adherent large calyx-lobes. Twining herbs, the juice milky. *Flowers* yellowish.

*C. CANESCENS*, Wall.

On rocks and brickwork in Pegu and Martaban.

*Cephalostigma spathulatum*, Thw.

*CODONOPSIS*.

*C. JAVANICA*, H. f. et Th.

Martaban Hills.

*C. cordata*, Hassk.

*C. TRUNCATA*, Wall. (M.).

*PONGATIUM*, Jussieu.

*P. INDICUM*, Lam. (M.).

*CYCLOBON*, Griffith.

*Corolla* shallowly bell-shaped. *Calyx-lobes* linear, entire or lacinate, adnate to the base of the ovary or free. Erect annuals, the juice milky. *Flowers* small, white.

*C. (CAMPANIA) LANCEFOLIUM*, Roxb. (P.). Chittagong. Ava. Pegu Range and

*C. truncatum*, H. f. et Th.

Tenasserim, on rocky walls along

*Codonopsis albiflora* and *distans*, Griff.

streams up to 3000 feet.

*C. leucocarpa*, Miq.

*Calyx-segments* halfway adnate to the sessile ovary.

*PENTAPHRAGMA*, Wallich.

*Corolla* persistent, the tube short. *Stigma* shortly 3-lobed. *Calyx-lobes* broad and blunt. Succulent herbs. *Flowers* in one-sided bracted racemes.

*P. (PHYTEUMA) BEGONIEFOLIUM*, Roxb. (P.). Mergui.

× × *Stigma* capitate.

*CEPHALOSTIGMA*, De Candolle.

*Corolla* almost rotate, deeply cleft, the lobes linear. *Capsule* dry. Delicate herbs.

*C. PANICULATUM*, A. D.C.

All over Pegu and Martaban.

*Wahlenbergia perotifolia*, WA, Wight, appears to me to belong to *C. hirsutum*, not to the above, as Hooker and Thomson state (Kurz).

The plants of this Sub-Order contain a sweet and abundant mucilage, and the roots of some species are edible, as those of the Rapun ( *Campanula rapunculus* ). Some species were used in medicine, but have now fallen into disuse.

Sub-order LOBELIÆ.

*Corolla irregular, usually more or less slit on the back. Anthers united round the style. Ovary 2-celled.*

\* *Anthers united round the style. Ovary 2-celled (Eu-Lobeliæ).*

PRATIÆ.

Berry indehiscant. The 2 upper anthers terminated by a single bristle. Herbs.

P. (LOBELIA) NUMMULARIA, Lamk.

Yunnalin plateau at 2500 feet.

*Lobelia begoniifolia*, Wall.

LOBELIA, *Linnaeus*.

*Capsule* herbaceous or membranous, dehiscent. The upper 2, or all the anthers bearded. Small or tall herbs.

\* *Small erect procumbent or creeping herbs. Flowers solitary or in spurious racemes, small, 1-1 lines long.*

× *Stems terete.*

L. ZEYLANICA, L.

var. *a* in Tree forests of the Pegu Range and Tenasserim along streams.

Calyx puberulous. Flowers solitary, axillary.

var. *a* L. *Lobbiana*, H. f. and Th.

var.  $\beta$  L. *affinis*, Wall.; L. *succulenta*, Bl.

×× *Stems angular.*

L. TRIGONA, Roxb.

var. *a* swampy spots all over Burma. var.  $\beta$  a hill form in Pegu. Martaban and Ava.

L. *subincisa*, Wall.

L. *subracemosa*, Miq.

Stems 3-gonous. Calyx quite glabrous. Flowers solitary and axillary, or more usually in spurious racemes.

var. *a* L. *trigona*, Roxb. All parts more succulent, the floral leaves more ovate. Peduncles thicker and flowers much larger.

? var.  $\beta$  L. *stipularis*, Wall.; L. *triulata*, Ham. Slender, erect, branched, all parts less succulent. Peduncles filiform. Flowers minute, the floral bracts often very narrow. Probably a distinct species.

Vatke identifies L. *trigona* of Roxburgh with L. *alsinoides* of Lamarek; the description of the latter, however, does not in the least agree with the Indian plant. L. *stipularis*, Wall., will take precedence, if it is not specifically different, but I am at present inclined to believe it may be different.

L. GRIFFITHII, H. f. et Th.

var. *a* in swampy pastures near Rangoon. var.  $\beta$  along rivers in Arakan and Tenasserim.

Stems 4-gonous. Flowers in poor racemes. Calyx small.

var. *a* *genuina*. Leaves reduced to scales. Flowers only a line long.

var.  $\beta$  L. *dopatrioides*, Kurz. Leaves developed. Flowers nearly twice the size.

\*\* *Robust erect simple or branched herbs, 2-5 feet high. Flowers  $\frac{3}{4}$ -1 inch long, in leafy-bracted terminal simple or panicked racemes.*

L. WALLICHIANA, H. f. et Th.

Khakyen Hills, Pegu Range and Hills east of Toung-ngoo.

All parts, also the white corolla, quite glabrous. Capsule glabrous.

*L. rosea*, Wall.

Khakyen Hills and Karen-ni (fide Mason).

*L. trichandra*, Wight.

All parts, also the rose-coloured corolla and the capsule, velvety puberulous.

*L. TRIANGULATA*, Roxb. (M.).

\* *L. succULENTA*, Blume (M.).

Cultivated.

\*\* *Anthers free. Ovary 1- or 2-celled (Goodeniaceæ).*

*SCÆVOLA*, Linnæus.

*Corolla 1- or 2-lipped, posteriorly split to the base. Soft-wooded trees or shrubs.*

*S. KÖENIGII*, Vhl.

Coasts of Tenasserim, the Andamans,

*S. taccada*, Roxb.

and the Nicobars.

Glabrous, not or slightly silky-villous in the leaf-axils. Berries glabrous.

Pyn-leh-tan.

Most of the plants of this Sub-Order contain an acrid narcotic and bitter juice, which is vesicatory, and excites violent and fatal inflammation of the intestines; hence they are among the most poisonous of plants. They have been employed as medicine, but are highly dangerous, and fallen into disuse.

#### Order STYLIDEE.

*Corolla* epigynous, monopetalous, anisostemonous, aestivation imbricate. *Stamens* united to the style. *Ovary* with 2 many-ovuled cells. *Ovules* ascending, anatropous. *Embryo* albuminous.

*STYLIDIUM*, Swartz.

*S. UGIGINOSUM*, Swartz.

Swampy lands in Arakan, Pegu and Tenasserim.

*S. Kunthii*, Wall.

*S. Brunonis*, Griff.

*S. tenellum*, Swartz.

Leaves palmatinerved, almost rosulate, the stems terete. Flowers white, in dichotomous leafless or few-leaved radical glandular-puberulous spikes or panicles.

*S. ROSEUM*, Kz.

Swampy land in Chittagong.

*S. tenellum*, Kz. (non Swartz).

#### ASTERALES.

*Flowers* regular or irregular; if unisexual, usually collected in involucrate heads. Limb of the calyx usually reduced to a pappus, or none. *Stamens* as many as the corolla-lobes, rarely fewer, inserted on the corolla. *Ovary* inferior, 1-celled and 1-ovuled, or if 2- or 3-celled, only 1 cell ovuled. *Leaves* exstipulate. Herbs or shrubs, rarely trees.

#### Order COMPOSITÆ.

*Flowers* (usually called florets) collected into a head (very rarely reduced to a single or a few florets), surrounded by an involucre of several to many bracts, either in a single or several rows, the whole appearing like a single flower. *Receptacle* on which the florets rest either naked, or with chaffy scales or hairs or bristles between the florets. *Calyx-limb* wanting, or transformed into a pappus or ring of hairs or scales on the top of the calyx-tube. *Corollas* either all hermaphrodite, tubular, and 5- or rarely 4-toothed (heads discoid), or all hermaphrodite and ligulate (*i.e.* tubular with a flat strap-shaped lamina), or those of the centre or disk tubular, and hermaphrodite or male, and those of the circumference either ligulate and female, or neuter, forming a ray (heads radiate), or filiform and female (heads discoid but heterogamous). *Stamens* 5, rarely 4, inserted in the tube of the

corolla, the anthers linear and united in a tube round the style (except in *Xanthium*), 2-celled, opening inwards by longitudinal slits, the basal lobes sometimes prolonged into short or long fine hair-like points called tails, the connective usually produced at the top into a small erect appendage. *Ovary* inferior, with a solitary erect ovule. *Style* filiform, usually with 2 short stigmatic lobes. *Fruit* a dry nut or achene, crowned by the pappus, or naked. *Seed* erect, without albumen. *Embryo* straight or rarely curved. *Radicle* inferior. Herbs or shrubs, sometimes scandent, rarely trees. *Leaves* alternate or opposite. *Stipules* none. *Flower-heads* terminal or rarely axillary, solitary, or in panicles or corymbs, sometimes reduced to clusters or heads.

#### Sub-order ASTERACEÆ.

*Florets* all tubular or bilabiate, or more usually the outer ones ligulate and forming a ray. *Style-branches* in the female florets always filiform, those of the hermaphrodites variously shaped (in the sterile florets sometimes the style simple). Herbs, shrubs, or rarely trees; the sap usually watery, never milky.

#### CORYMBIFERIEÆ.

*Florets* all tubular, or more usually the marginal ones ligulate and forming a ray. *Style* not thickened, joint-like at or near the apex. Herbs, shrubs, or trees, usually aromatic.

\* *Flower-heads* heterogamous, radiate or discoid, the hermaphrodite or male florets tubular, and the female ones ligulate or filiform (or rarely the heads homogamous in absence of the ray-florets).

+ *Anthers* free or nearly so. *Female flowers* all apetalous. *Flower-heads* unisexual, rarely heterogamous.

#### Sub-tribe AMBROSIEÆ.

*Style* of hermaphrodite florets undivided. *Anthers* inflexed-appendaged. *Pappus* none. *Leaves* alternate.

#### XANTHIUM, Linnaeus.

*Male florets* numerous, in globular heads, the involucre small, consisting of free bracts in a single row. *Female florets* 2 together, consolidated with the involucre into a prickly burr.

#### X. STRUMARIUM, L.

Rubbishy spots all over Burma.

*X. Indicum*, Roxb.

*X. Roxburghii*, discolor, and *brevirostre*, Waller.

*X. inaequilaterum*, D.C.

++ *Anthers* always united into a tube. *Style-branches* truncate or appendaged.

× *Pappus* of short stiff awns or scales, or reduced to a raised border or none at all. *Anther-cells* not tailed at the base. (Genera with a similar or no pappus, not included here, should be sought for in the next division with capillary bristles.)

#### Sub-tribe HELIANTHOIDEÆ.

*Flowers* either heterogamous, with the female florets more or less ligulate, the central ones tubular hermaphrodite or male, or rarely discoid, with all the florets hermaphrodite and tubular. *Receptacles* with chaffy scales between the florets, or rarely (in *Helenioidæ*) naked. *Anthers* without tails. *Style-branches* truncate and penicillate, or appendiculate, or the style of the sterile flowers undivided. *Pappus* of stiff awns or of short scales or none. *Achenes* 3-4-gonous, terete, or more usually variously compressed. *Leaves* opposite or rarely alternate.

\* *Receptacle* paleaceous.

+ *Pappus* consisting of numerous scales, rarely awn-shaped (or none).

#### TRIDAX, Linnaeus.

*Flower-heads* radiate. *Involucral bracts* in 2 rows, membranous, or the outer ones herbaceous. *Scales* of pappus feathery-fringed. Herbs, leaves opposite. *Receptacle* flat or nearly so.

T. PROCUMBENS, L.

A weed in Chittagong, Akyab and Rangoon, but not yet spread over the interior.

++ Pappus consisting of only 1-4 bristly awns, or cyathiform, or absent.

× Corolla of all the flowers deciduous.

† Achenes more or less compressed from the top. Pappus of 2 (rarely 4) bristles, or none.

‡ Involucral bracts distinct, almost equal, the outer ones herbaceous, the inner almost conform to the scales of the receptacle.

## SYNEDRELLA, Gaertner.

Ray-florets fertile. Achenes almost flat, lacerate-winged, crowned with 2-3 awns. Herbs, leaves opposite. Flower-heads sessile or peduncled.

S. (VERBESINA) NODIFLORA, L.

Arakan, Maulmain and the Andamans, where introduced and spreading. Kamorta.

‡ † Involucral bracts in 2 rows, the inner ones membranous, often connate at the base or higher up, the outer ones small or minute.

§ Style-branches truncate, penicellate or overtopped by a short appendage.

## BIDENS, Linnaeus.

Ray-florets sterile, rarely fertile or none. Involucral bracts free or connate at the base. Style-branches terminating in a short acute or shortly subulate appendage. Achenes not beaked, crowned with 2-4 stiff awns, finally minutely retrorsely bearded or aculeate. Leaves opposite, simple to pinnatisect.

Sub-genus PSILOCARPÆA.

Achenes slender, 4-cornered.

B. PILOSA, L.

Hills North of Ava and East of Toung-ngoo at 2000 to 4000 feet.

B. leucantha, Willd.

B. sundaca, Bl.

Leaves mostly pinnately 4-3-foliolate. Ray-florets white.

B. BIPINNATA, L.

Tavoy.

B. Wallichii, D.C.

Leaves mostly bipinnate. Ray yellow. Slender dry herb.

## COSMOS, Cavanilles.

Ray-florets sterile, often rose-coloured or violet. Achenes more or less beaked. Rest as in Bidens. Leaves opposite, simple to pinnatisect.

C. CAUDATUS, Hum. Bon. and Kun.

Waste spots near Rangoon.

Florets all purple to rose-coloured. Achenes long and slenderly beaked, the beak terminated by 2 stiff awn-like bristles.

C. SULFUREUS, Cav.

Waste spots near Akyab and Rangoon.

Coreopsis artemisiifolia, Jacq.

Adenolepis calva, Schultz.

Florets all yellow. Achenes long, but thickly beaked, the beak without pappus-bristles.

I am not at all sure whether the above synonymy is correct. The same plant (Adenolepis calva) has become quite a nuisance about Buitenzorg and other places in Java, entering freely the hill-savannahs (Kurz).

‡ † Achenes all thick, or those of the ray triquetrous, those of the disk laterally compressed. Pappus cyathimorph or of 2-3 stiff chaffy or bristly awns, with or without intermediate scalelets or none (Verbesinæ).

‡ Inner involucral bracts (or outer scales of the receptacle) embracing or enveloping the achenes of the fertile ray-florets. Pappus none, or of minute free scales.

ENHYDRA, *Loureiro*.

*Involucre* of 4 broad leafy bracts, the 2 outer larger than the 2 inner. *Ray-florets* in several rows, with very small ligules. *Pappus* none. Aquatic herbs, with simple opposite leaves. *Flower-heads* axillary, sessile or nearly so.

*E. FLUCTUANS*, Lour.

Swampy grass lands of Bhamo, Arakan and Pegu.

*E. heloncha*, D.C.

*E. paludosa*, D.C.

*E. longifolia*, D.C.

*Hingtscha repens*, Roxb.

SIEGESBECKIA, *Linnaeus*.

*Outer involucrel bracts* leafy, narrow, spreading, gland-hairy, the inner ones and the receptacle-scales enveloping the florets. *Ray-florets* in a single row, with small ligules or almost bell-shaped. *Pappus* none. Herbs with opposite leaves. *Flower-heads* paniced.

*S. ORIENTALIS*, L.

Bhamo and Martaban from 2000 to 7000 feet.

*S. brachiata*, Roxb.

†† *Inner involucrel bracts* all flat.

§ *Scales of receptacle* flat, very narrow, usually only few.

ECLIPTA, *Linnaeus*.

*Involucrel bracts* in 2 or 3 rows, the outer ones ovate-oblong. *Disk-florets* 4-toothed. *Ligules* small, almost 2-seriate. *Pappus* none or shortly 2-awned. *Style-branches* obtuse and flattened. Herbs, leaves simple, opposite.

*E. (VERBESINA) ALBA*, L.

var.  $\alpha$  and  $\beta$  all over Burma and introduced in the Andamans. var.  $\gamma$  Prome.

*E. erecta*, L.

*E. longifolia*, Schrad.

§§ *Scales of receptacle* concave or complicate, more or less embracing or enveloping the disk-florets.

‡ *Achenes* wingless, compressed or 4-5-cornered.

△ *Pappus* united at the base into a ring or cup. *Flower-heads* small or rather small.

WEDELIA, *Jacqueminot*.

*Ray-florets* fertile, with conspicuous spreading ligules. *Disk-achenes* crowned by numerous minute scales or fringes or by 1-2 short deciduous awns united at base into a cup or ring, or rarely the pappus very minute or obsolete. Herbs, leaves opposite, simple. *Flower-heads* peduncled or almost sessile. *Florets* yellow.

\* *Some of the outer involucrel bracts* more leaf-like and longer than the others. *Pappus* cup-shaped.

*W. (VERBESINA) CALENDULACEA*, L.

Tidal forests of Arakan and Tenasserim.

*Flower-heads* on very elongate peduncles, always solitary. Leaves oblong to lanceolate, almost sessile or narrowed into a short petiole.

*W. FERTICIFOLIA*, D.C.

Prome Hills.

*Verbesina biflora*, Roxb. non L.

*Flower-heads* rather short-peduncled, usually by pairs or few, axillary, terminal and in the fork of the branchings. Leaves ovate to ovate-lanceolate, slenderly petioled.

\*\* *Outer involucrel bracts* not larger than the inner ones. *Pappus* none or of 2 or 1 deciduous bristles. *Flower-heads* larger or shorter peduncled, by 2-3 or few, axillary, terminal, and in the branch-forkings.

*W. (VERBESINA) BIFLORA*, L.

Tidal forests of Arakan. Tenasserim, the Andamans and Nicobars.

*Wollastonia scandens*, Clark.

*W. Horsfieldiana*, Miq.

*W. insularis*, D.C.

Straggling perennial. Leaves ovate or broadly ovate-lanceolate.

△△ Pappus-scales or awns free from the base. Flower-heads usually large.  
 †† Achenes of the disk laterally compressed (those of the ray sometimes dorsally compressed or triquetrous), ciliate or winged on the margins. Flower-heads small.

SPILANTHES, *Linnaeus*.

Ray-florets, if present, fertile. Style-branches truncate and not appendaged. Achenes usually ciliate. Awns of pappus, if present, very thin. Herbs, leaves opposite. Receptacles conical.

S. ACNELLA, L.

var. *a* all over Burma up to 3000 feet.

Prostrate or ascending, branched. Flower-heads solitary in the leaf-axils or in the forks of the branches.

Hen-ka-la,

var. *a* *gemma*. Achene marginate with the borders, bristly-rough, usually crowned with 1 or 2 bristles.

var. *β calca*, D C. Achenes not, or scarcely marginate, pappus obsolete.

var. *γ oleracea*, Jacq.

S. PANICULATA, Wall.

Pegu and Martaban.

S. *aemella*, var. *ε paniculata*, Clark.

In my eyes a very distinct species. It is the Ein-bi-zat of the Burmese, used for poisoning fish (Kurz).

TITHONIA, *Desfontaines*.

Ray-florets sterile. Awns of the pappus deciduous or persistent, the intermediate scalelets persistent. Involucral bracts striate at the base, stiff, elongate-leafy at apex. Tall herbs, leaves alternate. Flower-heads on thickened peduncles.

\* T. TAGETIFLORA, Desf.

Attaran.

No doubt only an escape from cultivation (Kurz).

\*\* Receptacle naked (*Helenioides*).

TAGETES, *Linnaeus*.

Involucral bracts oily-glandular, in a single row, united into a toothed cup. Pappus of 5-6 unequal scales or awns. Flower-heads usually radiate. Herbs, leaves opposite, pinnatisect or serrate.

\* T. PATULA, L.

Cultivated.

Peduncles elongate and almost cylindrical. Involucral bracts plain.

\* T. ERECTA, L.

Cultivated; but less commonly.

Peduncles elongate, much swollen at the apex. Involucral bracts almost angular.

Sub-tribe ANTHEMIDIEÆ.

Flower-heads heterogamous, the females ligulate or filiform or without corollas, the disk-florets hermaphrodite or male, or very rarely all the florets tubular and hermaphrodite. Receptacle naked, or very rarely scaly. Anthers tailless. Style-branches truncate or penicillate, rarely shortly appendaged. Pappus none, or reduced to a raised border or rarely of short scales. Leaves usually alternate.

\* Receptacle naked, or alveolate fibrillose.

× Flower-heads radiate. Involucral bracts rather broad.

CHRYSANTHEMUM, *Linnaeus*.

Receptacle flat or convex. Achenes regularly or irregularly 5-10-ribbed. Pappus none, or rarely of very short scales or forming a cup.

Sub-genus EU-CHRYSANTHEMUM.

Achenes of the ray almost triquetrous, the inner nerve produced at the apex into a tooth. Pappus scarcely any.

- \* *C. CORONARIUM*, L. Cultivated in Ava and Prome.  
*C. Roxburghii*, Desf.  
*Pyrethrum Indicum*, Roxb. non L.

Flower-heads large, on long terminal or almost terminal peduncles. Ray yellow.  
 Sub-genus *PYRETHRUM*.

*Achenes* oblong, irregularly 3-5-cornered. *Pappus* scarcely any.

- \* *C. INDICUM*, L. Ava. Cultivated.  
*C. tripartitum*, Sweet.  
*C. Chinense*, Sab.

Flower-heads numerous, on slender peduncles, in terminal corymbs. Rays yellow, or in garden varieties variously (purple to white and orange) coloured.

*C. FENICULACEUM*, L. (M.).

Of the *Chrysanthemum leucanthemum*, L., Prior<sup>1</sup> remarks: "Moon Daisy, a large daisy-like flower, resembling the pictures of a full moon, the type of a class of plants, which, on the doctrine of signatures, were exhibited in uterine complaints, and dedicated in pagan times to the goddess of the Moon and regulator of monthly periods, Artemis, whom Horsley (in Hosea ix. 10) would identify with Isis, the goddess of the Egyptians, with Juno Lucina, and with Eileithuia,<sup>2</sup> a deity who had special charge over the functions of women, an office in Roman Catholic mythology assigned to Mary Magdalene and Margaret."

For the information of non-Catholic readers it may be as well to add: "It is necessary to observe that the monks in the middle ages mixed up with the story of the Magdalene, as recorded in Scripture, that of another St. Mary, whose early life was passed in a course of debauchery. . . . Her penance and pardon were a favourite subject for the legends of all Western Europe. The attributes of the impure Goddess of the Egyptians, Isis, and of the Greek Artemis, and the Roman Juno Lucina, have been transferred in Roman Catholic times to this saint and her counterpart, St. Margaret" (*i.e.* p. 151).

- × × *Flower-heads heterogamous, discoid (Cotulce).*  
 + *Florets of the circumference few. Achenes obovate or rounded at the top.*

*ARTIMISIA*, Linnaeus.

*Involucral bracts* in few rows. *Achenes* almost terete or compressed, 2- or thinly many-ribbed or without ribs. Herbs or undershrubs, the leaves dissect to simple. *Flower-heads* small, in racemes or paniced racemes.

Section *PRACUNCELLUS*.

*Flower-heads heterogamous, the ray-florets in a single row and female, the disk-florets bisexual, but sterile by abortion of the ovaries.*

- A. PARVIFLORA*, Roxb. Blamo and Nat-toung in Martaban (*fide* Mason).  
*A. glabrata*, Wall.

More or less glabrous, the lower leaves simple, obovate-oblong, toothed at the apex.

<sup>1</sup> Popular Names of British Plants, p. 159.

<sup>2</sup> Among the Romans we know Ilithya was a mere title of Diana in her capacity of Lucina, as in the Carmen Sæculare—

Rite maturos aperire partus  
 Lenis, Ilithya, tuere matres,  
 Sive tu Lucina probas vocari  
 Seu Genialis.

But in the Homeric poems the functions of the Roman Lucina were assigned to the Ilithyie, 'daughters of Juno,' *i.e.* ministers of her functions—

Ὡς δ' ὅτ' ἂν ᾠδίνουσας ἔχη βέλους ὀξὺ γυναιῶνα,  
 Δρὺν, τό τε προΐεισι μογροστόκοι Εἰλειθυῖαι,  
 "Ἡρῆς θυγατέρες πικρὰς ᾠδῖνας ἔχουσαι.

*I. c.* XI. 269.

## Section ABROTANUM.

*Flower-heads heterogamous, the ray-florets female, the disk-florets hermaphrodite: all fertile.*

- A. VULGARIS*, L. var.  $\alpha$  Khakyen Hills and Karen-ni (*vide* Mason).  
*A. leptostachya*, D.C. var.  $\beta$  Ava and Khakyen Hills.

Leaves once or twice bipinnatifid, the segments rather broad and elongate, more or less greyish or silky-villose beneath. Flower-heads in large panicles.

- A. CURVIFOLIA*, Roxb. Prome.

Leaves twice or thrice bipinnatifid, glabrous, the segments almost filiform, acute. Flower-heads rather large, in loose panicles.

The English name of *Artemisia absinthium*, L., Wormwood, affords a curious illustration of how the sense of words and names gets changed through the errors of copyists and the ignorance of uneducated people. The word was originally *wer-mod* or *wer-muth* from *wehren* or *werian*, to keep off, and *mod*, a maggot or worm. In time *wer* got altered into *worm*, annexing the initial letter of the next word, and *od* (left out in the cold!) naturally got fashioned into *wood*, the more so as the plant, being a bitter one, was considered good against 'worms.'—Prior, Popular Names of British Plants, p. 258.

++ *Florets of circumference very numerous. Achenes flat or concave at the top. Flower-heads spherical or hemispherical.*

## COTULA, Linnaeus.

*Florets* of the circumference without any or with a very short broad or conical corolla, the hermaphrodite florets 4-toothed, with a widened or thin tube. *Achenes* flat, obtuse or truncate. *Flower-heads* peduncled. Small herbs.

- C. ANTHEMOIDES*, L. var.  $\alpha$  Khakyen Hills.  
*Pleioogyne cardiosperma*, Edg. var.  $\beta$  Bhamo. Pegu.  
 var.  $\alpha$  *genuina*. Achenes not winged.  
 var.  $\beta$  *hemispherica*, D.C. Achenes winged.

## MYRIOGYNE, Less.

*Florets* of the circumference with a 2–3-cleft corolla nearly as long as the style, the hermaphrodite florets 4-toothed. *Bracts* of involucre small and much shorter than the 3–4-cornered achenes. *Flower-heads* sessile, minute. Prostrate herbs.

- M. MINUTA*, Less. All over Burma, and now introduced into the Andamans.  
*Artemisia sternutatoria*, Roxb.  
*Dichrocephala Schmidii*, Wight.  
*M. Cunninghamii*, D.C.  
*Centipeda orbicularis*, Miq. non Lour.  
*Sphæromorpha Russeliana*, D.C.  
*Centipeda minima*, A. Braun et Aschers.

## CENTIPEDA, Loureiro.

As preceding, but involucre bracts large and broad, in fruit connivent and covering the cylindrical slightly striate achenes. Prostrate herbs. *Flower-heads* sessile, small.

- C. ORBICULARIS*, Lour. In dried-up marshes near Radbource (Siam).

×× *Pappus* usually of numerous capillary soft bristles (rarely paleaceous or none).

° *Anthems* tailed at the base.

## Sub-tribe INULOIDIEE.

*Flower-heads* heterogamous, discoid or radiate, or homogamous in absence of the ray-florets. *Anthems* terminating in a basal bristle or tail. *Style-branches* linear, obtuse and not appendaged (or the style undivided in the sterile florets). *Leaves* usually alternate.

\* Female flowers, if present, ligulate.

× Bristles of pappus all conform and almost equal, capillary, copious.

ISULA, *Linneus*.

Flower-heads heterogamous. Involucre-bracts in many rows, narrow or leafy-appendaged. Ray florets few, in 1 or 2 rows, disk-florets numerous. Anthers with double tails. Achenes not or 4-5-ribbed. Herbs or under shrubs.

× Stems not winged. Villous or villous-pubescent under shrubs.

I. CAPP, D.C. Upper Tenasserim at 4000 to 5000 feet, and Ava Hills.

*I. pseudocappa*, *eriophora*, and *oblonga*, D.C.

*I. salviodora*, Schultz.

*Duhuldea Chinensis*, D.C.

Bracts of the involucre narrow-linear. Flower-heads corymbose panicled.

× × Stems leafy-winged from the decurrent sessile leaves. Densely woolly villous. Tall annuals.

I. POLYGONATA, D.C.

All over Pegu and Martaban up to 2000 feet.

Flower-heads thick, woolly, and rather large, corymbose, the outer involucre-bracts leafy linear-oblong.

T. OBLONGA (M.).

× × Pappus unequal, the outer consisting of short bristles or more usually of minute scales, rarely no pappus at all.

+ Pappus present (rarely absent).

PULICARIA, *Gaertner*.

Flower-heads heterogamous, the ray-florets in 1 or 2 rows, yellow. Involucre broad, the bracts narrow, in few rows, the outer ones herbaceous. Achenes ribbed or not. Bristles of inner pappus in a single row, the outer pappus of very short scales more or less connate into a crown or slit cup.

P. GLAUDESCENS, Clark.

Tenasserim (or Andamans).

Evidently no *Pulicaria*, and certainly not identical with the Persian plant. It looks more like *Pluchea*, but the pappus is different. The material at disposal is defective (Kurz).

VICOA, *Cass*.

Flowers-heads heterogamous or homogamous. Involucre usually broad, the bracts narrow, in many rows. Achenes hardly ribbed. Bristles of pappus very thin, in a single row, rarely intermixed with a few minute scales.

V. (ISULA) INDICA, L.

Prome.

*V. aurita* and *auriculata*, D.C.

*Doronicum calcaratum*, Roxb.

V. INDICA, L.

Slender, more or less roughish. Leaves short. Flower-heads only 2-2½ lines across.

V. APPENDICULATA, D.C.

Ava.

More robust, more glabrescent. Leaves elongate-linear. Flower-heads ½-¾ inches in diameter.

\*\* Female flowers, if present, filiform.

× Style-branches of hermaphrodites usually truncate. Flower-heads androgynous or unisexual, or homogamous. Involucral bracts usually scarious, hyaline or petaloid (*Gnaphalieæ*).

+ Flower-heads 1-flowered. Pappus none.

## CLESULA, Roxburgh.

*Flower-heads* clustered, axillary, of 2 bracts only, inserted on the broad receptacle and surrounded by a leafy involucre. *Aquatic* herbs, the leaves simple.

C. AXILLARIS, Roxb.

Chittagong.

*Meyera orientalis*, Don.

++ *Flower-heads many-flowered.*

† *Flower-heads androgynous, usually with more female than hermaphrodite florets, or more or less unisexual, dioecious or monocious, clustered or distinct. Involucral-bracts rarely petaloid.*

° *Hermaphrodite florets all sterile, the style usually entire or scarcely and only very shortly 2-cleft.*

## ANAPHALIS, De Candolle.

*Flower-heads* androgynous or incompletely dioecious, in corymbs, rarely few or solitary. *Bristles* of pappus free from the base. *Inflorescence* not involucred.

A. ROYLEANA, D.C.

Ava Hills and hills east of Toung-ngoo at 4000 to 5000 feet.

Leaves adnate but not decurrent at the base, 1-nerved. *Flower-heads* peduncled, 3-4 lines in diameter, corymbose.

A. ADNATA, D.C.

Martaban between 5400 and 7000 feet.

Leaves more or less decurrent at the base, 1-nerved. *Flower-heads* half the size, sessile and clustered, in corymbs. A densely white adnate-woolly stout herb.

°° *Most or all hermaphrodite florets fertile. Style deeply 2-cleft.*

## GNAPHALIUM, Linnaeus.

*Flower-heads* more or less androgynous, usually small and clustered, rarely solitary, the involucral bracts scarious, often coloured. *Ray-florets* very numerous, disk-florets few. *Bristles* of pappus not feathery, free or united at the base into a ring.

\* *Flower-heads corymbose, or the corymbs contracted and almost head-like.*

+ *Leaves linear, with a rounded base half-stem-clasping.*

G. HYPOLEUCUM, D.C.

Hills of Ava and Martaban at 4000 to 6000 feet.

*G. confertum*, Bth.

Tall annual. *Flower-heads* laxly corymbose, the involucral bracts yellow or brown.

× × *Leaves more or less spatulate-linear to cuneate-obovate.*

G. LUTEO-ALBUM, L.

All over Burma and its islands up to 4000 feet.

*G. confusum*, *ramigerum*, and *Javanicum*, D.C.

*G. multiceps*, Wall.

*G. orizense*, Roxb.

*G. Reinwardtianum*, Miq.

Silky-villous herb much branched from the base. *Flower-heads* densely clustered, forming leafless more or less lax corymbs, the involucral bracts bright yellow or greyish-pale-yellow.

G. FLACIDUM, Kz.

Doab of the Hlein and Irrawaddy, in bamboo jungles (*B. arundinacea*).

Simple or almost simple tender herb, thinly viscid-pilose. Leaves obovate-cuneate, almost half-amplexicaul, thinly herbaceous. *Flower-heads* in dense terminal almost head-like corymbs, the involucral bracts almost membranous, often more or less steel-blue coloured.

\*\* *Flower-heads clustered or rarely solitary in the axils of the leaves, and usually gradually passing into a leafy terminal spike or head.*

*G. INDICUM*, L.

All over Burma.

*G. strictum* and *multicaule*, Roxb.*G. Niliacum*, Raddi.

Erect or spreading from the base, more or less silky-pilose. Leaves elongate obovate-cuneate. Flower-heads only about a line long, leafy spicate.

*G. CRISPATULUM*, Del.

Pegu in cultivation.

Prostrate and spreading, the branchings only slightly leaved at the lower parts, more so upwards, the upper leaves forming stellate involucre to the densely crowded leafy heads.

†† Flower-heads androgynous, with usually fewer female than hermaphrodite florets, or homogamous with the florets all hermaphrodite. Involucral bracts usually scarious.

×× Style-branches of hermaphrodite flowers not truncate, filiform. Flower-heads androgynous.

+ Female florets supported or enveloped by the scales of the receptacle or by the involucral bracts.

*ATHROISMA*, De Candolle.

Flower-heads in dense terminal solitary clusters or short spikes. Female florets subtended by the scales of the receptacle. Achenes broad, dorsally compressed, ciliate on the margins. Scales of pappus very short, united into a ciliate-fringed ring. Herbs, the leaves pinnatisect.

*A. LACINIATUM*, D.C.

River-beds in Pegu and Tenasserim.

*A. viscidum*, Zoll.

+ + Receptacle naked. Involucral bracts herbaceous, or scarious, linear.

† Flower-heads small, packed into dense globose or ovoid clusters.

*SPHERANTHUS*, Linnæus.

Flower-heads in solitary terminal globular clusters. Pappus none. Anthers without tails or points at the base.

Sub-genus *POLYCEPHALUS*, Forsk.

Outer bracts of the flower-heads longer than the flower-heads themselves, scarious and long-awned.

*S. PEGUENSIS*, Clarke.

Waste spots in Ava and Prome.

Glandular-puberulous, the branches leafy- and serrate-winged; heads shortly peduncled, the empty bracts appressed bristly and ciliate.

Sub-genus *EU-SPHERANTHUS*.

Bracts shorter than the flower-heads and almost entirely hidden by them. Branches leafy-winged.

*S. NIRTUS*, Willd.

Fallow lands all over Burma.

*S. mollis*, Roxb.

Pubescent or hirsute. Heads globose,  $\frac{1}{2}$ – $\frac{3}{4}$  inch thick, the involucral bracts tapering into a subulate ciliate point.

*S. INDICUS*, L.

Prome. Maulmain.

*S. microcephalus*, Willd.

Glabrous. Heads half the size, the involucral bracts scarious, often jagged at the ends.

*PTEROCALYX*, Elliott.

Flower-heads sessile, in spiked clusters or rarely solitary. Pappus of capillary bristles. Anthers with short tails or points at the base.

*P. BILLIARDIERI*, F. Muell.

Fallow lands in Ava and Prome.

*P. Monticola spicatus*, Labill.*P. cylindrostachyum*, Clarke.

†† *Flower-heads separate, solitary, corymbose or paniced, rarely clustered.*

° *Pappus of a few rigid bristles or scales, or none.*

EPALTES, Cassini.

*Involucral bracts rigid. Anthers with simple tails. Pappus of the female florets none, of the disk-florets small.*

E. (ETNULIA) DIVARICATA, L.

Prome Hills.

*E. linearifolia* and *pygmaea*, D.C.

°° *Pappus consisting of copious capillary soft bristles or hairs.*

BLUMEA, De Candolle.

*Flower-heads racemose, spiked or paniced. Style of the disk-florets all 2-cleft. Involucral bracts narrow-linear, herbaceous or thin scarious. Herbs, rarely shrubs.*

\* *Cauline leaves not decurrent on the branches. Florets golden to pale yellow (except in the white or blue-flowered B. Wightiana) (Apterae).*

× *Flower-heads on long peduncles arising singly from the axils of the leaves, or rarely appearing compound from the reduction of the leaves.*

B. AMPECTENS, D.C.

In rubbishy spots, Chittagong. Introduced

*B. arcuaria* and *tenella*, D.C.

into the Andamans.

*Conyza amplexicaulis*, Lamk.

Shrubby annual. Leaves small, sessile, with broad base and almost half-stem-clasping. Involucral bracts narrowed into filiform tails. Peduncles almost glabrous.

B. BIFOLIATA, D.C.

Chittagong. Pegu.

*B. anagallidifolia* and *oligocephala*, D.C.

*Conyza humifusa*, Miq.

Low perennial, branched and ascending from the base, thinly pubescent. Peduncles spreadingly pubescent. Involucral bracts very acute. Leaves rather large, sessile, with a rounded base.

×× *Flower-heads in panicles, racemes, or densely packed into shorter or longer spikes.*

+ *Serratures or teeth of the leaves spiny, indurated at their tips.*

B. OXYDONTA, D.C.

Waste spots in the deltas of the Tsittoung and Irrawaddy.

*Conyza spinidens*, Miq.

Spreading perennial, branched from the base and procumbent, sparingly pilose. Leaves small, the serratures few and coarse. Flower-heads few, forming irregular depauperate panicles.

B. SPINELLOSA, D.C.

Prome.

Erect, simple or branched annual, more or less appressed silky-pilose; leaves rather large, doubled-spiny-serrulate. Flower-heads in regular panicles.

De Candolle's *B. spinellosa* seems to be a spiny-toothed form of the silvery silk-hairy form of *B. hircanifolia*; Clarke's is near *B. lacera* (with slender peduncles), or near *B. barbata*? (Kurz).

++ *Serratures or teeth of the leaves various, but never spiny-indurated.*

† *Herbs, or biennials, simple or branched from the base, and more or less villous, pubescent, or viscid-puberulous, rarely almost glabrous.*

° *Flower-heads irregularly disposed and more or less peduncled, forming panicles, or rarely the panicle contracted.*

△ *Receptacle glabrous.*

‡ *Florets blue to violet, rarely bluish-white.*

B. WIGHTIANA, D.C.

All over Burma and introduced into the Andamans.

*B. trichophora* and *hymenophylla*, D.C.

Tall herb, reduced and small, more or less viscid-pubescent. Leaves simple and petioled. Flower-heads only 2 lines long, on shorter and long filiform peduncles, forming lax panicles.

The colour of the florets and the much smaller size of the flower-heads combined with a viscid pubescence ought to remove all difficulties in distinguishing this species from *B. lacera*, with which Bentham and Thwaites are inclined to combine it. *B. hymenophylla* has pale blue or white florets and is certainly nothing but a slender shade-form which I found in all transitional states in company with *B. Wightiana*, not *B. lacera*, as Clarke states (Kurz).

‡‡ Florets all yellow. Flower-heads in lax panicles. Peduncles slender, although sometimes very short. Annuals, rarely becoming biennials.

*B. LACERA*, D.C.

Waste spots near Akyab and elsewhere. Kamorta.

Erect, branched from the base, more or less silky-villous, but not viscid, the cauline leaves simple and sessile or nearly so. Flower-heads 3–3½ lines long, in panicles sometimes pretty contracted but elongate.

*B. GLANDULOSA*, D.C.

Chittagong.

*B. lacera*, var.  $\beta$  *Heyneana* and  $\gamma$  *glandulosa*, Clarke.

Erect, branchy, thinly viscid-pubescent, the cauline leaves simple and petioled. Flower-heads about 4 lines long, on long slender glandular peduncles, forming lax panicles.

*B. (CONYZA) DIFFUSA*, Roxb.

All over Burma and the Andamans.

*B. virens* and *lapsanoides*, D.C.

Erect, branchy, thinly puberulous, the cauline leaves (except in starved states) almost runcinate and petioled. Flower-heads about 3 lines long, with the involucre bracts green and glabrous, on spreading stiff capillary glabrous or glandular peduncles, in lax panicles.

*B. LACTUCIFOLIA*, D.C.

All over Burma.

Erect, simple or branched, almost glabrous or usually more or less hirsute, the cauline leaves (especially the lower ones) more or less runcinate. Flower-heads nearly 4 lines long, with the involucre bracts and the long slender peduncles pubescent, in lax panicles.

var.  $\beta$  *subsimpler*, D.C.; *B. paucifolia*, D.C.; *A. cuneifolia*, D.C. More glabrous and almost simple, the leaves obovate-cuneate and not lobed, but often passing into the runcinate form.

var.  $\gamma$  *viscosula*, Clarke. Densely and shortly glandular-pubescent, the leaves small and rather rigidly runcinate.

var.  $\delta$  *nudipes*. More hirsute instead of pubescent. Panicles more squarrose. Stem usually naked and destitute of leaves to ¼–½ feet from the ground.

Mr. Clarke refers var.  $\delta$  to his *B. fasciculata*, but the long peduncled flower-heads and indeed the whole inflorescence are entirely different (Kurz).

△ △ Receptacle hairy. Peduncles slender.

*B. LACINATA*, D.C.

Prome. Meaday.

*B. runcinata*, *sonchifolia* and *cinerascens*, D.C.

Branched or simple annual, shortly or rarely glandular-pubescent, the cauline leaves usually runcinate. Flower-heads about 3½ lines long, longer or shorter peduncled, forming lax leafless panicles.

◐ ◐ Flower-heads clustered in the axils of the upper leaves and passing more or less gradually into a contracted spike-like panicle, or crowded in a dense terminal spike, or the sessile clusters remote and in simple or panicked slender spikes.

△ Receptacle hairy. Flower-heads sessile, clustered, or rarely solitary simple or panicked spikes.

B. (CONYZA) FISTULOSA, Roxb.

var.  $\alpha$ ,  $\beta$ ,  $\gamma$ , all over Burma, up to 4000 feet;  
var.  $\delta$  on laterite in Martaban, and rare in  
Prome, up to 3000 feet.

Erect, simple or branched annual, slightly or rarely densely pubescent or pilose, the cauline leaves narrow and simple. Flower-heads about 3 lines long, often pilose or almost woolly.

var.  $\alpha$  *fasciculata*, D.C. (*B. fistulosa*, Roxb.). Spikes more or less paniced. Receptacle tawny velvety, the velvet sometimes intermixed with a few white soft hairs.

var.  $\beta$  *racemosa*, Clarke. Spikes almost simple or little branched. Receptacles yellowish velvety.

var.  $\gamma$  *glomerata*, D.C. (*Conyza Burmanni*, Miq.). Spikes more or less paniced. Receptacles velvety, the velvet intermixed with copious soft white hairs.

var.  $\delta$  *holosericea*, D.C. More simple, thinly silky pilose, the spikes usually simple, rarely with a few additional basal ones, long-silky-pilose. Receptacle shortly white pilose.

The above varieties are, with the exception of  $\delta$ , hardly worth keeping up. Bentham refers *B. holosericea*, D.C., to his *B. hieracifolia*; but a scrap of Wallich's authentic specimens shows small sessile heads, indeed represents the upper part of the form correctly referred by Mr. Clarke to the above species (Kurz).

$\Delta \Delta$  *Receptacle glabrous. Flower-heads more or less peduncled to almost sessile, clustered in the leaf-axils and forming leafy or leafless contracted spike-like panicles or spikes (rarely the panicle developed).*

B. BARBATA, D.C.

var.  $\alpha$  Maulmain. var.  $\beta$  along the Zamayee stream  
of the Pegu range and the Thou-kye-gat.

Erect slender annual, long silky-pilose, the leaves all cuneate-oblong to linear. Flower-heads silky-pilose, nearly 4 lines long, on longer or shorter slender peduncles or almost sessile, clustered in the upper leaf-axils and passing into a leafy spike-like contracted panicle.

var.  $\alpha$  *genuina*. Leaves broader or narrower. Flower-heads on slender or short peduncles in a diffuse usually long-pilose panicle, or the panicle reduced and raceme-like but laxly contracted.

var.  $\beta$  *sericans*. Leaves more elongate-cuneate to almost linear, appressed silvery pubescent as in *B. lacera*. Flower-heads larger, almost sessile or thickly peduncled, clustered in the axils of the leaves and gradually passing into terminal dense spikes.

B. HIERACIFOLIA, D.C.

var.  $\alpha$  Mergui. var.  $\beta$  Ava Hills.

Erect robust annual, villous to silky pubescent, the lower stem-leaves more or less spatulate-oblong or linear. Flower-heads  $\frac{3}{4}$ –1 inch long, on short, thick, woolly-tomentose peduncles or almost sessile, forming dense spikes or spike-like (rarely lax) panicles, often accompanied by clusters of flower-heads in the upper leaf-axils.

var.  $\alpha$  *typica*, Clarke. Little or not branched except from the base. Flower-heads clustered, forming dense terminal spikes. Radical leaves chiefly developed.

var.  $\beta$  *evolutior*, Clarke. Panicles more or less branched, larger or smaller. Radical leaves none or marcescent.

A species apparently very variable as to inflorescence and habit, the paniced form approaching *B. crinita* and *B. flexuosa* (if these be really distinct from one another), while the subscapiferous forms look somewhat like *Gnaphalium*. *B. lacera*, var.  $\alpha$  *subcapitata*, Clarke, is in my eyes the same as Clarke's var.  $\gamma$  *Nilagirica* of this species.

†† *Erect or scandent shrubs or under shrubs, or tall shrub-like biennials.*

○ *Erect shrubs.*

$\Delta$  *Peduncles thick and short, densely tomentose. Leaves more or less villous or tomentose, especially beneath. Receptacle more or less hairy.*

*B. MACROPHYLLA*, D.C.

var.  $\beta$  Martaban at 3000 to 5000 feet,  
and Khakyen Hills.

Leaves pubescent, especially beneath, decurrent and entire at the base. Flower-heads 4 lines long, the involucrel bracts narrow, almost glabrous. Pappus rufescent. Receptacle shortly pilose.

var.  $\beta$  *procera*, and *B. semivestita*, D.C. Flower-heads larger. Involucrel bracts densely pubescent. Pappus white.

*B. (CONYZA) BALSAMIFERA*, L. All over Burma up to 3000 feet. Kamorta.

*B. densiflora*, *excisa*, and *grandis*, D.C.

Leaves silky to silvery villous beneath, with one or two pairs of small dissevered pinnæ on the petiole. Flower-heads 4 lines long, the involucrel bracts densely pubescent. Pappus rufescent. Receptacle almost glabrous.

$\triangle \triangle$  *Peduncles long and slender, puberulous to glandular-pubescent. Leaves narrow.*

*B. AROMATICA*, D.C.

Tenasserim.

Glandular-pubescent, especially the leaves beneath, the cauline leaves all sessile, membranous. Flower-heads 4-5 lines long. Receptacle glabrous.

*B. SENSIFOLIA*, D.C. Martaban and the Andamans; also the Khakyen Hills.

*B. myriocephala*, D.C. Kamorta. Trice, Track, and Great Nicobar.

*B. squarrosa*, Clarke.

Almost glabrous, or the thick almost coriaceous leaves beneath shortly hirsute, the lower cauline leaves long-petioled. Flower-heads 4-5 lines long. Receptacle densely silky pilose to glabrous.

var. *a genuina*. Receptacle more or less densely pilose. Leaves beneath and involucrel bracts often more hairy.

var.  $\beta$  *Conyza lanceolaria*, Roxb., *B. longifolia*, D.C., *B. Wallichii*, Clarke, *Conyza nitida*, Miq., teste Clarke. Receptacle glabrous, or sparingly pilose.

$\circ \circ$  *Scandent shrub. Leaves almost coriaceous, simple.*

*B. RIPARIA*, D.C.

South Andaman. Kamorta.

Almost glabrous. Flower-heads 5 lines long, in small axillary corymbs transforming into terminal pubescent panicles. Receptacle villous. Pappus white.

\*\* *Cauline leaves decurrent and forming entire or interrupted-lacinate leafy wings.*

*Flower-heads long peduncled. Florets purple or rose-coloured (Cauloptera, D.C.).*

$\times$  *Leafy cauline wings cut or variously interrupted.*

*B. AURITA*, D.C.

Ava, Pegu, and Martaban.

Leaves pinnatifid-auricled at the base.

*B. PTERODONTA*, D.C.

Chittagong. Khakyen Hills. Pegu.

Martaban up to 7000 feet.

Leaves entire at the base.

$\times \times$  *Leafy cauline wings all entire and continuous.*

*B. ALATA*, D.C.

*B. Fernonioides*, D.C.

*Conyza nutans*, Bl.

The following doubtful species are also enumerated: *B. napifolia*, D.C., Tavoy; *B. membranacea*, D.C., Prome; and *B. viscosa*, D.C., Ava.

*PLUCHEA*, Cassini.

*Flower-heads corymbose. Some or all of the disk-florets sterile, with a simple style. Involucrel bracts rigid, often broad. Shrubs or under shrubs.*

\* *Annuals, glabrous. Florets intensely yellow. Corymbs irregular, small.*

- P. (BLUMEA) SENECEOIDES, D.C. All over Burma. Kamorta (K.).  
*Erigeron falcatum*, Don.  
*Laggera flava*, Bth.  
*Conyza repanda*, Roxb.  
*P. Doniana*, Kz.

Erect, simple or branched, the cauline leaves sessile, with broad rounded base; flower-heads about  $2\frac{1}{2}$  lines long, on rather short smooth peduncles.

I place this species only reluctantly in *Pluchea*. But I cannot find any ally to it in *Blumea*, while here it has a very near one in *P. linearifolia* (Kurz).

\*\* *Shrubs or under shrubs. Florets purple to lilac. Corymbs dense, terminal. Receptacle glabrous.*

- P. (BACCHARIS) INDICA, L. Tidal forests from Chittagong to Tenasserim,  
*Conyza corymbosa*, Roxb. the Andamans, and Nicobars.  
*P. foliolosa*, D.C.

Leaves obovate, blunt or acute. Flower-heads  $22\frac{1}{2}$  lines long, the bracts shortly pubescent, bluish to acute. Shrub.

° ° *Anther-base obtuse, or only mucronate, or acute, but not tailed.*

#### Sub-tribe ASTEROIDIEÆ.

*Flower-head heterogamous radiate, or discoid or homogamous in absence of the ray-florets. Involucral bracts in several or rarely only 2 rows. Anthers with obtuse almost entire base. Style-branches linear, more or less flattened, produced beyond the stigmatic lobes into lips or appendages, papillose on the outside. Receptacle usually naked. Leaves usually alternate.*

- \* *Female florets, if present, filiform or bell-shaped or 2-toothed.*  
 × *Female florets, if present, filiform. Pappus bristly (Conyziceæ).*

#### MICROGLOSSA, De Candolle.

*Female florets in 1 or several rows, with the corollas minutely ligulate, those on the disk fertile. Pappus-bristles elongate. Involucral bracts in many rows. Shrubs.*

- M. (SONCHUS) VOLUBILIS, Rumph. Khakyen Hill, Martaban, and Tenasserim  
*Conyza pyrifolia*, Lamk. up to 3500 feet.  
*C. prolifera*, Bl.

#### CONYZA, Lessing.

*Female florets in many rows, with the corollas shortly filiform (rarely slightly and minutely ligulate), the hermaphrodite florets mostly fertile. Achenes compressed. Pappus-bristles elongate. Involucral bracts in 2 to many rows. Herbs or under shrubs.*

\* *Flower-heads very small, not above a line long, very numerous, corymbose.*

- C. PINNATIFIDA, Roxb. Khakyen Hills and Martaban from 2000  
*C. absinthifolia*, D.C. to 5000 feet.

Erect branches annual, shortly pubescent, the leaves small, simple or 3-cleft. Pappus more or less rufescent.

\*\* *Flower-heads 2-4 lines long.*

× *Pubescence not viscid nor glandular. Leaves serrate to almost lobed, cuneate at base.*

- C. SEMIPINNATIFIDA, Wall. Banks of large rivers, the Irrawaddy, Tsittoung, etc.

Erect, more or less branched annual, more or less hirsute. Flower-heads spherical, corymbose. Pappus white.

C. VERONICEFOLIA, Wall.

Nāt-toung in Martaban at 7000 feet.

C. Japonica, Less.

Erect, simple or more usually branched from the base, hirsute or pubescent. Flower-heads not spherical, in dense terminal corymbs or clusters. Pappus rufescent.

× × Glandular, otherwise almost glabrous. Leaves almost entire, narrow.

B. VISCIDULA, Wall.

Pegu and Tenasserim between 3000 and 6000 feet.

C. striata, Wall.

C. polyccephala, Edg.

Erect, branched. Flower-heads 2-2½ lines long, corymbose on glandular puberulous peduncles. Pappus pinkish to pinkish-white.

## THIESTIS, De Candolle.

Female florets in 2 to many rows, destitute of a corolla, the hermaphrodite florets sterile. Pappus-bristles short, somewhat dilated at the base. Herbs.

T. DIVARICATA, D C. Banks of Rivers, as the Megna, Irrawaddy and Tsittoung.

× × Female florets in 2 or more rows not exceeding the disk, 2-toothed at the apex or bell-shaped. Herbs (Granginieæ).

## CYATHOCLINE, Cassini.

Receptacle almost contracted around the margin, raised, the disk concave. Achenes not beaked, compressed, bordered with a marginal nerve. Flower-heads panicle.

C. LYRATA, Cass.

On mossy boulders in streams all over Burma.

Artemisia hirsuta, Rottl.

C. stricta, D.C.

## GRANGEA, Adanson.

Receptacle convex or conical, naked. Achenes produced into a ring or neck, toothed or almost bristly on the margins. Flower-heads solitary.

G. (ARTEMISIA) MADERASPATANA, Roxb. A weed all over Burma.

\*\* Female florets, if present, ligulate.

× Ligulate female florets not yellow (white or rose-coloured to purple).

+ Pappus none or very short (Bellidica).

## MYRIACTIS, Lessing.

Involucre broad, the narrow bracts in few rows. Ligules in 2 or more rows, small. Achenes not or very shortly beaked, oily. Pappus none.

M. WALLICHII, Less.

Nāt-toung in Martaban at 6000 to 7000 feet.

## RHYNCHOSPERMUM, Reinwardt.

Involucral bracts in few rows, imbricate. Ligules in 2 or more rows, short and broad. Achenes beaked. Pappus of a few very caducous bristles or none.

R. VERTICILLATUM, Rwdt.

Blamo.

Leptocoma racemosa, Less.

Zollingeria scandens, Schultz.

++ Pappus of elongate bristles, rarely short, paleaceous, or awned (Heterochromicæ).

† Pappus consisting of very short bristles, scales, or awns, or absent in the ray-achenes.

## BOLTONIA, L'Heritier.

Receptacle conical or convex. Bristles of pappus very short, almost paleaceous, often accompanied by 2-4 awns not exceeding the achene.

- B. (ASTER) INDICA, L. Khakyen.  
*Calimiris integrifolia*, D.C.  
*Hisutsua Cantonensis*, D.C.  
*H. serrata*, Hook.  
*Chrysanthemum cuneatum*, Roxb.

†† Pappus consisting of copious capillary bristles in a single or more rows (rarely depauperate in the ray-achenes).

‡ Ligules rather broad or ample.

CALLISTEPHUS, Cassini.

Involucre hemispherical, the outer bracts leafy, the inner ones membranously scarious. Achenes compressed. Outer bristles of pappus very short, and forming a small crown.

- \* C. (ASTER) CHINENSIS, L. Cultivated.

†† Ligules numerous, in 2 or more rows, narrow or almost filiform or minute.

ERIGERON, Linnaeus.

Involucral bracts in 2 rows, narrow, somewhat unequal. Achenes compressed. Bristles of pappus in a single row, or with a few very short outer ones.

- E. AEGYPTIACUM, L. Pegu and Martaban.  
*E. asteroides*, Roxb.  
*E. hispidum* and *Blumea pubiflora*, D.C.  
*E. sublyratum*, Roxb.  
*Conyza Jordonii*, Clarke.

The ligulate ray-florets seem to be sometimes absent, at least in dried specimens they appear so. The Egyptian plant agrees in all parts with the Indian, but appears to be often ray-less.

*Conyza angustifolia*, Roxb., appears from the description and MS. figure to be a luxuriant form of *E. Canadensis*, L., or *E. linifolius*, Willd., and is, therefore, hardly an Andamanese plant (Kurz).

#### Sub-tribe SENECTIONIDIEE.

Flower-heads either heterogamous, with the female florets ligulate or rarely filiform, or sometimes homogamous, with all the florets hermaphrodite and tubular. Receptacle usually naked. Involucral bracts usually in a single row, with or without outer small ones, rarely in several rows and imbricate. Anthers obtuse or shortly 2-mucronate at the base. Style-branches of the hermaphrodites truncate and penicillate, or rarely with pubescent tips or appendages. Pappus of capillary bristles. Leaves alternate.

× Flower-heads radiate or homogamous. Bristles of pappus not feathery.

GYNURA, Cassini.

Flower-heads homogamous. Style-branches terminating in an elongate shortly hairy subulate appendage. Rest as in *Senecio*. Herbs, often tuberous-rooted.

- G. NEPALENSIS, D.C. Ava. Tenasserim at 4000 feet (P.).

Pubescent. Leaves rather small, ovate to linear-lanceolate, repand-toothed, acuminate. Peduncles and involucral bracts hoary pubescent.

- G. SINUATA, D.C. Tsittoung Valley.

Pubescent, the root tuberous. Leaves more or less lacinate to pinnatifid. Peduncles and involucral bracts less hairy.

As long as it is young, the plant looks almost scapiferous and the leaves are then simpler and smaller, but at the rate that the tuberous roots enlarge, the plant becomes more robust, larger, and branched from the base with the leaves up to 7 inches long (Kurz).

- G. BICOLOR (M.).

EMILIA, *Cassini*.

*Flower-heads* homogamous. *Style-branches* terminating in a short or rather long appendage. Rest as in *Senecio*. Herbs.

E. (CAMELIA) SONCHIFOLIA, L.

Waste spots all over Burma.

*Gynura ecalyculata*, D.C.

*E. sagittata*, D.C.

*E. flaccida*, Miq.

Achenes papillose-rough. *Style-branches* erect, half-cylindrical, with a short conical appendage. Lower leaves more or less lyrate.

E. PRENANTHOIDEA, D.C.

Hills East of Bhamo.

*E. angustifolia*, D.C.

Achenes quite glabrous. *Style-branches* elongate, recurved, almost cup-shaped at the apex. Lower leaves elongate-spatulate.

NOTONIA, *De Candolle*.

*Flower-heads* homogamous. *Style-branches* of hermaphrodites terminating in an ovate appendage. Rest as in *Senecio*. Fleshy glaucous herbs.

N. CRASSISSIMA, D.C.

Hills of Seguin.

SENECIO, *Linnaeus*.

*Flower-heads* radiate or homogamous. *Involucre* wide or narrow, the bracts narrow, equal, blunt or shortly pointed, the outer ones small or wanting, or rarely gradually longer from below. *Style-branches* truncate or obtuse, or rarely shortly appendaged. Achenes 5-10-ribbed. Herbs or rarely shrubs, the leaves alternate or radical.

Sub-genus EU-SENECIO.

Anthers not tailed at the base. Achenes all with, or those of the ray without pappus.

\* Achenes all with pappus.

S. OBTUSATUS, Wall.

Khakyon Hills.

Almost glabrous, the flower-stems almost scapiform. Lower leaves elongate-cuneate-oblong. Flower-heads short-peduncled, in dense corymbs. Achenes of the disk papillose-rough. Pappus white.

S. GRIFFITHII, H. f. et Th.

var.  $\beta$  Martaban Hill at 6000 to 7000 feet.

Almost glabrous or more or less hirsute. Leaves narrow-linear, with involute margins. Flower-heads long-peduncled, few. Achenes papillose-rough. Pappus more or less pubescent.

var. *a genuina*. Leaves longer and glabrous, or nearly so. Flower-heads longer peduncled, the involueral bracts nearly glabrous.

var.  $\beta$  *Kurzii*, Clarke. A fruticulose under shrub, the leaves hirsute on both sides or almost chaffy pilose along the midrib beneath. Flower-heads shorter peduncled, the involueral bracts more pubescent.

\*\* Achenes of the ray without pappus.

S. SAXATILIS, Wall.

Ava. Taong-doung.

Roughish hirsute. Leaves elongate-linear, narrowed at the base. Flower-heads in lax corymbs. Achenes striate, glabrous. Pappus rufoescent.

Sub-genus SYNOPSIS.

Anthers tailed, the tails free or adnate.

\* Erect shrubs or under shrubs.

S. DENSIFLORUS, Wall.

Martaban at 3000 to 6000 feet.

*S. angulosus* and *uncinellus* D.C.

Stem and leaves beneath white-tomentose. Flower-heads radiate, rather large, in dense corymbose panicles. Achenes glabrous. Pappus white.

*S. TRIANGULATUS*, Ham.

*S. vagans*, Wall.

Glabrous or nearly so. Flower-heads small, glabrous, discoid, in small dense corymbs. Achenes glabrous. Pappus white.

\*\* *Scandent shrubs or under shrubs.*

*S. CHINENSIS*, D.C.

Khakyen Hills.

*Cineraria repanda*, Lour.

*S. campylodes*, D.C.

*S. Hindsii*, Bth.

Stems almost zigzag-flexuose, slightly woolly and glabrescent. Flower-heads discoid, rather large, in divaricate corymbose panicles. Achenes difform, those of the disk 5-gonous with pilose corners and white pappus, the ray-achenes glabrous, almost trigonous.

× × *Flower-heads homogamous, all the florets regularly tubular, never yellow (usually purple, violet, or white).*

Sub-tribe EUPATORIACEÆ.

*Anthor-base nearly entire. Style-branches almost terete, or very elongate-club-shaped, obtuse, only minutely papillose. Leaves opposite or alternate.*

\* *Anthers appendaged at the tip. Achenes 5-ribbed (Ageratiæ).*

*Bristles of pappus copious, smooth or minutely hairy.*

EUPATORIUM, Tournef.

*Involucral bracts in several, rarely in 2-3 rows, somewhat unequal, always more than 5. Flower-heads usually many (rarely 1-4)-flowered, corymbose or panicled.*

*Leaves penninerved.*

*E. BIRMANICUM*, D.C.

Segain.

Corymbs of few small few-flowered flower-heads.

*E. PENDULUM*, Wall.

Burma.

*E. nodiflorum*, Wall.

Flower-heads numerous, in corymbose, elongate panicles.

Bentham refers this species to the following, and the penninervation really seems to be a fallacious character (Kurz).

*Leaves triplinerved.*

*E. WALLICHII*, D.C.

Upper Burma.

*E. cannabinum*, Clarke.

Flower-heads numerous, in corymbs.

MIKANIA, Willdenow.

*Involucral bracts 4 only, somewhat unequal. Flower-heads 4-flowered, racemose or panicled. Twining shrubs.*

*M. (EUPATORIUM) SCANDENS*, Burm.

Attaran.

*E. cordatum*, Burm.

*E. volubile*, Vhl.

× × *Pappus entirely or partially chaffy or awned, or consisting of 5-10 rigid bristles, or minute and coronate, or none.*

AGERATUM, Linnæus.

*Involucral bracts in 2-3 rows, somewhat unequal. Pappus of 5 short scales or long awns free or united into a shaggy crown, or of 10-20 stiff bristles chaffy or dilated at the base. Herbs.*

A. CONYZOIDES, L.  
*A. cordifolium*, Roxb.

A weed all over Burma, Kamorta, Katchall.  
 Introduced in the Andamans.

\*\* *Anthers truncate at the top and not appendaged. Achenes 5-ribbed.*

ADENOSTEMMA, Forster.

*Involucral bracts* numerous, almost in 2 rows, somewhat unequal. *Pappus* of 3-5 short stiff spreading bristles usually gland-tipped. Herbs.

A. viscosum, Forst.

var.  $\alpha$  and  $\beta$  Arakan. Ava. Pegu.

*Ageratum aquaticum*, Roxb.

Kamorta and Katchall.  $\beta$  the

*A. fastigiatum* and *Roylei*, D.C.

rarer. var.  $\gamma$  Tenasserim.

*A. rugosum* and *Madurensis*, D.C.

*A. elatum*, Don.

*A. rivale*, Dalz.

var.  $\alpha$  *verum*, Clarke (including *elatum* and *latifolium*, Clarke). Larger, the leaves larger and broader, often somewhat succulent. Flower-heads larger. Achenes more or less glandular muricate.

var.  $\beta$  *microcephalum*, D.C. As preceding, but usually thinner and the leaves smaller. Heads very small.

var.  $\gamma$  *angustifolium*, Edg. Leaves elongate-linear, rest as in var.  $\alpha$ .

var.  $\delta$  *reticulatum*, D.C.; *A. leiocarpum*, D.C.; *A. erectum*, D.C. As var.  $\alpha$ , but leaves somewhat rough above and often more or less lacunose, tawny pubescent on the nerves beneath. Achenes smooth.

Sub-tribe VERNONIACEÆ.

*Anther-base sagittate. Style-branches subulate, shortly hairy all over. Leaves usually alternate.*

\* *Flower-heads small, usually 1- or few-flowered, packed into a head-like cluster (Lychnophoriæ).*

ELEPHANTOPUS, Linnaeus.

*Florets* slightly irregular, by 2-5 in a head. *Involucral bracts* usually 8, in two rows. Bristles or scales of pappus rigid, in 1 or 2 rows. *Flower-heads* clustered, the clusters leafy-involucled. Herbs.

E. SCABER, L.

Waste spots all over Burma.

\*\* *Flower-heads separate, usually peduncled and in more or less lax inflorescences (Vernoniæ).*

× *Pappus none or more usually composed of a few very caducous bristles.*

ETHULIA, Linnaeus.

*Involucre* bell-shaped, not leafy. *Flower-heads* small, corymbose. *Achenes* 4-5-cornered, broadly truncate at the top. *Pappus* none. Herbs.

E. CORYZOIDES, L.

Chittagong near Comilla.

*E. ramosa*, Roxb.

×× *Pappus more or less persistent, composed of numerous capillary bristles in 2-3 rows, those of the outer row sometimes very short or reduced to scabrets.*

VERNONIA, Schriber.

*Flower-heads* various, the bracts in many rows, scarious or the outer ones sometimes leafy-appendaged. *Receptacle* naked or areolate. *Achenes* 10-ribbed or 4-5-cornered. Outer pappus as long as the inner, or shorter, very short, or none. Shrubs or herbs.

Sub-genus CYANOPIS (Blume).

*Flower-heads* small. *Achenes* 4-5-cornered or terete, not ribbed. Outer row of pappus bristly or paleaceous. Low annual herbs.

\* *Achenes 4-cornered.*

V. CHINENSIS, Less.

In waste spots all over Burma.

*Cyanopsis pubescens*, Bl.

*C. villosa*, D.C.

Greyish puberulous or thinly pubescent. Flower-heads broad, in poor corymbs. Involucral bracts stiff, squarrose, acuminate.

\*\* *Achenes terete.*

V. CINEREA, Less.

All over Burma up to 4000 feet and

*V. abbreviata* and *physalifolia*, D.C.

introduced into the Andamans,

*V. lariflora*, Less.

Kamorta, and Tillangchong.

*Chrysocoma purpurea*, G. Forst.

Greyish puberulous. Flower-heads  $2\frac{1}{2}$ -3 lines long, corymbose-panicled.

Sub-genus *EU-VERNONIA*.

Flower-heads rather large or rarely small. *Achenes* longitudinally ribbed. *Involucral bracts* all scarious, not leafy nor leafy-appendaged.

\* *Under shrubs or herbs. Involucral bracts elongate, especially the inner ones, and usually narrow.*

× *Outer involucral bracts subulate and squarrose, passing on to the peduncle. Outer pappus consisting of numerous almost chaff-like bristles.*

*V. BRACTEOLATA*, D.C.

Khakyen Hills.

*V. subsessilis*, D.C.

Slightly puberulous. Leaves narrow or broad, shortly petioled or almost sessile. Flower-heads rather large, on long stiff peduncles, corymbose-panicled. *Achenes* densely villous.

× × *Outer involucral bracts rather broad and short, more or less appressed-imbricate.*

+ *Outer series of pappus consisting of a few caducous bristles or almost wanting.*

† *Flower-heads large, many-flowered, solitary or few, or in poor corymbs. Involucral bracts very acuminate. Harsh-leaved under shrubs or shrubs (Xipholepis).*

V. BRACTEATA, Wall.

Karen-ni (*vide* Mason).

*Decaneuron Silhetense*, D.C.

Flower-heads long-peduncled, in lax corymbs. *Achenes* 2 lines long, glabrous. Bristles of pappus bristly.

V. ROXBURGHII, Less.

Hills East of Bhamo.

*Eupatorium asperum*, Roxb.

Flower-heads short-peduncled, in compact corymbs. *Achenes* 1 line long, sparingly pilose. Bristles of pappus smooth.

V. TERES, Wall.

Ava. Prome. Pegu.

*V. rigiophylla*, D.C.

*V. squarrosa*, Less.

Flower-heads sessile or nearly so, clustered or solitary. *Achenes* 1 line long, appressed pilose. Bristles of pappus smooth.

† † *Flower-heads small or rather small, few- (not above 15-) flowered, in ample corymb-like panicles. Involucral bracts bluntish or hardly acuminate (Gymnanthemum).*

V. ASPERA, Ham.

All over Burma.

*V. multiflora*, Less.

*Decaneuron divergens*, D.C.

Roughish puberulous. Leaves narrow, rarely broad. Flower-heads only 8 lines long, numerous, in axillary and terminal corymbs.

V. SELIGNEA, D.C.

var. *a* Chittagong and the Khakyen Hills. var. *β* Pegu Range.*V. longicaulis*, D.C.

Roughish puberulous. Leaves rather broad or narrow. Flower-heads 4-5 lines long, shortly peduncled, in axillary and terminal panicle corymbs.

var. *a genuina*. Corymbs more or less panicle. Involucral bracts more acute to mucronate-acuminate, more glabrous.

var. *β Peguensis*, Clarke. A shade-form, panicles spreading, terminal, leafless. Involucral bracts more or less acute, usually more glabrous.

++ Outer series of pappus consisting of numerous or copious bristles. Involucral bracts acuminate (*Lepidaploa*).

V. KINGII, Clarke.

Khakyen Hills. Southern Slopes of Pegu Range and Martaban.

Leaves broad, roughish puberulous. Flower-heads peduncled, in small sessile pubescent axillary corymbs, or corymbose-panicle at the end of the branches. Involucral bracts white woolly.

V. ATTENUATA, D.C.

var. *a* Maulmain. var. *β* Radburi, Siam.

Leaves narrow, roughish puberulous, chartaceous. Flower-heads shortly peduncled or sessile, solitary or few in the leaf-axils, irregularly disposed raceme-like or forming terminal poor corymbs. Involucral bracts nearly glabrous.

var. *a genuina*. Flower-heads about half an inch across, longer or shorter peduncled, and usually in the axils of the leaves.

var. *β juncea*. Judging from the material at hand, the whole plant seems to be transformed into an ample leafless panicle, the flower-heads only half the size, all sessile and solitary, in very elongate slender poor spikes. Achenes only a line long or somewhat longer, the pappus pale rufous.

var. *β* may form a distinct species, but there are no leaves (Kurz).

\*\* Large shrubs or trees, rarely scandent. Flower-heads usually small and few-flowered.

× Pappus more or less turny to red-brown. Involucral bracts elongate, especially the inner ones. Scandent shrubs.

V. BLANDA, D.C.

Pegu Range and Martaban.

*V. blandula* and *Andersonii*, Clarke.

Glabrous or nearly so. Flower-heads  $\frac{1}{2}$  inch long, shortly peduncled, in small corymbs panicle at the end of the branches. Leaves petioled. Achenes pilose.

*V. Andersonii* has the receptacle densely hirsute, but in *V. blanda*, as well as in *V. blandula*, the same is also hispid, although much less so.

V. SCANDENS, D.C.

Pegu and Ava Hills up to 4000 feet.

*Decaneuron obovatum*, D.C.*V. vagans*, D.C.

As preceding, but shortly puberulous. Achenes glabrous.

×× Pappus white or whitish to pale straw-coloured. Involucral bracts short and rather broad. Flower-heads small (*Strobocarya*).

+ Trees or erect shrubs.

Leaves sessile or very shortly petioled.

V. VOLKAMERIEFOLIA, D.C.

Khakyen Hills and Martaban from 2000 to 4000 feet.

*V. acuminata*, D.C. non Less.*V. Panduana*, D.C.*V. cuspidata*, Buck.

Small tree, pubescent or puberulous. Leaves cuneate-narrowed, shortly petioled. Flower-heads shortly peduncled, corymbulose, in terminal leafless panicles. Involucral bracts slightly and fugaciously appressed pubescent.

*Leaves rather long-petioled.*

V. KURZII, Clarke.

Hills East of Toung-ngoo at 2000 to 4000 feet.

Meagre shrub or small tree, softly tomentose. Leaves broad. Flower-heads shortly peduncled, corymbose-panicled. Involucral bracts densely white-tomentose.

V. ARBOREA, Ham.

Tenasserim.

*V. Blumeana*, D.C.

*Eupatorium Javanicum*, Bl.

Trees. Leaves coriaceous, long-petioled, densely tomentose beneath, glabrescent above or rarely also beneath. Flower-heads sessile or nearly so, clustered, in corymb-like tomentose panicles. Involucral bracts thinly appressed pilose.

+ + *Scandent shrubs.*

V. ELEAGNIFOLIA, D.C.

Maulmain and Siam.

Stem and leaves beneath appressed silvery pubescent. Flower-heads almost sessile, divaricate corymbose and panicled. Involucral bracts glabrous, ciliate.

Sub-genus HOLOLEPIS, D.C.

Outer involucre entirely leafy and large, or smaller and produced into a leafy appendage.

\* *Outer involucral bracts large and leafy, entirely concealing the inner ones.*

V. CALYCINA, Wall.

Prome.

Leaves broadly oval, almost sessile, rather glabrous. Flower-heads peduncled, corymbose.

\*\* *Outer involucral bracts scarious, produced at the tips into a foliaceous linear appendage.*

V. (CONYZA) ANTHELMINTHICA, L.

Ava. Taong-doung.

Shortly and thinly pubescent. Leaves petioled. Flower-heads corymbose. Pappus rufescent.

#### CYNAROCEPHALIEÆ, Vaillant.

*Florets either regular and tubular, with the style usually thickened joint-like near or at the apex, or bilabiate with the style various. Herbs, rarely shrubs, not aromatic. Anther-base usually tailed or fringed.*

#### Sub-tribe CYNAROIDIEÆ.

*Flower-heads discoid, the florets all tubular and regular or nearly so, hermaphrodite, the lobes usually narrow. Anthers usually fringed or tailed at the base. Style usually thickened joint-like at or below the division into branches, which latter are narrow and obtuse, or slightly pointed and often erect. Leaves alternate, often spiny.*

\* *Flower-heads usually many-flowered, separate.*

× *Achenes usually glabrous, seated in the very oblique or lateral areoles of the receptacle.*

+ *Involucre without floral leaves or outer leafy bracts.*

#### TRICHOLEPIS, De Candolle.

*Involucral bracts narrow, awned-acuminate, entire, not appendaged. Filaments shortly papillose-pilose. Anthers with rather long shaggy tails. Style-branches thin. Achenes glabrous, obtusely cornered or compressed. Leaves unarmed.*

T. KARENSIUM, Kz.

Martaban. Karen-ni (*fide* Mason).

The largest Indian species.

+ + *Involucre surrounded by spiny-toothed floral leaves or outer leafy bracts.*

#### CARTHAMUS, Linnaeus.

*Outer involucral bracts with a large leafy appendage, inner ones spiny-pointed.*

*Florets* orange. *Pappus* none, or paleaceous. *Achenes* compressed or obtusely conical. *Leaves* spiny-armed.

\* *C. TINCTORIUS*, L.

Cultivated in Prome.

Hsu. Safflower. Bastard saffron.

There are two forms in cultivation, the one with almost entire leaves and involueral leaves and very slightly and shortly spiny, and the other, coming near *C. oxyacantha*, armed with long spreading spines (Kurz).

The Safflower is largely cultivated for its dye, *Carthamine*, which exists in its petals and is insoluble in cold water. The powdered petals are therefore first of all washed in cold water to remove a yellow colouring matter which is present. The Carthamine is now dissolved out by an alkaline solution, and then precipitated by an acid, lemon-juice being usually employed. Vegetable rouge is pure Carthamine precipitated on to finely powdered tale, or on to woollen 'crepons,' with which weak-minded or vicious women strive to heighten their charms.

× × *Achenes* usually glabrous, seated in the straight arcoles of the receptacle.

+ *Filaments* papillose-pilose, free. *Bristles* of pappus united at the base into a ring and both deciduous.

*CNICUS*, Linnaeus.

Outer involueral bracts usually spiny-armed, the innermost ones often unarmed. *Receptacle* densely covered with rigid bristles, often longer than the achenes themselves. *Bristles* of pappus feathery or shortly bearded. *Leaves* spiny-armed.

\* *Corolla-limb* bell-shaped, 5-cleft to the middle. *Flower-heads* bisexual, the inner involueral bracts not in any way dilated at the tips, but terminating in spines.

*C. (CARDUS) ERIOPHORUS*, L. var.  $\beta$  Khakyen Hills and Karen-ni (*vide* O'Riley).

Leaves white-tomentose beneath, pinnatifid, spiny. *Flower-heads* large, hemispherical, arachnoid-woolly.

var.  $\beta$  *involueratum*, D.C. Leaves above covered with sharp, sometimes spine-like bristles. Involueral bracts glabrescent. *Florets* purple.

\*\* *As above*, but the inner involueral bracts dilated into a terminal appendage.

*C. (CIRSUM) CHINENSIS*, Gard. et Champ. Hills East of Blanno.

Slender but stiff. Leaves narrow, entire, or somewhat sinuate-lobed, shortly spiny, usually whitish tomentose beneath. *Flower-heads* rather small, not leafy-involuered at the base, long-peduncled.

+ + *Filaments* glabrous, free.

*SATISUREA*, De Candolle.

*Involucre* not prickly. *Pappus* of numerous feathery bristles in a single row with or without a few simple ones outside. *Receptacle* with bristles between the florets. *Leaves* not armed.

*S. (APLOTAXIS) DELTOIDEA*, D.C. var.  $\alpha$  Nāt-toung in Martaban (*vide* Mason).

*A. nivea*, D.C. var.  $\beta$  Martaban Hills at over 6000 feet.

Leaves lyrate with a deltoid or hastate end-lobe, the upper cauline ones often entire or lobed, tomentose beneath. *Flower-heads* long-peduncled, laxly racemose and panicle, the involueral bracts nigrescent, often blunt and crose-toothed.

var.  $\alpha$  *vera*, Clarke (incl. var.  $\beta$  *nivea*, Clarke). *Flower-heads* long-peduncled, laxly racemose, larger, the involueral bracts nearly entire at the tips. Upper leaves entire or the end-lobe deltoid and large.

var.  $\beta$  *polyccephala*, Clarke. *Flower-heads* smaller, shorter peduncled, and more crowded, laxly racemose and panicle, the involueral bracts blunt and crose-toothed. Upper leaves or their end-lobe sagittate.

S. PEGUENSIS, Clarke.

Karen Hills.

Leaves pinnatifid, the end-lobe rather elongate, tomentose beneath. Flower-heads shortly peduncled or almost sessile, clustered and forming an elongate contracted almost raceme-like panicle, the involucre bracts greyish villous, acute.

## Sub-tribe MUTISIACIÆ.

*Flower-heads either heterogamous, with radiating female florets, or homogamous, with the florets all hermaphrodite and tubular, in both cases some or all of the florets more or less 2-lipped. Anthers with pointed or tailed base. Style not or slightly thickened joint-like at the apex, the branches very short or elongate, rounded or truncate at the tips, not appendaged. Pappus bristly, paleaceous or rarely absent. Leaves radical or alternate, rarely opposite.*

\* *Flower-heads homogamous, the corollas tubular with the segments of limb narrow, equal or almost 2-lipped.*

× *Flower-heads usually many-flowered.*

## DICOMA, Cassini.

*Flower-heads usually almost sessile. Style-branches linear, long or shortened. Achenes densely villous. Scales or bristles of the pappus feathery, copious. Herbs.*

S. TOMENTOSA, Cass.

Limestone hills of Segain.

*D. lanuginosa*, D.C.

× × *Flower-heads few-flowered.*

## LEUCOMERIS, Don.

*Receptacle naked. Style-branches very short, conniving or almost spreading. Achenes oblong, silky-villous. Bristles of pappus smooth. Flower-heads corymbose. Shrubs or small trees.*

L. DECORA, Kz.

Prome district.

Flower-heads solitary, in dense terminal umbel-like corymbs, the involucre bracts gradually shorter and passing into the thick short densely imbricate-bracted peduncle. Leaves membranous, glabrous.

## AINSLIEA, De Candolle.

*Style-branches very short. Bristles of pappus feathery. Flower-heads 2-5-flowered, sessile or peduncled, racemose or paniced. Herbs.*

\* *Leaves narrowed at the base and decurrent wing-like on the petiole.*

A. PTEROPODA, D.C.

var. *a* Top of Moolyit (*vide* Parish) and Hills of Martaban from 5000 to 7100 feet.

Sparingly pilose, the flowering stems more or less sessile-leaved. Leaves membranous, obscurely crenate-toothed. Flower-heads sessile or peduncled, in lax spikes or diffuse narrow panicles.

var. *a genuina*; *A. pteropoda*, D.C.; *A. Silhetensis*, Clarke. Flower-heads sessile, usually clustered, forming a simple elongate lax spike.

var. *β effusa*, Clarke. Flower-heads slenderly peduncled, almost racemose, forming a spreading narrow panicle.

\*\* *Leaves more or less cordate at the base, the petiole not winged.*

A. BRANDISIANA, Kz.

Martaban Hills between 2000 and 4000 feet.

Flowering stem radical and almost scapiform and leafless. Leaves almost coriaceous, entire, hirsute, often glabrescent above, densely villous fringed. Flower-heads peduncled, in diffuse panicles.

× × Flower-heads usually radiate, the corollas ligulate-2-lipped, rarely ligulate.

GERBERA, Gron.

*Involucre* turbinate or bell-shaped, the bracts unequal, imbricate. *Ray-florets* in 1 or 2 rows, 2-lipped, the ligules 3-4-nerved. *Achenes* usually beaked. *Pappus* reddish. Herbs, the leaves radical.

G. (ARNICA) PILOSELLOIDES, L.

Hills in Karen-ni (*vide* Mason).

G. ovalifolia, D.C.

The Cape-plant grows on sand-hills and has larger flower-heads and shorter, more robust scapes (Kurz).

#### Sub-order CICHORIACEÆ.

*Flower-heads* homogamous, all the florets ligulate and hermaphrodite. *Style* not thickened at the apex, the branches filiform, revolute, and puberulous. Herbs, tall or small, never woody, with fistulose stems, the sap always milky.

\* *Pappus* paleaceous, awned, coronate or none.

#### HYOSERIDIEÆ.

*Involucre* various. *Achenes* truncate at the top. *Pappus* consisting more or less of small scales or scalelets alternating with bristles, or none.

CICHORIUM, Linnæus.

*Inner involucrel bracts* in 1-2 rows, almost equal, erect, the outer ones short, lax, or wanting. *Pappus* none or very minute. *Florets* large, blue. Rigid branched herbs.

C. INTYBUS, L.

var. β cultivated in Prome and the drier districts.

var. β C. endivia, L. Floral leaves broadly ovate, half-stem-clasping with a cordate base, the lower leaves usually only sinuate.

\*\* *Bristles of pappus* (at least those of the central achenes) capillary, smooth or feathery.

#### CREPIDIEÆ.

*Involucre* calyx-like or rarely imbricate. *Achenes* contracted at the base, rarely columnar. Herbs.

\* *Hairs of indument* simple. *Innermost bracts of the involucre* usually thickening at the base.

CELPIS, Linnæus.

*Involucre* of a single row of nearly equal bracts, with a few small outer ones. *Achenes* not at all or scarcely flattened, very shortly contracted at the top. *Pappus* sessile, of numerous simple capillary bristles or hairs. Herbs with leafy stems.

C. (PRENANTHES) JAPONICA, L.

Ava and Martaban in cultivated land.

P. lyrata, Thbg.

Youngia Mauritiana, runcinata, Thunbergiana and napifolia, D.C.

Y. ambigua and poosia, D.C.

Prenanthes procumbens, Roxb.

P. striata, Bl.

\*\* *Hairs of indumentum* (if present) stellate, often accompanied by simple ones, or the indument intricately woolly. *Innermost bracts of the involucre* not thickening.

HIERACIUM, Linnæus.

*Receptacle* naked or very shortly fibrillose. *Bristles of the pappus* rather stiff, fragile, persistent, simple. Herbs.

H. SILHETENSE, D.C.

Tenasserim.

#### LACTUCACEÆ.

*Involucre* calyx-like or rarely imbricate. *Achenes* contracted at both ends, or beaked. *Bristles of pappus* simple, the hairs if present simple. Herbs.

\* *Achenes shortly or long-beaked.*

LACTUCA, *Linnaeus.*

*Achenes* more or less compressed, ribbed. Bristles of *pappus* persistent or deciduous. *Florets* yellow or blue.

\* L. SCARIOLOA, L.

Cultivated in Prome and the drier districts.

Stout annual. Leaves runcinate and spinulose-toothed, half-stem-clasping with a sagittate base. Panicle large, furnished with auricled stem-clasping bracts. Flower-heads nearly  $\frac{1}{2}$  inch long.

var. *a genuina*. Panicle pyramidal. var.  $\beta$  *sativa*, L. Panicle fastigate.

L. (IXERIS) POLYCEPHALA, Cass.

Tapau, near Bhamo.

*Ixeris fontinalis*, D.C.

Slender annual. Leaves linear, entire or runcinately lobed, sessile with a sagittate base. Panicle lax and corymb-like, poor, the bracts subulate, small. Flower-heads rather broad, 3-3 $\frac{1}{2}$  lines long.

\*\* *Achenes not beaked.*

PRENANTHES, *Linnaeus.*

*Achenes* almost terete or somewhat compressed, bluntish 3-5-cornered, not or scarcely ribbed. Bristles of *pappus* more or less persistent. *Florets* purple to white, never yellow.

*Leaves simple.*

P. ALATA, H. f. et Th.

Martaban at 5000 to 6000 feet.

Leaves sagittate, the petiole long and broadly-leafy-winged and sagittately or auricular-dilated at the base. Panicle lax, the flower-heads nearly  $\frac{1}{2}$  inch long, nodding, on slender-bracted peduncles.

P. (SONCHUS) HOTHELÆ, Clarke.

Khakyen Hills.

Leaves, at least the cauline ones, sessile with a sagittate base. Flower-heads long and slenderly peduncled, forming a narrow terminal panicle.

The base of the involucre bracts becomes slightly thickened and indurated in fruit, but the inflorescence and the narrow few and apparently purple-flowered flower-heads are those of a *Prenanthes*, not of *Sonchus* (Kunz).

SONCHUS, *Linnaeus.*

*Achenes* more or less compressed, ribbed. Bristles of *pappus* soft, white at base, united into a ring and deciduous with it. *Involucre bracts* often incrassate-dilated in fruit. *Florets* yellow.

\* *Involucre bracts glabrous or puberulous, but not glandular-pilose or hispid.*

S. ASPER, Vill.

Burma (*vide* Clarke).

*S. fallax*, Waller.

*Achenes* much compressed, 3-ribbed on both sides, the ribs perfectly or almost perfectly smooth. Leaves usually runcinate-pinnatifid.

S. OLERACEUS, L.

Ava.

*S. ciliatus*, Lamk.

*S. Wallichianus*, D.C.

*Achenes* compressed, the ribs marked with transverse asperities, and muricate. Leaves runcinate-pinnatifid or simple.

\*\* *Involucre bracts and peduncles glandular-hispid or glandular-pilose.*

S. ARVENSIS, L.

Waste spots round cultivation, about Bhamo and the Martaban Hills.

*S. oricensis*, Roxb.

*S. Wightianus*, D.C.

*Achenes* hardly compressed, the ribs thick and transversely muricate. Leaves more or less slightly runcinate, the upper ones simple.

## MICRORHYNCHUS, Lessing.

*Achenes* columnar, truncate at both ends, bluntly 4-5-ribbed, sometimes narrowly 2-3-winged. *Florets* yellow.

M. (PRENANTHES) ACAULIS, Roxb.

All over Burma.

*M. glaber*, Wight.

Leaves narrow, slightly-lobed or entire. Flowering stems erect. Achenes strongly 4-5-ribbed, the ribs smooth.

M. (PRENANTHES) ASPLENIIFOLIUS, Roxb.

Pegu in fields and the bed of the Irrawaddy.

Leaves pinnatifid with the lobes all rounded. Flowering stems divaricate and much dichotomously branched. Achenes strongly 10-12 ribbed, the ribs transversely wrinkled.

This huge Order embraces nearly a tenth of the Cotyledonous plants; but its value to man bears no proportion to its size, as it yields nothing which can be considered of importance. Among its most useful products may be enumerated *Cichorium intybus*, or chicory, so largely used as a substitute for coffee, and *C. endivia* or endive. *Taraxacum officinale*, dandelion<sup>1</sup> (called also *Pissabed* by nursemaids and children, from the supposed results of little children handling the plant), a valuable tonic in hepatic complaints and dyspepsia, and the leaves of which form a wholesome addition to salad. *Lactuca sativa*, the common lettuce, the inspissated juice of which possesses narcotic properties, and which may in some cases be advantageously substituted for opium. *Sonchus*, or sow-thistles, which rabbits and cattle eat, and which in India are dressed as a pot-herb. All these belong to the tribe *Cichoraceæ*.

The tribe *Cynaroidicæ* yields various thistles, as *Cardus benedictus*, the Blessed-thistle, so called from its supposed alexipharmic powers. *Centaurea cyanus*, the corn-flower, once used to form an eye-water. *Cynara cardunculus* and *C. scolymus*, respectively the Cardoon and common artichoke. *Carthamus tinctorius*, the safflower, so largely cultivated for its valuable red dye, and *Serratule tinctoria*, which yields a yellow one.

In the tribe *Calendulicæ* occurs that common flower in every Indian garden, *Calendula officinalis*, the marigold. This name has no reference to Mary, but is derived from *Merse-mear gealla* 'Marsh, horse gowl,' or marsh marigold, *Caltha palustris*, whence the name was transferred to the garden plant.—Prior, Popular Names of British Plants, p. 118.

Another tribe, *Senecionidicæ*, embraces *Tussilago farfara*, or colt's-foot (so called from the shape of the leaves), which is used in compounding a sweetmeat, used for slight colds, but really inert, and *Arnica montana*, a nervine tonic, and favourite homœopathic medicine, which owes its power to an alkaloid, *Cysticine*, which it contains. The tribe *Anthemidicæ* embraces *Artemisia absinthium*, once in vogue as an anthelmintic, but now chiefly used for flavouring a pernicious liqueur, much esteemed on the Continent. *A. abrotanum*, or old man, as it is termed from its supposed invigorating properties, and *A. dracunculus*, or Tarragon, used to give flavour to vinegar.

The tribe *Helianthoidicæ* contains some useful plants. *Helianthus annuus*, or the common sunflower, and *H. tuberosus*, the tubers of which constitute Jerusalem artichokes. The word *Jerusalem* is, however, a mere corruption of the Italian name *Girasole*, or 'turn sun,' from an erroneous idea that the *Helianthus* (sunflower) turns towards the sun, an idea which has taken inveterate possession of the popular mind. The true origin of the term sunflower is the resemblance which its lusty disk with radiant yellow petals bears to the pictorial representations of the sun. The seeds of the sunflower are rich in oil, and are worth cultivating as oil-seeds.

<sup>1</sup> The following simple recipe is worth knowing: Take a quantity of fresh dandelion roots, wash them well, and slice up and bruise in a mortar, then express the juice through a cloth and add one-third the amount of rectified spirit, or good brandy, and filter. One or two teaspoonfuls of this mixture three times a day is an excellent tonic in hepatic derangements.

## Order DIPSACEÆ.

*Corolla* monopetalous, epigynous, æstivation imbricate. *Stamens* 4, inserted on the tube of the corolla. *Ovary* 1-celled, 1-ovuled, adnate to the receptacular tube, throughout its length, or only at the top. *Ovule* pendulous, anatropous. *Embryo* albuminous.

\* *Flowers* in terminal, rarely axillary, often peduncled heads.

DIPSACTS, *Linnaeus*.

*Involucral bracts* usually herbaceous, the paleas of the receptacle rigid or spinescent. *Corolla* 4-cleft. Rigid herbs, the flower-heads large.

*D. STRICTUS*, Don.

Ava. Martaban (Yunzalin).

*D. inermis*, Wall.

*D. longicaulis*, Wall.

*D. fullonum* is the European Teasel, used to *tease* or dress woollen cloth. The Karens make a similar use of the fruit of the *Pandanus*.

## CAPRIFOLIALES.

*Flowers* regular or irregular. *Stamens* as many as the corolla-lobes, inserted on the corolla. *Ovary* inferior, 2- or many-celled. *Seeds* generally albuminous. *Calyx* never pappose. Shrubs or trees, rarely herbs.

## Order RUBIACEÆ.

*Calyx-tube* adnate to the ovary, the limb entire or lobed or toothed. *Corolla* gamopetalous, inserted round the epigynous disk, 4-5- or sometimes more (rarely only 3)-lobed, the lobes imbricate or valvate. *Stamens* as many as corolla-lobes and alternating with them, inserted in the tube. *Anthems* versatile, the cells parallel, opening longitudinally. *Ovary* inferior, 2- or more-celled, with 1 or more ovules in each cell, rarely 1-celled, with parietal placentas, or reduced to a single 1-ovuled cell. *Styles* as many as carpels, high up, united or simple, with a thickened, entire, or lobed stigma. *Fruit* a capsule, berry, drupe, or indehiscent nut. *Albumen* fleshy or horny, copious, or rarely scanty or none. *Embryo* cylindrical, the cotyledons semi-terete. Trees, shrubs, or herbs, sometimes climbing, with opposite or whorled leaves. *Stipules* interpetiolar, either free, or united with the petiole in a sheath bordered by fringes, or leaf-like lobes or sheathing or annular, rarely reduced to 1 or 2 points on each side of the petiole. *Inflorescence* various, usually more or less cymose or paniced, axillary or terminal. *Flowers* occasionally polygamous or unisexual.

## Sub-order CINCHONEÆ.

*Fruit* a dehiscent *Capsule*, dry, or very rarely succulent; very rarely a berry or drupe, and in this case the seeds always winged, or appendaged. *Ovary* 2- or more celled, with 1 to many ovules in each cell. *Seeds* various. *Stipules* interpetiolar.

## NAUCLEIÆÆ.

*Flowers* inserted upon a thickened receptacle and forming heads. *Capsule* dehiscing from the base or otherwise, dry or rarely (*Sarcocephalus*) berry-like.

× *Capsule* berry-like, dehiscing from the base. Trees.

SARCOCEPHALUS, *Afzelius*.

*Capsule* 2-celled, or the 2 cells augmented by 2 superposed empty cells, more or less united in a fleshy syncarp.

*S. CADAMBA*, Miq.

Eastern Slopes of the Pegu Range.

Māu.

Capsules succulent and connate throughout. All parts glabrous, the young bractlets pruinose. Leaves more or less acuminate.

The wood is yellow, and recommended by Brandis for furniture. It is, however, shockingly liable to be wormed.

*S. CORDATUS*, Miq.

Pegu and Tenasserim.

Māu-let-tau-shay (Kurz).

var. *α glabra*. Leaves and all parts glabrous.

var. *β pubescens*. Leaves beneath, petioles, stipules, and peduncles shortly and softly pubescent.

Wood worthless.

× × Capsule dry, dehiscing loculicidally or septiciidally into 2 many-seeded cocci.

*NAUCLEA*, *Linnaeus*.

Flowers without bractlets. Capsule 2-celled. Trees, rarely erect shrubs.

Sub-genus *EU-NAUCLEA*.

Corolla slightly imbricate in bud.

Flowers without bractlets, solitary, or by threes, terminal.

\* All parts glabrous.

*N. EXCELSA*, Bl. *E.T.*

Myodwin, Pegu Range. Kamorta.

*N. PEDUNCULARIS*, Wall.

Leaves acuminate, the petiole  $\frac{1}{2}$ –1 inch long. Flower-heads often by threes.

*N. SESSIFOLIA*, Roxb.

Pegu Range and Tenasserim.

Hteing-kalā (Kurz).

Leaves blunt, almost sessile, flower-heads solitary.

\*\* All parts more or less pubescent.

*N. CORDIFOLIA*, Roxb.

Chittagong. Ava. Pegu. Martaban.

Nhing-pen or Nham-ben (Kurz).

Leaves cordate, petioled. Flower-heads 1–3 axillary.

Wood brown, coarse. Recommended for furniture. Weight about 50 lbs.

Sub-genus *ADINA*.

Corolla valvate. Flowers surrounded by bractlets.

\* Flower-heads small, panicled.

*N. POLYCEPHALA*, Wall. *E.T.*

Chittagong. Tenasserim.

*N. aralioides*, Miq.

All parts glabrous. Leaves petioled.

\*\* Flower-heads larger, panicled. Bractlets angularly clavate.

× Petiole very slender and thin. Leaves thin membranous, acute at the base.

*N. PARVIFLORA*, Roxb.

Hteing thē (Kurz).

var. *α genuina*. Bractlets only half as long as the calyx. Flower-heads more constantly solitary between 2 longer-persistent floral leaves.

var.  $\beta$  *diversifolia*, Wall. Leaves much larger, from 3 to 6 inches long, beneath more conspicuously pubescent. Stipules pubescent. Bractlets as long as the calyx.

var.  $\gamma$  *microphylla*. Leaves small, only 1-2 inches long, minutely and inconspicuously pubescent beneath. Stipules glabrous. Bractlets as long as the calyx.

var.  $\alpha$  not yet found in Burma; var.  $\beta$  frequent in the mixed forests and in savannahs, all over Burma from Ava and Martaban down to Upper Tenasserim; var.  $\beta$  exclusively in the savannahs.

× × *Petioles very thick and pubescent. Leaves large, cordate at the base.*

N. ROTUNDIFOLIA, Roxb.

Chittagong to Tenasserim.

N. *Brunonis*, Wall.

Byn-gā.

Flower-heads dichotomously panicle. Leaves wrinkled above. Corolla-lobes as long as the short tube. Wood yellowish, or very pale yellowish-brown, close-grained and suitable for furniture. Weight 35 lbs. (W.T.).

UNCARIA, Schreber.

*Flowers* sessile or pedicelled, destitute of bractlets. *Capsule* dehiscing in longitudinal slits. Scandent shrubs with hooked tendrils.

\* *Capsule long-stalked. Leaves more or less pubescent beneath.*

U. FERRUGINEA, D.C.

Tropical forests of Pegu Range and Tenasserim.

U. *speciosa*, Wall.

Flowers large, the pedicels 1-2 lines long, velvety. Calyx  $\frac{1}{2}$  inch long. Corolla hirsute.

U. SESSIFOLIA, Roxb.

Tropical forests of Pegu range and Tenasserim.

Flowers almost sessile. Calyx 2 lines long. Corolla velvety.

\*\* *Capsule sessile.*

× *Calyx-limb long-toothed.*

U. PILOSA, Roxb.

Tropical forests of Ava Hills, Pegu Range.  
Tenasserim. Kaomrta.

All parts more or less woolly pubescent.

× × *Calyx almost truncate or obscurely 5-toothed. Leaves glabrous.*

U. LEVIGATA, Wall.

Tropical forests of Khaboung stream and Tenasserim.

Leaves green on both sides. Corolla glabrous.

U. SESSILIFRUCTUS, Roxb.

Tropical forests of Pegu, Tenasserim and  
Khakyen Hills.

Leaves glaucous beneath. Corolla-lobes velvety.

EU-CINCHONIEÆ.

*Flowers* panicle or corymbose, never in heads. *Capsule* 2-celled, dehiscing septically into 2 valves or into 4 apical valves.

× *Capsule septically dehiscing into 2 woody valves.*

+ *Corolla imbricate.*

LEUCIA, Sweetner.

*Calyx-limb* deciduous. *Stamens* included. *Corymbs* terminal, without floral leaves. Trees.

L. GRATISSIMA, Sweet.

Hills East of Bhamo.

++ *Corolla valvate.*

HYMENODICTYON, Wallich.

*Inflorescence* furnished with conspicuous discoloured floral leaves. Trees.

H. THYRSIFLOKUM, Wall.

Chittagong and Pegu Range.

H. Horsfieldii, Miq.

× × *Capsule dehiscing at the apex into 4 valves. Corolla valvate.*

HYMENOPOGON, Wallich.

*Inflorescence* furnished with conspicuous discoloured floral leaves. Epiphytcal shrubs.

H. PARASITICUS, Wall.

Epiphytic on mossy trees on Kambalu Hill in the Pegu Range.

#### HEDYOTIDIEÆ.

*Orary* 2-4-celled, the cells many- or few-ovuled, the ovules laterally attached. *Capsule dehiscing in various ways or separating into 2-4 cocci, rarely indehiscent.*

× *Stipules connate or free, neither sheathing nor setaceously fringed (Rondeletieæ).*

+ *Stigma 2-lobed or 2-cleft. Corolla imbricate or twisted. Anther-cells blunt.*

WENDLANDIA, Barth.

*Corolla* tubular, twisted. *Capsule* opening into two apical valves. Trees or shrubs. *Flowers* 5-merous, sessile or shortly pedicelled, in short spikelets, racemes, or clusters, forming thyrsoïd panicles.

\* *Calyx-teeth short, triangular-acute.*

W. SCABRA, Kz.

Hills East of Bhamo.

All parts and leaves on both sides harshly and shortly pubescent.

W. TINCTORIA, D.C.

Ava to Tenasserim up to 4000 feet.

Ta-ma-gouk.

Leaves beneath more or less shortly pubescent or almost glabrescent. Panicles pubescent or tomentose.

The bark is used for dyeing red. The wood is said to be dark-brown, fine-grained, and suitable for ornamental carpentry.

W. GLABRATA, D.C.

Tenasserim, 2000 to 4000 feet.

All parts (also the panicle) quite glabrous. Flowers minutely pedicelled.

\*\* *Calyx-teeth subulate-acuminate, as long as or longer than the calyx-tube.*

W. LIGSTRINA, Wall.

Ava, Taong doung. Khakyen Hills, Tenasserim  
(a var. with longer corolla-tube).

Leaves coriaceous, glabrous.

W. GLOMERULATA, Kz.

Mergui.

Leaves lanceolate, membranous, appressed, pubescent on the midrib below.

Sub-genus GREENIA.

*Flowers* 4- or 5-merous, in one-sided spikes forming divaricate corymbose panicles.

W. SECUNDA, Griff.

Mergui.

All parts glabrous.

W. CORYMBOSA, Jack.

Tenasserim.

*W. spicata*, D.C.*Greenia Jackii*, W. A.SPIRADICLIS, *Blume*.

*Corolla-tube* short. *Capsule* dehiscing into 2 valves, which again separate into 2 valves inflexed with their margins. Erect annual herbs.

S. BIFIDA, Wall.

Martaban.

Stem, petioles, and inflorescence, shortly pubescent. Capsule globular, 2-lobed.

S. CESPITOSA, Bl.

Martaban, along streams.

*S. cylindrica*, H.f.AXANTHES, *Blume*.

A. LONGIFOLIA, Wight (M.).

OPHIORRHIZA, *Linnaeus*.

*Corolla* funnel-shaped or tubular. *Placenta* free, erect. *Capsule* compressed, divaricately 2-lobed, opening loculicidally by an apical slit. Herbs.

\* *Cymes* all terminal, on peduncles 1-3 inches long. *Calyx-teeth* short, triangular.

× *Bractlets* conspicuous, subulate, up to a line long.

O. GRACILIS, Kz.

Tenasserim.

All parts glabrous. Leaves long-acuminate.

× × *Bracts* subulate, usually persistent, but the bractlets very minute, if any.

O. MUNGO, L.

var. *a* along the coast. var. *β* in Martaban  
at 3000 feet. The Nicobars.

All parts (also the capsule) glabrous.

var. *a genuina*. Capsule about 3 lines across, emarginate, the lobes somewhat acute.

var. *β orthocarpa*. Capsule about 2 lines across, truncate at the apex, the lobes blunt or almost truncate.

Dr. Brandis' specimens are not sufficient to enable one to make out whether they should not rather form a distinct species. The true Linnean species is a sea-shore plant, growing chiefly in the beach-forests, most probably also growing along the Burmese coasts.

This plant is so called from its being supposed to be that one which the 'mongoose' seeks for and swallows as an antidote, after being bitten by a cobra. It is, however, now well known that there is no specific for snake poison, and that the fact even of the mongoose (*Herpestes*) seeking out and swallowing an antidote is merely one of the many fictions of the imagination with which the whole subject is surrounded. The *Herpestes* owes his immunity to his own agility, which secures him generally from being bitten, to his possessing a thick skin and hispid hair, more or less erected when angry, and which probably often foils an otherwise effective bite, and to his peculiar idiosyncrasy, in virtue whereof he probably sustains and survives a bite which to an animal of another family would be fatal.

O. ARGENTEA, Wall.

Chittagong and Boronga Island.

Stems and petioles brown-pubescent. Leaves thick-membranous, whitish beneath. Capsule glabrous.

Probably not distinct from *O. canescens* (Kurz).

O. VILLOSA, Roxb.

Tropical forests of Ava. Chittagong.

*O. rugosa* and *hispidula*, Wall.

Pegu and Tenasserim.

*O. trichocarpa*, Bl.

As preceding, but leaves only pale-coloured beneath, the inflorescence more hispid-pubescent. Capsule minutely hispid.

\*\* *Cymes terminal and axillary, on very short peduncles, only 4-6 lines long, or almost sessile. Calyx-teeth lanceolate, acute.*

O. ERUBESCENS, Wall.

Tenasserim at 3000 to 5000 feet.

Stem, petioles and peduncles more or less shortly pubescent. Lateral branches all shortened.

++ *Stigma capitate. Corolla valvate. Anther-cells prolonged into a setaceous sterile appendage.*

ARGOSTEMMA, Wallich.

*Corolla almost rotate, the limb 3-5 cleft. Anthers dehiscing longitudinally or by 1 or 2 apical pores. Capsule dehiscing by 4 apical valves. Herbs of the habit of Sonerila.*

\* *Flowers 5-merous.*

× *Leaves reduced to bract- or stipule-like leaflets, of which only 1 or 2 are fully developed.*

A. UNIFOLIUM, Benn.

Attaran valley.

All parts glabrous. Leaf solitary. Anthers oblong, blunt.

A. TAVOYANA, Wall.

Tavoy.

Umbels stiff-hairy. Leaves two.

×× *Leaves all developed, but very unequal, whorled or crowded at the apex of the stem.*

A. VERTICILLATUM, Wall.

Maulmain district (*fide* Parish).

Glabrous or nearly so. Anthers free, linear, acuminate, opening by terminal pores.

\*\* *Flowers 4-3-merous.*

A. SONERILOIDES, Kz.

On Pagodas in Rangoon.

Stem, inflorescence, and petiole villous-pubescent. Leaves sparingly pubescent, cordate, bluntish or acute. Flowers in peduncled or cymose umbels.

A. OLIGANTHA, Kz.

South Andaman.

Quite as preceding, but flowers solitary on a short pedicel, or by 2 or 3 on a very short peduncle, pale rose-coloured.

A small species of *Argostemma*, with slightly pubescent leaves solitary or by pairs, occurs on damp rocks of the tropical forests on Boronga Island, Arakan, but the specimens are too few and reduced to admit of description. Its calyx-lobes are blunt or rather retuse (Kurz).

×× *Stipules adnate to the petiole and sheathing at the base, setaceously fringed (Eu-Hedyotideæ).*

DENTELLA, Forster.

*Flowers 5-merous, the petals 2- or 3-toothed. Capsule indehiscent.*

D. REPENS, Forst.

All over Burma, and introduced into the Andamans.

*Lippaya telephioides*, Enell.

HEDYOTIS, Linnaeus.

*Flowers 4-5-merous, the petals entire. Capsule dehiscing loculicidally or septicidally, rarely almost indehiscent.*

\* *Capsule loculicidally dehiscent.*

Sub-genus OLDENLANDIA, L.

*Capsule* more or less hemispherical or obsoletely 2-lobed, opening loculicidally. Annual, rarely perennial herbs.

\* *Prostrate or diffuse herbs. Flowers solitary, or in cymes or clusters in the axils of the leaves (rarely also terminal). Root sometimes turning perennial.*

× *Leaves more or less oval, petioled.*

H. (OLDENLANDIA) TRINERVIA, Retz. Chittagong and Akayab.

Flowers solitary, sessile or nearly so.

× × *Leaves linear to narrow-linear, rarely lanceolate, more or less sessile.*

+ *Flowers solitary or by 2-3 on an axillary peduncle.*

H. RAMOSISSIMA, Spreng.

Along the course of the larger Rivers

*Oldenlandia brachypoda*, D.C.

(Irrawaddy, Tsittoung).

*O. diffusa*, Roxb.

Flowers solitary, on very short strong pedicels. Leaves membranous, flat.

H. (OLDENLANDIA) BIFLORA, L.

All over Burma.

*Oldenlandia Burmanniana*, R. Br.

O. HERBACEA, D.C.

var. β and γ in Ava, Pegu, and the Andamans.

*O. diffusa*, Willd.

*O. corymbosa*, L.

*O. graminicola*, Kz.

Kamorta.

*O. ramosa*, Roxb.

Flowers by 2-3, rarely solitary, on a capillary peduncle. Pedicels very long and capillary. Leaves membranous, flat.

+ + *Flowers by 4 or more, forming axillary and terminal clusters or cymes. Leaves more or less revolute on their margins, somewhat rigid.*

H. (OLDENLANDIA) UMBELLATA, L.

Ava (probably).

*H. polygonoides*, Wall.

Flowers in peduncled cymes or the cymes umbel-like.

The bark of the roots of this small biennial plant yields a durable scarlet dye for which it is extensively cultivated in India and Ceylon, and with it the celebrated red turbans of Madura are dyed. The wild plant is supposed to yield more colouring matter than the cultivated, which last sells for 20 rupees per candy of 500 lbs. It is good for dyeing at two years, but the quality of older roots is better. A test of its quality is to grind up some of the root with quicklime, when, if the root is good, the whole quickly assumes a fine red colour. It is extensively used for dyeing chintzes in India, but is said to deteriorate if shipped in bulk.

H. ANGUSTIFOLIA, Cham. et Schlecht.

Amherst.

*H. pinifolia*, Wall.

Flowers in small clusters.

\*\* *Erect annuals. Flowers in terminal panicles or cymes, or solitary, rarely the inflorescence also axillary.*

× *Leaves sessile or nearly so.*

H. LINOIDES, Griff.

Tavoy. Mergui.

*H. arguta*, R. Br.

Leaves sagittate at the base, shortly bristly rough. Flowers pale-blue, by 3-4 terminal, and also singly from the leaf-axils. Pedicels long and capillary.

H. GRACILIS, Wall.

Ava; near Katha.

*H. stricta*, Wall.

*H. fusca*, Ham.

*H. aspera*, Heyne.

Leaves linear. Corolla about an inch long, brownish-purple.

× × *Leaves more or less petioled, more or less tapering at the base.*  
+ *Calyx only  $\frac{1}{3}$ – $\frac{1}{2}$  line long.*

H. WALLICHII, Kz.

Tenasserim. Kamorta.

*H. galioides*, Wall. (non F. Muell.).

All parts sparingly pilose. Leaves acute. Cymes peduncled, axillary and terminal. Pedicels capillary, 3–4 lines long.

H. (OLDENLANDIA) SPERGULACEA, D.C.

Pegu and Martaban.

*H. ovalifolia*, Miq.

*H. scapigera*, R.Br.

H. NUDICAULIS, W. A.

Stem villous-pubescent, the leaves often whorled at the end of the nude scape-like stem. Cymes divaricate, peduncled, terminal. Pedicels capillary, 2–4 lines long.

+ + *Calyx  $\frac{3}{4}$ –2 lines long. Flowers in racemes or cymes, terminal and in the axils of the upper leaves.*

H. (OLDENLANDIA) PANICULATA, L.

In rubbishy spots all over Burma.

*H. racemosa*, Lamk.

Great Nicobar.

*O. alata*, Roxb. non Koen.

Glabrous, more or less succulent. Flowers slenderly pedicelled. Capsule not winged, the crowning calyx-lobes very short.

H. ANDAMANICA, Kz.

The Andamans. Kamorta.

Stems, and nerves beneath, shortly pubescent. Flowers sessile or nearly so. Capsule more or less compressed and winged, the crowning lobes nearly a line long.

A branched variety of this has the capsules more compressed and more keel-winged and the calyx-teeth still larger. As a species it is allied to *H. lanceafolia*, Dalz., and *H. alata*, L. (Kurz).

\*\* *Capsules opening septicidally.*

Sub-genus DIMETIA, W. A.

*Capsule* opening septicidally at the apex by a gaping short slit, more or less truncate hemispherical and obscurely 2-lobed. Scandent, diffuse or erect perennials. *Flowers* in small heads, forming axillary and terminal peduncled cymes or panicles. *Corolla* often villous within.

H. CAPITELLATA, R. Br.

var.  $\alpha$ ,  $\beta$  Khakyen Hills and Tenasserim.

var.  $\gamma$  Tenasserim up to 3000 feet.

Glabrous or pubescent; flowers sessile or nearly so; nerves of leaves prominent.

var.  $\alpha$  *genuina* (*Oldenlandia rubioides*, Miq.). All parts quite glabrous.

var.  $\beta$  *subpubescens*. Stems glabrous, the branchlets and the under surface of the leaves minutely pubescent.

var.  $\gamma$  *pubescens*. All parts densely pubescent, the leaves above roughish minutely, beneath softly and yellowish but shortly pubescent. Calyx-teeth often longer and larger.

This species has been identified with *H. fruticosa* of Linne, but the Ceylon plant of this name is certainly distinct (Kurz).

H. SCANDENS, Roxb.

Chittagong. Khakyen Hills.

Scandent or diffuse, quite glabrous, glaucous. Flowers pedicelled. Calyx-lobes acute.

H. FLEGANS, Wall.

Tavoy and Hills East of Toung-ngoo at 3000 to 5000 feet.

Erect, branched, quite glabrous. Flowers sessile. Calyx-lobes broad and blunt.

Sub-genus *METABOLOS*, Bl.

*Capsule* septiciidally dehiscent or nearly so, hemispherical and more or less truncate at the apex, often obscurely 2-lobed. *Diffuse* or half-scandent, rarely erect perennials. *Flowers* in axillary (very rarely terminal) clusters or cymes.

\* *Flowers* in axillary peduncled cymes. *Prostrate* or *diffuse* perennials.

× *Flowers* pedicelled, in loose cymes.

*H. ULMIFOLIA*, Wall. Hills East of Toung-ngoo at 4000 to 6000 feet.

All parts more or less pubescent. Calyx-lobes longer than the tube.

*H. (SPERMACOCE) GLABRA*, Roxb. Tenasserim.

All parts glabrous. Calyx-teeth minute.

× × *Flowers* sessile or nearly so, in little heads collected into peduncled cymes or clusters.

*H. (SPERMACOCE) COSTATA*, Roxb.

Southern portion of Pegu Range,

*H. caerulea*, Korth. non L.

Tenasserim, and Kamorta.

*H. capituliflora*, Miq.

Flowers minute, pale blue. Capsule only about  $\frac{1}{2}$  line across.

\*\* *Flowers* sessile or very shortly pedicelled, in axillary or terminal clusters or heads.

*H. AURICULARIA*, L.

Hills East of Bhamo.

*H. venosa*, Korth.

*H. idoneura*, Miq.

*H. lineata*, Roxb.

Prostrate or diffuse, all parts more or less pubescent. Clusters axillary.

*H. SCABRA*, Wall.

Upper Tenasserim.

Erect, slightly pubescent. Clusters terminal, involucred by the 4 or 5 uppermost leaves.

Two doubtful species are *H. argentea*, Wall., Ava; and *H. Merguensis*, H. f. et Bth., Mergui (Kurz).

Kurz adds from the Nicobar group:

*H. RIGIDA*, Miq.

Tropical forests of Kamorta.

Very close to *H. hispida*, Retz, but the corolla more than twice as large. Capsules globose, as in *Odenlandia*. Stems hispidulous. Leaves glabrous above, puberulous beneath.

*H. APPROXIMATA*, W. A.

Kamorta.

*Spermococc tubularis*, R. Br.

#### *SCLEROMITRION*, Wight and Arnott.

As preceding, but capsule separating into 2 or 4 several-seeded cocci.

Sub-genus *EU-SCLEROMITRION* (FERGUSONIA, H. f. ?).

*Capsule* loculicidally separating into 2 many-seeded cocci. *Calyx* more or less obovoid, crowned by the converging calyx-limb. *Stigmatic lobes* 2. *Diffuse* perennials.

\* *Flowers* in terminal sessile heads or clusters.

*S. CORONARIUM*, Wall.

Tavoy. Attaran Valley.

Flower-heads half-included in the embracing bases of the involucre-like uppermost leaves. Calyx-teeth large.

*S. (RONDELETIA) TETRANDRUM*, Roxb.

Tenasserim.

*Hedyotis macrophylla*, Wall.

*H. nodiflora*, Wall.

\*\* *Flowers in axillary clusters or heads.*

× *All parts glabrous or nearly so.*

*S. (HEDYOTIS) RIGIDA*, Miq. Tenasserim.

Leaves linear, not nerved, quite glabrous. Flowers in dense clusters. Calyx-tube glabrous or nearly so. Capsule glabrous or shortly hispid.

*S. NITIDUM*, W. A. Pegu and hills East of Toung-ngoo.

Leaves ovate to ovate-oblong. Flowers by 2-3 or few in the leaf-axils. Capsule glabrous.

Very probably only an extreme, broad-leaved form of *S. hispidum*, while *S. approximatum* (*Hedyotis approximata*, W. A.), may be an extreme narrow-leaved variety of it.

× × *All parts, more especially the stems and capsule, more or less shortly hispid.*

*S. HISPIDUM*, Retz. Ava and Pegu.

All parts, also the leaves, shortly scabrous-pubescent. Capsule ovoid, about a line long or longer.

*S. PARADOXUM*, Kz. Andamans. Great Nicobar.

Stem shortly hispid. Leaves glabrous above, minutely puberulous beneath. Corolla half the size, pubescent at the throat. Capsule globular (as in *Oldenlandia*), with short calyx-lobes.

\*\* *Ovules and seeds solitary in each cell.*

#### SPERMACOCIEÆ.

*Capsules distinct, dehiscing, or separating into cocci, rarely indehiscent. Flowers not in heads. Corolla without toothlets between the lobes valvate. Radicle inferior.*

#### SPERMACOCE, *Linnaeus.*

*Ovule* attached to or below the middle of the cell. *Capsule* dehiscing septicidally from the apex. Herbs.

*S. STRICTA*, L. Ava, Pegu and Upper Tenasserim.

Flowers in dense whorl-like clusters or heads, white, about a line long. Capsules 1 line long.

*S. HISPIDA*, L. var.  $\beta$  from Ava to Tenasserim up to 1500 feet.

*S. scabra*, Willd.

var.  $\alpha$  *hispidula*. Whole plant hispid-pubescent, the leaves usually of a softer texture and undulate. Corolla-tube only  $1\frac{1}{2}$ -2 lines long. Capsule greyish or whitish villous. Seeds opaque, black.

? var.  $\beta$  *S. articularis*, L. (*S. Arana*, and *longicaulis*, R. Br.). Whole plant more scabrous, and short pubescent, the leaves rigid and not undulate. Corolla-tube about 3 lines long, slender. Capsule shorter and hispid. Seeds often glossy black or brownish.

#### KNOXIA, *Linnaeus.*

*Ovule* attached at or below the summit of the cell. *Capsule* dehiscing from the base into two deciduous cocci, leaving the persistent setaceous axis. Herbs.

\* *Stem leafy, without radical leaves, more or less branched.*

*K. CORYMBOSA*, Willd. Ava. Pegu and hills East of Toung-ngoo.

*Spermacoe teres*, Roxb. Trice and Track.

*S. Sumatrensis*, Retz. non Roxb.

Leaves petioled. Flowers spiked, forming corymbs.

*K. MICROCARPA*, Kz. Pegu. Yunzalin. Zwa-ka-bin (*vide* Parish).

Leaves sessile or nearly so. Flowers corymbose, forming corymbs.

There are specimens with a short wide corolla-tube and others with a slender tube nearly twice the length (Kurz).

*\*\* Leaves all crowded at the base. Stem scape-like, with narrow small cauline leaves only.*

K. PLANTAGINEA, Wall.

Prome, North of Myodwin.

More or less hairy while young. Calyx-tube densely villous. Corolla nearly  $\frac{1}{2}$  an inch long.

#### CEPHALANTHIEÆ.

*Capsules indehiscent, usually united into a syncarp. Corolla imbricate. Radicle superior.*

CEPHALANTHUS, *Linnaeus.*

*Corolla-lobes* with toothlets in their sinuses. *Capsules* berry like, connate. *Flowers* in heads.

C. NAUCLEOIDES, D.C.

Ava (probably).

*Nauclea tetrandra*, Roxb.

#### Sub-order EU-RUBICEÆ.

*Fruit* a more or less fleshy drupe or rarely a berry 1 to many-celled. *Ovary-cells* 1 to many-ovuled. *Seeds* never winged nor appendaged. *Stipules* interpetiolar or developed into leaves, or rarely none.

*\* Stipules interpetiolar, various.*

+ *Seeds inclosed in pyrenes of a coriaceous, crustaceous, or chartaceous texture. Ovules solitary in each cell. Radicle inferior.*

#### PEDERIEÆ.

*Orule and the seed pendulous. Drupe dry, crustaceous or chartaceous, irregularly rupturing.*

PEDERIA, *Linnaeus.*

*Corolla* valvate. *Cocci* thin-chartaceous, expanded into wings. *Twining*, the leaves opposite or whorled.

*\* Ripe seeds not winged. Capsule globular.*

P. TOMENTOSA, Bl.

Arakan Hills.

*P. barbata* and *densiflora*, Miq.

Glabrous or pubescent. Corolla scurfy-tomentose or velvety outside.

*\*\* Ripe seeds broadly winged. Capsule more or less compressed.*

× *Corolla mealy or scurfy-tomentose or velvety outside.*

P. FETIDA, L.

Chittagong. Ava. Upper Tenasserim.

*P. ovata*, Miq.

Quite glabrous. Calyx-lobes shorter than the calyx-tube. Seed-wings pale-coloured.

var.  $\beta$  *microcarpa*. Capsule compressed ovoid-orbicular, only about 3 lines long.

P. CALYCINA, Kz.

Tavoy.

Sparingly and shortly puberulous. Calyx-lobes longer than the tube. Seed-wings blackish.

× × *Corolla not tomentose, but only sparingly and shortly pilose.*

P. LANGEINOSA, Wall.

All over Burma.

*P. macrocarpa*, Wall.

All softer parts, and more especially the under surface of the leaves, villous-tomentose. Seed-wings corky, pale-coloured.

## COFFEEÆ.

Ovary 2-9- (very rarely 1-)celled, the solitary orules erect or attached to the middle of each cell. Berry consisting of 2 or more (rarely a single) 1-seeded coriaceous or chartaceous pyrenes.

† Orules erect and basal. Albumen often fleshy. Corolla valvate.

× Ovary 4-9- (rarely 2-)celled (*Lasianthæ*).

## LASIANTHUS, Jack.

Calyx more or less toothed. Styles and ovary-cells 4-9. Flowers clustered or cymose, axillary. Shrubs.

\* Flowers in clusters or short peduncled cymes, the bracts very minute and usually deciduous.

L. LUCIDUS, Bl.

Upper Tenasserim.

Flowers sessile. Calyx glabrous, the lobes about as long as the tube. Drupes crowded by the linear-lanceolate calyx-teeth.

L. CONSTRICTUS, Wight.

Tropical forests of Tenasserim and the Andamans.

Flowers very shortly pedicelled or almost sessile. Calyx puberulous, the limb broad with very short teeth. Drupes crowned with the cyathiform contracted almost truncate calyx-limb.

Habit of *L. stercorarius*, but differs in the inflorescence and in the shape of the calyx-limb (Kurz).

\*\* Flowers in densely bracted sessile clusters, the bracts more or less conspicuous and often persistent.

× Calyx-segments about a line long or shorter. Stipules small.

L. STERCORARIUS, Bl.

Upper Tenasserim and the Andamans.

Leaves shortly petioled, puberulous beneath. Outer bracts broad and blunt, but short. Calyx-lobes lanceolate.

L. (MELPHITIDÆ) WALLICHII, W. A.

Upper Tenasserim and the Andamans.

Sparingly stiff-hairy. Leaves almost sessile, oblique. Bracts all linear-subulate, hirsute.

× × Calyx-segments linear to linear-subulate, 3-5 lines long, hirsute.

+ Stipules very large and leafy, oval.

L. STIPULARIS, Bl.

Tenasserim (or the Andamans).

Leaves glabrous or nearly so. Stipules persistent, infolding the flower-heads.

+ + Stipules more or less lanceolate, small, not leafy.

L. CYANOCARPA, Jack.

Chittagong. Tropical forests of South Andaman.

*L. bracteatus*, Wight.

*Triosteum hirsutum*, Roxb.

*L. Roxburghii*, Wight.

All parts brown-hirsute. Outer bracts very large, leafy, ovate, acuminate.

L. LEVICAULIS, Kz.

Tropical Forests of Kamorta.

× × Ovary 2- (very rarely 4-)celled (*Psychotriæ*).

## CERAPHELLIS, Linnaeus.

Corolla funnel-shaped, the tube long. Calyx 4- or 5-toothed or lobed. Flowers in heads or solitary, axillary. Herbs or under shrubs.

C. (PSYCHOTRIÆ) HERBACEA, L.

Southern Pegu Range, Tenasserim, and the Andamans.

*Geophila reniformis*, Don.

## HYDNOPHYTUM, Jack.

*Calyx-limb* entire. *Corolla-tube* short. *Flowers* sessile, clustered. Epiphytical shrubs with tuberous trunks.

## II. FORMICARUM, Jack.

On trees in Mangrove swamps in the Andamans.

## PSYCHOTRIA, Linnæus.

*Corolla-tube* short, the throat bearded. *Pyrenes* flat or entire on the inner face. *Flowers* cymose or cymosely panicled. Shrubs, rarely scandent.

## Sub-genus LEUCOPYRENOS.

*Seeds* plano-convex without ribs or dorsal keel, inclosed in a white thin membranous pyrene.

## P. CALOCARPA, Kz.

Khakyen Hills. Pegu. Upper Tenasserim.

Small decumbent under shrub, the stems and often also the nerves beneath shortly tomentose.

## Sub-genus EU-PSYCHOTRIA.

*Pyrenes* hard, with a more or less distinct dorsal rib, or ribbed and furrowed.

\* *Pyrenes* not ribbed and furrowed, but dorsally more or less distinctly keeled or trigonous.

× *Pyrenes* plano-convex, with an obsolete longitudinal dorsal rib. *Albumen* spuriously ruminant.

## P. CONNATA, Wall.

Pegu Range. Tenasserim. The Andamans. Car Nicobar.

*Grumilca elongata*, Wight.

*Pæderia erecta*, Roxb.

Glabrous. Panicles elongate and raceme-like.

## P. PLATYNEURA, Kz.

Tropical forests of the Andamans.

As preceding. Leaves larger. Panicle thyrsoid or corymb-like. Berries obovoid.

Much resembling *P. robusta*, Bl., from which it differs in the stipules, glabrous inflorescence, and glabrous corolla (Kurz).

× × *Pyrenes* 3-gonous, the inner face flat, the 2 lateral ones more or less concave and meeting in a longitudinal ridge.

+ Quite glabrous.

## P. SYMLOCIFOLIA, Kz.

Hills East of Toung-ngoo at 5000 to 7000 feet.

Habit of *P. connata*. Cymes small, in slightly puberulous peduncled panicles. Calyx about a line across, obsoletely 5-toothed. Albumen equable.

++ Tawny or rusty hairy. *Flowers* sessile, clustered or in heads.

## P. POLYNEURA, Kz.

Tropical forests of South Andaman.

Flower-heads very small. Leaves glabrous above.

## P. HELFERIANA, Kz.

Tenasserim (or the Andamans).

Flower-heads rather large, compact. Leaves hirsute on both sides. Albumen equable.

\*\* *Pyrenes* longitudinally ribbed and furrowed (ribs usually 3-5).

× *Flowers* clustered or in heads.

## P. MONTICOLA, Kz.

Martaban between 3500 and 6000 feet.

Leaves opaque. Cyme compact, somewhat tomentose. Bracts subulate. Albumen ruminant.

## P. ADENOPHYLLA, Wall.

Tenasserim (or the Andamans).

Leaves glossy. Panicle thyrsoid, glabrous, the branchings whorled. Bracts broadly ovate.

Wallich describes his plant as having racemes of the thickness of the little finger. My plant agrees with his herbarium specimens and belongs in the vicinity of *Grumilea Gardneri*, Thw., a very near ally to *Psych. leucocoma*, Teysm. and Binn.

× × *Flowers pedicelled, in lax cymes or corymbs.*

+ *Small erect shrubs.*

× *Leaves thick membranous, turning more or less brownish in drying.*

† *Drupe 4-5 lines long.*

P. (GRUMILEA) VIRIDIFLORA, Miq. var. β Chittagong.

Glabrous. Cymes rusty-puberulous. Albumen ruminant.

var. α *genuina*. Stipules broad and rather large. Leaves entire. Cymes puberulous. Calyx-teeth inconspicuous.

var. β *undulata*. As preceding, but leaves undulate, the calyx-teeth about  $\frac{1}{2}$  line long.

? var. γ *calophylla*, Wall. and Griff. Stipules small and subulate. Cymes glabrous. Calyx-teeth about  $\frac{1}{2}$  line long.

*P. picta*, Wall., from Tavoy, seems to belong to var. γ, but the specimens are too imperfect for identification (Kurz).

† † *Drupe only 2-3 lines long. Albumen ruminant.*

P. ASIATICA.

Cymes rusty puberulous on a peduncle  $\frac{1}{2}$ -1 inch long. Calyx-teeth distinct, linear. Berries crowned by the calyx-lobes.

P. (GRUMILEA) DIVERGENS, Miq. Tenasserim; rare in Pegu Range.

Cymes glabrous. Leaves narrower.

This may possibly be a form only of *P. asiatica*.

P. ANDAMANICA, Kz. Tropical forests of the Andamans. Katchall and Kamorta.

Cymes rusty puberulous, almost sessile. Calyx almost truncate. Berries truncate-crowned.

× × *Leaves thin membranous, remaining green in drying.*

P. VIRIDISSIMA, Kz. Tropical forests of Tenasserim and hills East of Toung-ngoo.

All parts glabrous.

+ + *Large scandent shrubs. Albumen equable.*

P. SARMENTOSA, Bl. Amherst.

Corymbs furnished at the lower branchings with two opposite narrow floral leaves.

Kurz adds from the Nicobars:

P. NICOBARICA, Kz. Katchall.

P. TYLOPHORA, Kz. Katchall.

CHASALIA, Commerson.

*Corolla-tube* elongate, the throat naked. *Pyrenes* carved out on the inner face along the central placenta. *Inflorescence* of *Psychotria*. Shrubs or under shrubs.

C. (PSYCHOTRIA) CURVIFLORA, Wall. Tenasserim. The Andamans.

*P. ophiophylloides*, Wall.

*C. lurida*, Miq.

*P. ambigua*, W.A.

SAPROSMA, Blume.

*Corolla* funnel-shaped, velvety, often almost oblique. *Berry* 1, rarely 2-seeded. *Flowers* terminal and axillary. *Stipules* free. Shrubs or trees.

\* *Flowers sessile, terminal.*

*S. CONSIMILE*, Kz.

Upper Tenasserim from 3000 to 5000 feet.

Flowers solitary. Stipules cut and fringed.

Much resembles *S. fruticosum*, Bl., but differs in the flowers and stipules (Kurz).

\*\* *Flowers solitary or by 3 or more in peduncled, axillary cymes.*

*S. (PÆDERIA) TERNATUM*, Wall.

$\beta$  in Tropical forests of the Andamans.

Cymes poor-flowered, long-peduncled, glabrous, axillary by 2-4. Upper leaves usually ternary. Corolla 4-merous.

var. *a genuina*. All parts quite glabrous.

var. *\beta puberula*. Stipules, petioles, and nerves beneath more or less pubescent.

†† *Ovules attached to the middle or above the middle of the septum. Corolla twisted. Albumen often horny (Ixoricæ).*

*COFFEA, Linnaeus.*

*Corolla* funnel-shaped, the limb 4-7-parted. *Berry* 2 or rarely 1-seeded, the pyrenes chartaceous. *Flowers* terminal and axillary. *Stipules* free.

\* *Corolla funnel-shaped.*

\* *C. ARABICA*, L.

Occasionally cultivated.

All parts quite glabrous and glossy. Flowers very shortly pedicelled, in axillary clusters.

\*\* *Corolla salver-shaped.*

× *Berries peduncled.*

*C. TETRANDRA*, Roxb.

Tropical forests of Martaban up to 3000,  
also Chittagong and the Andamans.

All parts quite glabrous and glossy. Flowers on pedicels,  $\frac{1}{2}$ -1 inch long, usually terminal, rarely axillary.

*C. BENGALENSIS*, Roxb.

Tropical forests of Martaban and Tenasserim.

× × *Berries sessile.*

Young shoots and nerves beneath sparingly pubescent. Flowers sessile, terminal and axillary.

Kurz adds :

*AMARACARPUS PUBESCENS*, Bl.

Tropical forests of Ulala Bay, Nicobars.

*IXORA, Linnaeus.*

*Corolla* salver- or nearly funnel-shaped, the limb 4- or 5-parted. *Flowers* corymbose or paniced. *Stipules* connate.

Sub-genus *PAVETTA*, L.

*Flowers* 4- or 5-merous. *Style* exerted to the same or nearly the same length of the tube, the stigma simple and spindle-like.

° *Corolla more funnel-shaped, the tube only 3 lines long.*

+ *Flowers sessile or nearly so, in a dense head.*

*I. COMPACTIFLORA*, Kz.

Upper Tenasserim at 2000 feet.

Glabrous, turning black in drying. Habit of *I. Pavetta*.

++ *Flowers in cymes or corymbs, shortly pedicelled.*

*I. (PÆDERIA) RECURVA*, Roxb.

Chittagong.

Glabrous, the corymbs puberulous and recurved. Berries crowned by the calyx-lobes.

- I. (PAVETTA) WEBEREFOLIA, Wall. Ava, Segain. The Andamans. Katchall.  
*P. cerberaefolia*, Miq. Kamorta. Great and Car Nicobar.

Glabrous, also the erect or nearly erect corymbs. Berries marked by the circular scar of the fallen calyx-limb.

"Resembles *Webera Asiatica*, Bedd., to such a degree that it is frequently mistaken for it. My *Stylocoryne Webera* also belongs here" (Kurz).

° ° Corolla-tube slender,  $\frac{1}{2}$ – $\frac{3}{4}$  inch long. Flowers pedicelled.

- I (PAVETTA) INDICA, L. The Andamans.

All parts (also the corymbs) glabrous, in drying remaining green.

- I. TOMENTOSA, Roxb. All over Burma.

*Pavetta subclutina*, Miq.

*P. Rothiana*, DC.

*P. montana*, Rwdt.

All parts more or less puberulous to tomentose, usually turning black in drying. Corymbs short puberulous.

*Pavetta Brunonis*, Wall., seems to be that tomentose harsh-leaved form of the above species which is also frequent on calcareous substrata in Ava. Miquel confounds *Pavetta Brunonis*, Wall., and *Ixora Brunonis*, Wall., two perfectly different species (Kurz).

- I. NAUCLEIFLORA, Wall. Maulmain Hills.

All parts villous pubescent, in drying not blackening. Corymbs villous from spreading short hairs.

Sub-genus EU-IXORA.

Flowers 4-merous.

\* Flowers in sessile or peduncled cymes or corymbs.

× Corymbs trichotomous, short peduncled or sessile, and in this case consisting of 3 or more terminal peduncled cymes. Flowers and fruits conspicuously (1–2 lines) pedicelled, as in true *Pavetta*.

+ Leaves acuminate or acute at the base, on a petiole  $\frac{1}{2}$ –1 inch long.

- I. MACROSIPHON, Kz. Tropical forests of the Andamans and Great Nicobar.  
 Exactly as preceding, but corolla-tube nearly an inch long.

- I. ROSILLA, Kz. Tropical forests of the Andamans.

Leaves pale-coloured beneath. Flowers pale-rose. Corolla-tube an inch long.

++ Leaves sessile or nearly so, the base rounded or cordate.

- I. BRUNNESCENS, Kz. Beach forests of the Andamans,  
 Tree. Corymbs on a peduncle 1–1 $\frac{1}{2}$  inch long. Katchall and Car Nicobar.

× × Cymes or corymbs short peduncled or sessile, the flowers sessile or shortly and stoutly pedicelled.

+ Flowers white or rarely pale rose-coloured (never orange or scarlet), the corolla-lobes often comparatively narrower.

° Corolla puberulous or pubescent outside.

- I. BRUNONIS, Wall. Tropical forests of the Eastern slopes of the Pegu Range.

All parts more or less pubescent. Cymes rather small, almost sessile. Leaves pubescent.

° Corolla glabrous, rarely the throat bearded.

† Flowers sessile. Corolla-tube  $\frac{1}{2}$ – $\frac{3}{4}$  inch long, the throat naked.

## I. MEMECYLIFOLIA, Kz.

Upper Tenasserim.

Shrub. Leaves sessile with a rounded or cordate base. Corymb glabrous.

The inflorescence and flowers are suspiciously like those of *I. sessiliflora*, Kz., and, despite the very different leaves, may only be a variety of it (Kurze).

## I. SESSIFLORA, Kz.

Hills East of Toung-ngoo, at 3000 to 4000 feet.

Shrub. Leaves petioled, the base acute or obtuse. Corymb glabrous.

Very near to *I. subsessilis*, Wall., but differs in the sessile flowers, calyx, etc.

## I. RUGOSULA, Wall.

Tropical forests of the Pegu Range and the Attaran.

Tree. Leaves petioled, the base acute or obtuse. Cymes puberulous.

†† Flowers shortly pedicelled. Corolla-tube  $1\frac{1}{2}$ –2 inches long, the throat bearded.

## I. BRANDISIANA, Kz.

Upper Tenasserim.

Glabrous, also the inflorescence. Leaves sessile or nearly so.

## I. COCCINEA, L.

Generally planted, but elsewhere wild.

Pau-sa-yeik.

*I. grandiflora* and *I. propinqua*, R. Br.*I. bandhuca*, Roxb.

Glabrous. Calyx-teeth acute. Corolla-lobes more or less acute.

††† Inflorescence glabrous.

## I. STRICTA, Roxb.

Tropical forests in Pegu and Upper Tenasserim.

*I. coccinea*, Curt.*I. alba*, Roxb.*I. blanda*, Ker.Glabrous. Calyx-teeth blunt. Corolla-tube  $1-1\frac{1}{4}$  inch long, the lobes orbicular.

var. *a* *Roxburghiana*. Corymbs sessile or nearly so, rarely shortly peduncled. Leaves usually almost sessile and often rounded at the base.

var. *β* *Blumeana*, Bl.; *I. amara*, Wall. Corymbs more lax on a  $1-1\frac{1}{2}$  inch peduncle, leaves usually acute at the base. Petiole 1–2 lines long. Flowers larger.

## I. (PAVETTA) GLAUCINA, Teysm. et Binn.

Upper Tenasserim.

Glabrous. 2 of the calyx-teeth acute, the 2 others blunt. Corolla-lobes acute or almost acuminate.

This differs from *I. fulgens*, Roxb., chiefly in the corolla-lobes; these are figured in Roxburgh's drawings as very acute, while Wallich's specimens of this name have them blunt. The leaves are now rather opaque, now very glossy above, and they seem to vary in shape also. *Pavetta Lobbiai*, Teysm. and Binn., is also very near to it, but really distinct in my eyes. *Pavetta Teysmanniana*, Miq., and *Pavetta macrophylla*, Teysm. and Binn., are both the same and probably not specifically different from *Ixora congesta*, Roxb. *Ixora alba* of the Botanical Gardens at Buitenzorg (not of Roxb.) appears to me to be the same as Korthals' *Pavetta calycina*, and has exactly the calyx of *I. calycina*, Thw., but otherwise the two species are entirely different. In order to avoid confusion, I suggest that the Malayan species should be called *Ixora Korthalsiana*. *Ixora juennda*, Thw., and *Pavetta Wyckii*, Hassk., appear to me conspecific (Kurze).

°° Calyx teeth  $1-1\frac{1}{2}$  line long.

## I. KORTHALSIANA, Kz.

Glabrous. Calyx-lobes erect. Flowers white.

\*\* Corymbs paniced, the panicles thyrsoid, brachiate-trichotomous.

× Panicle thyrsoid, long-peduncled, furnished at the base or above the base of the peduncle with a pair of sessile cordate or oval floral leaves.

† Corolla-throat naked, the tube 5–6 lines long.

- I. PAVETTA*) *NIGRICANS*, Miq. In swampy spots in Pegu and Tenasserim.  
*I. affinis*, Wall.

Leaves thin, turning black in drying. Panicle glabrous. Pedicels 1-2 lines long.  
 var. *a genuina*. Corolla-lobes acute.  
 var. *β erubescens*, Wall. Corolla-lobes blunt.

I do not think that varieties *a* and *β* can be retained as distinct species; both forms occur as well in Malaya as in Hindustan (Kurz).

- I. DIVERSIFOLIA*, Wall. Marshy spots in Tropical forests of Tenasserim.

Leaves membranous or chartaceous, one-coloured. Pedicels 1-2 lines long. Panicle glabrous.

- I. SPECTABILIS*, Wall. Tropical forests of Arakan and Tenasserim.  
 Leaves coriaceous, pale-coloured beneath. Flowers sessile. Panicle puberulous.

†† *Corolla-throat bearded.*

- I. BARBATA*, Roxb. The Andamans and Great Nicobar.  
 Glabrous. Corolla-tube an inch long.

× × *Panicle longer or shorter peduncled, without floral leaves.*  
 + *Style hairy. Panicle minutely puberulous.*

- I. PARVIFLORA*, Vhl. Prome district.  
*I. decipiens*, Griff.

Tree. All parts glabrous. Flowers sessile, the corolla-tube only 2-2½ lines long.

++ *Style glabrous. Panicle pubescent.*

- I. VILLOSA*, Roxb. Sources of the Khaboung stream; Pegu Range. Kondul.  
 Shrub. Leaves puberulous beneath. Corolla-tube 1-1½ inch long.

- I. CUNEIFOLIA*, Roxb. vars. *a* and *β* in Tropical forests of Pegu  
*I. oblonga*, Wall. and Tenasserim. var. *γ* in the 'Eng'  
*Pavetta Ackeringsæ*, Teysm. et Binn. forests of Martaban. var. *macrocarpa*  
 on Pulu Milu.

A glabrous shrub. Corolla-tube ½ inch long. Berries the size of a large pea.

var. *a Roxburghii*. Panicle sessile or short-peduncled. Leaves glabrous.

var. *β I. puberula*, Wall. Panicle usually longer peduncled. Leaves minutely puberulous beneath.

var. *γ pumila*. Only 1-3 feet high, simple or nearly so. Flowers often pale rose-coloured. Corymbs small and short, more slender. Leaves glabrous.

A very variable plant, of which some forms closely approach *I. villosa*. I identify Roxburgh's species from the Wallichian specimens thus named, which have pubescent inflorescences, while Roxburgh's drawings exhibit sessile glabrous corymbs. Var. *γ* may form a distinct species, but (being a laterite plant) it shows no other differences, except such reductions and modifications of growth as can be explained by the influence of the peculiar substratum on which it grows (Kurz).

- I. (PENTADIUM) HELPERI*, Kz. Tenasserim.

Flowers 5-merous. Panicle long-peduncled. Leaves glabrous, membranous.

The specimens before me are incomplete, but very much resemble the following species.

- I. LONGIFOLIA*, Don. Tropical forests of Toukyeghat.  
*I. macrophylla*, R. Br. non Bl. nec aliorum.

Leaves almost coriaceous, more or less shortly pubescent beneath.

Kurz adds from the Nicobars:

I. PAVETTA, Roxb.

Katchall.

I. KURZIANA, T. et B.

Katchall.

#### MORINDIEÆ.

*Ovary 2-4-celled, the solitary ovules attached to the middle or below the middle of the cell. Corolla calvate. Berries free or often united in a syncarp.*

\* *Berries free, not connate.*

#### GYNOCITODES, Blume.

*Calyx-limb truncate. Style 2-cleft. Ovary 4-celled. Flowers clustered, axillary. Scandent shrubs.*

G. MACROPHYLLA, Kz.

Along the coasts of the Andamans.  
Katchall and Nankowry.

\*\* *Berries united into fleshy syncarps.*

#### MORINDA, Linnaeus.

*Berries fleshy. Pyrenes appendaged. Trees or shrubs.*

Sub-genus MORINDA, L.

*Corolla-limb 5- rarely 6-lobed. Stamens as many. Erect shrubs or trees.*

\* *Stamens included in the corolla-tube.*

× *All parts more or less tomentose or pubescent.*

M. LEIANTHA, Kz.

Maulmain district.

All parts shortly and roughish pubescent. Corolla glabrous.

M. TOMENTOSA, Heyne.

Prome.

*M. multiflora*, Roxb.

All parts (also the corolla) softly and shortly tomentose.

× × *All parts (also the corolla) glabrous.*

+ *Flower-heads solitary and leaf-opposed.*

† *Flower-heads longer or shorter peduncled.*

\* M. CITRIFOLIA, L.

var. *a* planted all over Pegu and Martaban.

Nyā-gyi. Ni-pa-hsac.

var. *β* of the Andamans.

Stipules rounded or blunt. Corolla-throat hairy. Berries united into a fleshy greenish white syncarp.

var. *a genuina*. Stipules blunt. Syncarps the size of a hen's egg, or larger.

var. *β bracteata*, Roxb. Stipules often acute. Syncarps much smaller.

M. ANGUSTIFOLIA, Roxb.

Khakyen Hills and Tenasserim, often cultivated.

Stipules acute or acuminate. Corolla-tube naked. Berries purplish-black, only few developed on the thick torus.

var. *bracteata*, Roxb.

Kamorta. Katchall and Car Nicobar.

† † *Flower-heads sessile or nearly so.*

M. PERSICIFOLIA, Ham.

Ava down to Martaban. var. *β* in dry forests in Prome.

Low shrub. Quite glabrous or minutely scabrous.

var. *a genuina*. All parts quite glabrous.

var. *β scabra*. All softer parts more or less rough from a minute indistinct pubescence.

M. WALLICHII, Kz.

Tenasserim (*vide* Parish).

† † † *Flower-heads in a peduncled cyme.*

Quite glabrous. Corolla-tube only  $\frac{1}{4}$  inch long, the lobes as long.

Sub-genus *LUCINÆA*, DC.

*Corolla-limb* 4-parted. *Stamens* 4. Scandent shrubs.

\* *Calyx truncate*.

*M. TETRANDRA*, Jack.

Tenasserim.

As preceding, but leaves glossy on both sides, the net-venation prominent.

\*\* *Calyx 4-toothed. All parts glabrous.*

*M. (RENNELLIA) SPECTOSA*, Bth. et H. f.

Upper Tenasserim.

*Calyx* sulcate. Flower-heads by threes in a peduncled poor brachiate terminal cyme.

++ *Seeds free, not inclosed in distinct pyrenes.*

#### VANGUERIÆ.

*Ovary many-celled, the cells with a solitary pendulous ovule attached above the middle or near the apex of the cells. Fruit a drupe, the putamen 1 to many-celled. Albumen usually fleshy. Radicle superior.*

△ *Corolla valvate. Ovule attached laterally or below the summit of the cell.*

*VANGUERIA*, Commerson.

*Stigma* discoid. *Ovary* usually 5-celled.

+ *Unarmed.*

\* *V. EDULIS*, Vhl.

Chittagong (cultivated).

*V. Commersonii*, Desf.

All parts glabrous. *Stigma* mitre-shaped.

× × *Armed with opposite sharp spines.*

*V. SPINOSA*, Roxb.

Prome.

All parts glabrous. Berries about an inch thick.

*V. PUBESCENS*, Kz.

Ava to Pegu.

All softer parts (also the corolla) pubescent. Berries up to  $\frac{1}{2}$  inch thick.

*PLECTRONIA*, Linnaeus.

*Ovary* 2-celled, the stigma capitate, oblong or mitre-shaped. *Drupe* didymous or occasionally almost 4-celled by abortion.

\* *Pyrenes quite smooth, triangular and almost keeled.*

*P. (CANTHIUM) GLABRA*, Bl.

Tropical forests of the Pegu Range,

*Canthium recurvum*, Wall.

Tenasserim and the Andamans.

Unarmed, glabrous. Flowers in dichotomous elongate-branched cymes.

\*\* *Pyrenes more or less wrinkled and tubercled, rounded on the back.*

+ *Unarmed shrubs or trees.*

*P. (CANTHIUM) DIDYMU*M, Gacrtn.

Tenasserim.

*Canthium umbellatum*, Wight.

*C. spirostylum* and *lucidulum*, Miq.

All parts glabrous and glossy. Flowers cymose.

Two different species may really be included in the above synonymy. *Canthium oliganthum*, Miq., and *Canthium umbelligerum*, Miq., Ann. Mus. Lugd., are both referable to *Canthium lucidum*, Hook. and Arn. (Kurz).

*P. (CANTHIUM) GRACILIFES*, Kz.

Tropical forests of the Andamans.

Branchlets and nerves of leaves pubescent. Flowers on long capillary pedicels, solitary or paired. Much resembling *Vangueria Miqueliana*, but differs in the absence of spines, in its larger leaves, and in the different fruits.

× × × *Armed with opposite (rarely ternary) sharp spines.*  
 + *Branchlets more or less rusty or tawny pubescent.*

P. (CANTHIUM) PARVIFOLIA, Roxb. Chittagong and Southern Pegu.  
*C. scandens*, Bl.

Leaves pubescent on both sides, or hispid above. Drupes the size of a pea.

P. (CANTHIUM) HORRIDA, Bl. Tavoy.

Leaves glabrous, or the mid-rib beneath slightly pubescent. Drupes the size of a small cherry.

++ *All parts perfectly glabrous.*

P. (CANTHIUM) ANGUSTIFOLIA, Roxb. Chittagong Hills.  
*C. Leschenaultii*, W. A.

Leaves glossy, caudate-acuminate. Flowers clustered.

P. PARVIFLORA, Bth. et H. f. (?).

Leaves more or less blunt, glaucous beneath. Flowers in peduncled cymes.

I have found another small-leaved glabrous unarmed shrub in the swamp-forests of Pegu apparently belonging to this genus, but unfortunately without flower or fruit. In habit it somewhat resembles *P. parviflora*, Bth. and H. f.—*Gardenia parvifolia*, Wall. Cat. 8256 from Tavoy, of the habit of *Damnacanthus*, is sterile and, therefore, indeterminate (Kurz).

△ △ *Corolla imbricate. Ovule suspended from the summit of the cell.*

GUETTARDA, *Linnaeus*.

*Stigma* simple, thick. *Drupe* globose, rather large, the putamen many-celled.

G. SPECIOSA, L. Coast of Tenasserim and the Andamans. Trice and Track.

POLYPHRAGMON, *Desfontaine*.

*Stigma*s as many as ovary-cells. *Berry* 5–10-celled, the seeds pyrene-like. Anomalous genus. (*Timonius*, Rumph.)

P. (HELOSPORA) FLAVESCENS, Jack. var. β Tropical forests of South Andaman.  
 Kamorta and Car Nicobar.

var. β *macrocarpum*. Leaves larger and of thinner texture; drupes the size of a small cherry. Seeds oblong, about 2 lines long.

var. β may be distinct, but the species of *Polyphragmon* belonging to the immediate affinity of *P. flavescens* are difficult to understand (Kurz).

Grows to 30 feet in Kamorta, but is dwarfed to a shrub on the grass plains of the same island. What authors (except Miquel) take to be cells are in reality the ovules, which are attached usually in two rows to the inner angles of the 4–7 cells of which the ovary consists. The seeds have a crustacean testa. The berries of the Nicobar trees are larger and usually 6-celled, and many pertain to a distinct species (Kurz).

#### RANDIÆ.

*Ovary* 1-celled, with parietal placentas or more usually 2- or more-celled, with numerous ovules in each cell.

△ *Corolla imbricate or twisted.*

× *Ovary* 1-celled, with 4 or 5 parietal placentas (*Gardeniæ*).

GARDENIA, *Linnaeus*.

*Flowers* often conspicuous. *Stigma* entire, sulcate-twisted. *Berry* usually large, many-seeded, the seeds imbedded in pulp.

Sub-genus EU-GARDENIA.

Unarmed. *Stipules* more or less connate into a sort of sheath. *Flowers* showy, salver-shaped, the tube long. *Calyx* various.

\* *Flowers and berries sessile or nearly so.*

*G. OBTUSIFOLIA*, Roxb.

Prome to Upper Tenasserim.

*G. suavis*, Wall.

Leaves almost sessile, scabrous. Berries globular, in the forks of the branchings.

\*\* *Flowers (and berries) on short pedicels 3-5 lines long.*

*G. RESINIFERA*, Korth.

Chittagong.

*G. lucida*, Roxb.

Leaves glabrous, with a tuft of hairs in the nerve-axils beneath. Calyx-limb deeply 5-cleft. Berry oblong, terete.

var. *glutinosa*, T. et B.

Kamorta.

*G. CORONARIA*, Ham.

Chittagong, Pegu and Tenasserim.

*G. costata*, Roxb.

*G. carinata*, Griff.

Yen-khat.

Leaves glabrous. Calyx-limb laterally cleft and more or less spathaceous. Berry oblong, more or less distinctly ribbed.

Sub-genus CAMPANULARIA.

Unarmed. *Stipules* connate or almost free. *Corolla* campanulate-funnel-shaped with a ventricose-inflated tube. *Leaves* glossy.

*G. PULCHERRIMA*, Kz.

Tropical forests of the Andamans.

Tree. Leaves coriaceous, with a gland in the nerve-axils beneath. Flowers large and showy.

*G. HYGROPHILA*, Kz.

Swampy places in Pegu.

Low shrub 1-3 feet high. Leaves membranous. Flowers middling-sized, white.

Sub-genus RANDIOIDES.

*Randia*-like trees or shrubs, armed with opposite sharp spines (abortive branchlets). *Stipules* free, very deciduous. *Flowers* comparatively small.

\* *All parts (also the leaves) glabrous. Calyx-lobes herbaceous or leafy.*

*G. CAMPANULATA*, Roxb.

Tropical forests of Chittagong, Pegu and Martaban.

Leaves more or less lanceolate. Flowers pedicelled, by 2 or more clustered. Calyx about 2 lines long.

\*\* *All parts more or less pubescent, villous, or tomentose.*

× *Fertile flowers sessile, hermaphrodite-sterile ones in cymes. Calyx-lobes herbaceous or leafy. Flowers green.*

*G. SESSILIFOLIA*, Wall.

All over Burma.

Bark grey. Fertile and sterile flowers on the same plant. Berries plumply beaked, terete.

*G. ERYTHROCLADA*, Kz.

Ava, Pegu and Martaban.

Bark red. Fertile and sterile flowers usually on separate trees. Berries ribbed.

×× *All flowers fertile, or at least the fruits all conform and equally well developed. Calyx truncate or minutely toothed. Flowers white or yellow.*

*G. CUNEATA*, R. Br.

Ava.

Calyx puberulous. Berry smooth. Branches silvery white. Leaves glabrous.

*G. TURGIDA*, Roxb.

Irrawaddy Valley.

Calyx minutely pubescent. Berry roughish, glabrous. Leaves pubescent beneath.

*G. DASYCARPA*, Kz.

Prome and Martaban.

*G. tomentosa*, Wall. non. Bl.

Calyx velvety-tomentose. Berry densely brown-velvety.

× × Ovary 2-celled (*Eu-Randia*).

RANDIA, *Linnaeus*.

*Stigma* 2-lobed. *Style* thickened spindle-like. *Berry* large, the seeds imbedded in pulp. Trees or shrubs, erect.

\* *Corolla* almost rotate, large (up to nearly 1½ inch across).

R. UGINOSA, DC.

Ava. Pegu. Martaban.

Leaves glossy, glabrous. Berries large, sessile or peduncled.

This species, and most likely all true species of *Randia*, exhibits the same peculiar dimorphism of the fruit as some species of section *Randioides* of *Gardenia*. But here the peduncled fruits differ only in size, while they produce perfect seeds (Kurz).

\*\* *Corolla* salver-shaped, rather small (about 4 lines in diameter or less).

R. LONGISPINA, DC.

Tropical forests of Pegu Range, Southern Slopes.

Calyx glabrous or nearly so. Berries glabrous or sprinkled with minute hairs.

R. NUTANS, DC.

Pegu and Martaban.

More or less shortly puberulous. Calyx densely pubescent or almost villous. Berries tawny-velvety.

The following are doubtful species :

R. EXALTATA, Griff.

Mergui, with Mangroves.

R. POLYSPERMA, Roxb.

Chittagong.

No *Randia*, but indeterminable for the present (Kurz).

The mucus of some species of *Randia* (*R. dumetorum*) is an excellent substitute for *Ipecacuanha*, and Dr. Moodeen Sheriff<sup>1</sup> gives the following directions for preparing it for use :

"After breaking and removing the shell, the seeds and mucus will be found as a hard lump, and the two latter cannot be separated from each other, except by dissolving in water, or powdering and passing through a sieve. The lump of two or three nuts is generally a dose of the medicine as an emetic. They should be bruised, macerated for ten or fifteen minutes in two or three ounces of water, rubbed with the fingers, and then strained through cloth. The mucus being very soluble in water, passes off with it, and the numerous and extremely hard seeds, of a reddish-brown colour, with some resinous and other insoluble matter, remain on the cloth. The draught is now ready for use; given to a patient it produces nausea and vomiting in about ten minutes, and very free emesis is produced if assisted with warm water. The whole of this draught, or half of it, with 30 or 40 minims of tincture of opium, is to be given in dysentery, three or four times in 24 hours, according to the emergency of the symptoms.

"The best and most convenient way of using this medicine is in powder, which is prepared as follows: the lumps of seeds should be well bruised, and passed through an ordinary sieve, or thin cloth. By this means all the seeds will be separated. The coarse powder thus obtained should be powdered again and sifted through a fine sieve or very fine cloth. The powder is now fit for use, and should be kept in a stoppered bottle." In doses of 40 to 50 grains this is said to be fully equal to *Ipecacuanha*. Dr. Moodeen Sheriff adds the following prescription for use in dysentery.

R. Pulpæ Randiæ dumetorum . . . . .	gr. xxx to lx
Tinet Opii . . . . .	m. xxx to lx
Aquæ . . . . .	℥i-ii.

Mix and give three or four times in the 24 hours according to symptoms. Or this pill :

R. Pulpæ Randiæ dumetorum . . . . .	gr. x. to xx
Opii . . . . .	gr. i. to ii.

Make into a pill and give every three, four or six hours, as the case may require.

<sup>1</sup> Madras Monthly Journal of Medical Science, 1870, p. 119.

## WEBERA, Schreber.

*Stigma* simple. *Style* not thickened, filiform. *Berries* small, not pulpy. Erect trees or shrubs, unarmed.

\* *Cymes terminal or in the forks of the branchings.*

W. GLOMERIFLORA, Kz. Pegu Range. Sources of the Toung-nyo stream.  
Glabrous. Inflorescence grey pubescent. Unarmed evergreen tree.

\*\* *Cymes or corymbs leaf-opposed.*

W. OPPOSITIFOLIA, Roxb. Chittagong. Pegu. Tenasserim, the  
W. densiflora, Wall. Andamans and Katchall.  
Gynopachys axilliflorus, Miq.

All parts glabrous. Cymes puberulous. Unarmed evergreen tree.

var. *a genuina*. Calyx 2 lines long or somewhat longer, the limb more bell-shaped, almost glabrous. Flowers in shorter cymes. Berries the size of a large pea.

? var. *β floribunda*. Calyx about  $1\frac{1}{2}$  lines long or shorter, densely pubescent, the limb shorter. Flowers in densely pubescent slender divaricate corymbs. Berries half the size.

Sub-genus GRIFFITHIA, W. A.

*Stigma* 2-lobed. Shrubs, often scandent, armed with straight or recurved spines.

\* *Spines recurved. Scandent shrubs.*

× *Inflorescence quite glabrous.*

W. (RANDIA) LONGIFLORA, Lamk. Tropical forests of Chittagong,  
Griffithia fragrans, Miq. Tenasserim, and the Andamans.

Corolla-tube  $\frac{3}{4}$ – $1\frac{1}{4}$  inch long.

This, as other species of *Griffithia*, has the cymes not strictly axillary, but arising from the end of, or laterally from, the transformed spine-like branchlets (Kurz).

W. (GRIFFITHIA) SIAMENSIS, Miq. Upper Tenasserim.

Corolla-tube hardly longer than the calyx (2 lines long).

× × *Inflorescence and calyx appressed-pubescent.*

W. (STYLOCORYNE) BISPINOSA, Griff. Tropical forests of Pegu Range,  
Eastern slopes, and Tenasserim.

Corolla-tube about 3 lines long.

W. (RANDIA) FASCICULATA, DC. Maulmain (fide Parish).

P. rigida, Wall.

\*\* *Spines straight. Erect or straggling shrubs.*

W. FASCICULATA.

Flowers sessile or almost sessile between 2 connate bractlets.

W. (GARDENIA) MYRTIFOLIA, Wall. Swampy forests of Pegu and Tenasserim.

Flowers solitary, on a slender bractless pedicel.

Kurz adds:

W. (GRIFFITHIA) CURVATA, Kz. Kamorta and Katchall.

DIPLOPOBA, De Candolle.

*Style* 2-cleft. *Berries* rather large, not pulpy. *Seeds* in 2 rows in each cell. Erect trees or shrubs, unarmed.

D. SINGULARIS, Korth. Tropical forests of the Pegu Range, Eastern

Discospermum sphaerocarpum, Dalz. slopes. Tenasserim and the Andamans.

HYPOBATHRUM, *Blume*.

*Styles* 2-lobed. *Berry* small, stalked or sessile, not pulpy. *Seeds* in a single row in each cell. Erect shrubs or trees.

Sub-genus PETUNGA, DC.

*Flowers* 5-merous; the calyx-limb persistent. *Berry* contracted into a longer or shorter stalk (the elongating pedicel).

H. (RANDIA) RACEMOSUM, Roxb.

Marshy forests of Pegu and Martaban.

*Petunga variabilis*, Hassk.

Katchall and Great Nicobar.

Glabrous. Flowers in axillary spikes.

Sub-genus HYPTIANATHERA, W. A.

*Flowers* 5- rarely 4-merous, the calyx-limb persistent. *Berry* sessile.

H. (RANDIA) STRICTA, Roxb.

Chittagong. Blamo.

Glabrous. Flowers in axillary clusters.

BRACHYTOME, *Hooker, f.*

*Flowers* polygamously diceious. *Corolla* funnel-shaped, glabrous. *Style* shortly 2-lobed. *Berry* small, not pulpy. *Seeds* very numerous. Erect shrubs.

B. WALLICHII, H. f.

Khakyen Hills. Ava.

Inflorescence, flowers, and berries very like those of *Saprosma ternatum*, but the last are many-seeded (Kurz).

MORINDOPSIS, *Hooker, f.*

*Flowers* diceious, in peduncled heads. *Calyx-limb* cupular or 4-toothed. *Corolla-throat* villous. *Style* hirsute. *Berry* elongate, cylindrical, the numerous seeds imbricately pendulous, almost appendaged. Trees.

M. (PSILOBIUM) CAPILLARIS, Kz.

Swampy forests of Pegu and Tenasserim.

\* *Corolla* valvate.

× *Ovary* 2-celled, the *placenta* 2-clft. *Corolla* reduplicate-valvate (*Mussaendia*).

MUSSENDIA, *Linnaeus*.

The one or other calyx-lobe of the outer flowers extended into a discoloured leaf. Connective not mucronate. *Style-branches* 2.

\* *Calyx-limb* deciduous, leaving an angular scar at the top of the berry.

× *Calyx-teeth*  $\frac{1}{2}$ -1 line long.

M. GLABRA, Vhl.

Hills East of Toung-ngoo at 3000 to 4000 feet.

*Calyx-teeth* erect, lanceolate. Branchlets puberulous or velvety.

var. *a genuina*. More glabrous, especially the leaves and branches.

var.  $\beta$  *Wallichii*, Don. Leaves pubescent beneath and along the nerves above, petioles shorter.

M. VARIOLOSA, Wall.

Arakan, Pegu and Tenasserim, more common south of Maulmain.

*Calyx-teeth* as in preceding, but reflexed. Branchlets hirsute.

*M. parva*, Wall., from Tavoy, possibly belongs here, but the only specimen seen by me is not sufficient for a correct identification.

M. JELINEKII, Kz.

Great Nicobar.

*Calyx-teeth*  $\frac{1}{3}$  line long.

Allied to *M. longifolia*.

× × *Calyx-lobes* 2-4 lines long.

M. PAVETTEFOLIA, Kz.

Tropical forests East of Toung-ngoo.

*Calyx-lobes* filiform, 2-2 $\frac{1}{2}$  lines long, all conform and none expanded leaf-like.

*M. MACROPHYLLA*, Wall. non Schum. Tropical forests of the Andamans, Kamorta and Nankowry.

Calyx-lobes linear, 2-3 lines long. Corolla-lobes nearly half as long as the corolla-tube.

*M. CALYCINA*, Wall. Ava and Pegu.

Calyx-lobes lanceolate, about  $\frac{1}{2}$  inch long. Corolla-lobes about  $\frac{1}{4}$  as long as the corolla-tube.

\*\* *Calyx-limb persistent, crowning the berry.*

*M. CORYMBOSA*, Roxb. Valley of the Koladyne and Upper Tenasserim.

Calyx-teeth linear-subulate, about 4 lines long. Corymbs rather compact.

*M. WALLICHII*, G. Don. (M.).

#### ACRANTHERA, *Arnott.*

*Calyx-teeth* all conform, not appendaged. Connective mucronate-produced. *Stigma* clavate.

*A. (MUSSENDA) UNIFLORA*, Wall. Maulmain and Tavoy.

× × *Ovary usually 5-6- (rarely 2-3-)celled, the placentas simple (Urophyllice).*

#### ADENOSACME, *Wallich.*

*Calyx* 5-4-cleft. *Corolla-throat* naked. *Ovary* 5-3-celled. *Cymes* or corymbs terminal or nearly so, rarely lateral.

*A. LONGIFOLIA*, Wall. Pegu Range and more frequent in Tenasserim up to 3000 feet. Great Nicobar.

In the tropical forests of the valleys of the Nāt-toung hills (Martaban) grows another species, apparently new, which has very short thick petioles and the uppermost leaves almost sessile; but the specimens are too bad for description (Kurz).

#### MYRIONEURON, *R. Brown.*

As preceding, but ovary 2-celled.

*M. NITANS*, R. Br. Chittagong.

Glabrous. Cymes compact and head-like, densely bracted, nodding. Bracts subulate, rigid.

*M. HIRSETUM*, Kz. Hills East of Bhamo.

Branches hirsute. Cymes corymb-like, trichotomous, hirsute, erect. Bracts broad, membranous, hirsute.

#### UROPHYLLUM, *Jack.*

*Calyx* entire or minutely toothed. *Corolla-throat* bearded. *Flowers* clustered or cymose, axillary.

\* *Ovary and berry 5-6-celled. Flowers in simple or decomposed umbels or cymes.*

*U. GLABRUM*, Wall. Mergui.

Leaves and shoots glabrous. Calyx about 2 lines across.

*U. STRIGOSUM*, Korth. Tenasserim (or Andamans?).

Leaves beneath and shoots more or less pubescent. Calyx a line across.

\*\* *Ovary and berry 2-celled. Flowers in sessile clusters.*

*U. BILOCLARE*, Kz. Tropical forests East of Toung-ngoo.

All parts glabrous. Flowers minute.

*\*\* Stipules transformed into leaves and forming whorls, or rarely the leaves opposite and the stipules wanting.*

#### STELLATE.

*Calyx entirely adnate to the calyx or the calyx-limb 4-6-cleft. Corolla valvate. Ovary 2-celled, the ovules solitary, erect or ascending. Drupe indehiscent, often didymous.*

#### RUBIA, *Linnaeus*.

*Flowers 5-merous. Drupe sappy. Erect or twining herbs.*

*R. CORDIFOLIA*, L.

var.  $\beta$  Ava, or Taong-doung.

*R. munjista*, Roxb.

*R. scandens*, Zoll. et Mor.

*R. purpurea*, Dene.

Leaves more or less cordate-ovate, long-petioled, 3-5-nerved.

var. *a genuina*. Leaves various, more or less scabrous on the upper side and on the margins and on the nerves beneath, but not pubescent.

var. *affinis*, Wall. Leaves scabrous above, softly but shortly pubescent beneath.

*R. ANGUSTISSIMA*, Wall.

Ava or Taong-doung.

*R. charaefolia*, Wall.

Leaves narrow-linear, sessile, 1-nerved.

#### GALIUM, *Linnaeus*.

*Flowers 4-merous. Drupe didymous or globose, dry. Herbs or under shrubs.*

*G. ASPERIFOLIUM*, Wall. Khakyen Hills and Nät-toung in Martaban at 7000 feet.

A large Order of great importance, including tonics, febrifuges, emetics, purgatives, poisons, and valuable dyes. Cinchona as a febrifuge is already too well known to require special notice, and thrives well in the Karen Hills east of Toung-ngoo, where it is cultivated by the Forest Department. As substitutes for Peruvian bark may be mentioned *Rondeletia febrifuga*, *Hymenodictyon*, *Ophiorrhiza mungos*, and others. Gambier is the product of *Uncaria gambir*. Ipecacuanha (*Cephaelis ipecacuanha*) is now cultivated in Burma, and similar, although inferior properties obtain in *Richardsonia*, some species of *Spermacoce*, and the indigenous *Geophila reniformis*. The powdered fruit of *Randia dumetorum* is a powerful emetic, and its root bruised is used for poisoning fish. The root bark of the Brazilian *Chiococca angui-fuga* and *Ch. densifolia* produces the most violent emetic and drastic effects. Only a few species yield edible fruits, as *Fouquieria edulis*, which is now introduced into India. Coffee is the produce of *Coffea Arabica*, and thrives well in Burma, but is unfit for cultivation on a large scale unless it be in the southern parts of Tenasserim. Madder-dye is obtained from *Rubia cordifolia* and *Hedyotis umbellulata*, and a very inferior dye, but one much used in Burma and India, is the product of various species of *Morinda*. The timber of most rubiaceous trees is rather inferior, and the best is that derived from *Nuclea* and allied genera.

#### Order CAPRIFOLIACEÆ.

*Flowers* regular or almost irregular. *Calyx-tube* adnate to the ovary, the limb truncate or 4-5 or more lobed or toothed. *Corolla* gamopetalous, tubular, funnel-shaped, or rotate, inserted round the epigynous fleshy disk, 4- or 5- rarely 3-lobed, imbricate. *Stamens* as many as corolla-lobes and alternating with them, inserted in the tube. *Anthers* versatile, the cells parallel, opening longitudinally. *Ovary* inferior, 2-5- rarely 1-celled, with 1 or more pendulous ovules in each cell. *Stigmas* as many as ovary-cells, united into one, sessile, or on a filiform simple style. *Fruit* an indehiscent berry, or rarely a dry dehiscent capsule, nude or crowned by the calyx-limb, 1-5-celled. *Seeds* solitary, or several in each cell, the testa crustaceous or bony, rarely membranous. *Albumen* fleshy. *Embryo* axial, radicle superior, cotyledons oval or oblong. Trees or shrubs, sometimes climbing, rarely herbs, with

opposite, simple or pinnate leaves. *Stipules* usually none. *Flowers* small or middling-sized, variously arranged, but usually cymose.

The Elder (*Sambucus nigra*) and the Honeysuckle (*Lonicera caprifolium*) belong to this Order. The flowers of most exhale a sweet odour, especially after sunset.

All Burmese species are woody plants.

#### SAMBUCIÆ.

*Corolla* rotate or shortly tubular. *Stigmas* 3, sessile or on a very short style. *Raphe* introrse or lateral.

#### VIBURNUM, *Linnaeus*.

*Ovary* 1- rarely 2- or 3-celled. *Berry* 1-celled and 1-seeded. *Leaves* simple.

V. FETIDUM, Wall.

var. *a* Ava, Taong-doung.

Leaves more or less stellately pubescent beneath. *Corymbs* terminal.

var. *β* *premnacea*, Wall. *Corymb* involucred by 3 or 4 small leaves.

var. *γ* *Griffithianum*. All parts more robust and more densely stellate-pubescent. Leaves about 4 inches long, acuminate, 6-7-nerved on each side, the lower nerves not meeting at the base (in var. *a* and *β* the leaves are trinerved at the base and, besides, have only 2-3 lateral nerves on each side). Most probably a good species (Kurz).

V. COLEBROOKEANUM, Wall.

Khakyen Hills.

Leaves glabrous. *Corymbs* usually on axillary short branchlets. Berries about 2 lines long, broadly ovate.

#### SAMBUCUS, *Linnaeus*.

*Ovary* 3-5-celled. *Berry* with 3 to 5 pyrenes. *Leaves* unpaired, pinnate or pinnatisect.

S. THUNBERGIANA, Bl.

Khakyen Hills.

#### LONICERIÆ.

*Corolla-tube* more or less elongate. *Style* filiform. *Raphe* extrorse.

#### LONICERA, *Linnaeus*.

*Corolla* tubular. *Ovary* and *berry* 2-3-celled, or the berry 1-celled by absorption of the septa.

L. LEIANTHA, Kz.

Khakyen Hills.

\* L. JAPONICA, Thunb. (M.).

#### SEMPHICHOXA, *Gaertner*.

*Corolla* tubular-funnel-shaped, regular. *Ovary* 2-celled, with a parietal 2-ovuled placenta protruding into the cells so as to form a spuriously 4-celled ovary. *Fruit* a drupe.

S. HYDROPHYLLACEA, Gaertn.

Andamans, in mangrove swamps.

*Epithinia Malayana*, Jack.

Kamorta.

"This genus is generally ascribed to *Rubiaceæ*; but the structure of the ovary and the position of the ovules are tell-tale marks of its Caprifoliaceous descent" (Kurz).

### Division III. POLYPETALOUS.

*Flowers* with both a *Calyx* and a *Corolla*, the latter of separate *Petals*.

#### Series I. CALYCIFLORE.

*Sepals* connate, rarely free, often adnate to the ovary. *Petals* uni-seriate, perigynous or epigynous. *Disk* adnate to the base of the calyx, rarely tumid or raised into a torus, or gynophore. *Stamens* perigynous, usually inserted on or beneath the outer margin of the disk. *Ovary* frequently inferior.

## UMBELLALES.

*Flowers* regular, usually hermaphrodite. *Stamens* usually definite. *Ovary* inferior, 1-, 2-, or many-celled. *Ovules* solitary, pendulous in each cell from its top. *Styles* free or connate at the base. *Ovules* with the coats confluent with the nucleus. *Seeds* albuminous. *Embryo* usually minute.

## Order CORNACEÆ.

*Flowers* unisexual or hermaphrodite, regular. *Calyx-tube* adnate to the ovary, the limb forming a raised border, persistent, truncate, or with as many teeth as petals. *Petals* 4 or 5, rarely more, (imbricate or) valvate, inserted round an epigynous disk or on the calyx-border, rarely wanting. *Stamens* as many or rarely 2-4 times as many as petals, and inserted with them. *Filaments* filiform or complanate. *Anthers* with parallel cells, opening longitudinally. *Disk* epigynous or central, variously shaped. *Ovary* inferior, 1-4-celled, with 1, or rarely 2, anatropous pendulous ovules in each cell. *Style* simple, with a terminal entire or rarely lobed or 2-3-cleft stigma. *Fruit* an indehiscent drupe, with a 1-4-celled stone, or rarely 2 bony or crustaceous pyrenes. *Seeds* pendulous. *Albumen* fleshy. *Embryo* straight, nearly as long as the albumen, the radicle superior, and shorter than the flat usually leafy cotyledons. Trees or shrubs, rarely herbs, with opposite or rarely alternate, simple or slightly-lobed leaves. *Stipules* none. *Flowers* usually small in axillary or terminal heads, cymes, or corymbose panicles.

The Burmese species are all woody plants.

## CORNIEÆ.

*Flowers* hermaphrodite.

\* *Petals* narrow-linear, valvate. *Anthers* basifixed. *Style* elongate. *Leaves* alternate.

## ALANGIUM, Lamarck.

*Stamens* usually 2 to 4 times the number of the petals. *Ovary* 1-celled. *Albumen* ruminant. *Flowers* clustered or fascicled.

A. DECAPETALUM, Lamk.

Burma (*vide* Mason).

*A. hexapetalum* and *tomentosum*, Lamk.

*A. Lamarckii*, Bedd.

A tree, spiny-armed. Petioles 6-8 lines long. Petals 10-6. Filaments densely pilose at the base. Bracts and bractlets broadly ovate, very deciduous.

The above synonymy probably includes two different species. I suspect that Thwaites' *A. Lamarckii* is a climber. The calyx-tube is apparently sulcate-ribbed (Kurz).

A. SCUDANUM, Miq. Katchall. var.  $\beta$  Tropical forests of the Andamans.

A large climber, unarmed. Petioles shorter. Petals 6. Filaments sparingly pilose at the base. Bracts and bractlets linear-oblong, longer persistent.

var.  $\alpha$ . Flowers on pedicels  $\frac{1}{2}$  to  $\frac{2}{3}$  inch long.

var.  $\beta$ . Pedicels only 2-3 lines long.

## MARLEA, Roxburgh.

*Stamens* as many as petals. *Ovary* 1-3-celled. *Albumen* homogeneous. *Flowers* cymose-panicled.

M. BEGONIEFOLIA, Roxb. Tropical forests East of Toung-ngoo and Bhamo Hills.  
*Styrum Javanicum*, Bl.

Petals about  $\frac{1}{2}$  an inch long or shorter. Anthers with a glabrous connective. Leaves glabrous.

M. TOMENTOSA, Endl. Tropical forests of Tenasserim (Thoung-yeen).

*Diacarpium rotundifolium*, Hassk.

\*\* *Petals short, valvate. Anthers dorsifixed. Style short.*

CORNUS, *Linnaeus*.

*Petals 4. Ovary 2-celled, with a simple stigma. Leaves usually opposite.*

C. OBLONGA, Wall. Hills East of Toung-ngoo at 4000 to 7000 feet.

#### Order ARALIACEÆ.

*Flowers* hermaphrodite or polygamous, regular. *Calyx-limb* forming a slightly raised line or short cup round the summit, truncate or toothed, or quite inconspicuous. *Petals 5* or more, rarely 4, valvate, shortly inflexed at the tip, and often cohering (very rarely blunt and imbricate). *Stamens* as many as petals or sometimes more. *Anthers* versatile, the cells parallel and opening longitudinally. *Ovary* inferior, 2- or more celled, rarely by abortion 1-celled, with a single anatropous ovule in each cell, suspended from the summit. *Styles* as many as cells, either distinct with small terminal stigmas, or united in a cone, or more or less reduced to a slight protuberance with inconspicuous stigmas. *Fruit* more or less drupaceous and indehiscent, the epicarp succulent, rarely almost dry and thin. *Seeds* solitary, pendulous, inclosed in pyrenes. *Albumen* homogeneous or ruminant. *Embryo* minute, near the apex, with a superior radicle. Trees, often palm-like, shrubs or climbers, with alternate compound or rarely simple leaves. *Stipules* none. *Flowers* small, in umbels or heads often collected into panicles.

This Order contains few species of economic value. It comprises, however, the famous Ginseng (*Panax ginseng*) so extravagantly esteemed in China, Japan, and other parts of the East for its restorative qualities. The substance known as rice-paper is the pith of *Fatsia papyrifera*, cut into thin slices. The only other noteworthy plant is the Ivy (*Hedera helix*).

#### ARALIEÆ.

*Petals more or less imbricate, broad at the base.*

ARALIA, *Linnaeus*.

*Gynacium 2-5-merous. Styles free. Fruit angular in a dried state. Pedicels jointed. Leaves usually pinnate or decompound.*

A. (PANAX) ARMATA, Wall.

Tavoy.

#### HEDERIEÆ.

*Petals valvate in bud.*

\* *Stamens as many as petals.*

× *Albumen homogeneous (Panacivæ).*

+ *Ovary 2- (rarely 1-, 3-, or 4-) celled, the cells usually fewer than the petals.*

† *Styles distinct from the base or from a conical base.*

PANAX, *Linnaeus*.

*Fruits* laterally compressed or didymous, rarely 3-4-angular. *Filaments* filiform. *Styles* distinct, at length recurved, the stigmas more or less decurrent on the inner side. *Umbels, heads or racemes* forming compound inflorescences, rarely simple. *Leaves* various.

\* P. FRUTICOSUM, L.

Cultivated in Pegu.

†† *Styles united into a cone or column.*

BRASSAIOPSIS, *Douc. et Planch.*

*Flowers 5-merous. Fruits terete. Ovary 2-1-celled. Pedicels not jointed. Umbels* forming large terminal racemes. *Leaves* palmatifid, rarely digitate.

B. (PANAX) PALMATA, Roxb.

Chittagong and the Andamans.

++ Ovary 5- or more (rarely by abortion 3-4-)celled.

HEPTAPLEURUM, Gaertner.

Flowers 5-6- (rarely 4- or 7-8-)merous. Drupes angled and ribbed in a dried state. Umbels, heads, or racemes forming large compound inflorescences. Pedicels not jointed. Stigmas immersed on the ovary, dot-like.

H. (PARATROPIA) VENULOSA, W. A.

All over Burma and the Andamans.

*Arulia digitata*, Roxb.

Ba-loo-let-wa (Mason).

Climber. Leaves and inflorescence glabrous.

H. ELLIPTICUM, Seem.

Kamorta, Katchall and Great Nicobar.

Sub-genus AGALMA, Miq.

Styles united into an elongate column.

H. (AGALMA) GLAUCUM, Seem.

Hills East of Toung-ngoo at 6000 feet.

Leaflets on thick rather short petiolules, entire.

H. HYPOLEUCUM, Kz.

Hills East of Toung-ngoo at over 6000 feet and the Khakyen Hills.

Leaflets on very long, slender petiolules, usually pinnati-lobed.

TREVESIA, Visconti.

Flowers 8-12-merous. Drupes globular, sulcate or ribbed. Umbels paniced. Leaves palmatifid, digitate or pinnate. Pedicels not jointed.

T. (GASTONIA) PALMATA, Roxb.

Tropical forests all over Burma up to 4000 feet.

*T. Burmanica*, T. And.

The leaves in this species vary very much in cut, the base of the lobes being often abruptly reduced to the midrib only.

× × Albumen ruminat (*Hedericæ*).

+ Ovary 1-celled.

ARTHOPHYLLUM, Blume.

Pedicels not jointed. Umbels compound. Leaves pinnate or simple.

A. JAVANICUM, Bl.

Tropical forests of Western coast of South Andaman and Kamorta.

*A. ellipticum*, Bl.

*A. Blumeianum*, Zoll. et Mor.

A palm-like tree up to 30 feet high.

++ Ovary 2- or rarely 3-celled.

† Pedicels not jointed with the calyx.

HETEROPANAX, Seem.

Styles distinct, filiform. Umbels racemose, in panicles. Leaves pinnately decompound.

H. (PANAX) FRAGRANS, Roxb.

Chittagong, Ava, and Pegu up to 3000 feet.

†† Pedicels jointed under the calyx.

MACROPANAX, Miquel.

Styles united into a cone or column. Umbels or heads forming panicles. Leaves digitate.

M. OREOPHYLLUM, Miq.

Khakyen Hills and Bhamo at 4000 feet.

\*\* Stamens numerous, and more numerous than the petals. Styles none or connate. Petals valvate or firmly cohering (*Pleurandricæ*).

*TUPIDANTHUS*, *Hooker, f. et Thomson.*

*Petals* firmly cohering into a thick mitre. *Gynæcium* poly- (up to 100-)merous. *Leaves* digitate.

*T. CALYPTRATUS*, H. f. et Th.

Arakan Hills (*vide* Theobald).

Order UMBELLIFERÆ.

*Corolla* polypetalous, epigynous, isostemonous, valvate in bud. *Petals* 5, inserted on an epigynous disk. *Stamens* 5, alternate with the petals. *Ovary* inferior, of two 1-ovuled cells. *Orules* pendulous, anatropous. *Fruit* dry. *Embryo* albuminous apical; radicle superior. *Leaves* alternate.

\* *Umbels* simple or irregularly (very rarely regularly) compound. *No rittle in the furrows of the mericarp.*

HYDROCOTYLIEÆ.

*Fruits* laterally compressed, the mericarps rounded or acute on the back (not sharply angular).

HYDROCOTYLE, *Linnaeus.*

*Fruits* much compressed. *Calyx-teeth* minute or obsolete. *Petals* concave, valvate or imbricate. *Umbels* simple. Creeping herbs with simple leaves.

\* *Leaves* entire or crenate. *Umbels* bracted.

*H. ASIATICA*, L.

In grass lands and cultivation all over Pegu up to 2500 feet. Introduced into the Andamans.

*H. CORDIFOLIA*, H. f.

Flowers by 3—4 in the head, sessile. Fruits nearly 2 lines in diameter, each mericarp with 2 hardly prominent ribs.

\*\* *Leaves* more or less lobed, the lobes acute or blunt, crenate or serrate. *Umbels* without bracts.

× *Peduncles* and *petioles* more or less puberulous.

*H. JAVANICA*, Thunb.

In betel gardens on the hills east of Toung-ngoo at 3000—4000 feet.

*H. Nepalensis*, Hook.

*H. polycephala*, W. A.

Flowers numerous, almost sessile or very shortly pedicelled, forming rather crowded terminal head-like umbels, the lower ones solitary and axillary.

× × *All parts* quite glabrous.

*H. BIRMANICA*, Kz.

Upper Tenasserim. Thong-yeen at 5000 (*vide* Parish).

Flowers on slender pedicels, forming slender solitary umbels in the axils of the leaves.

SANICULIEÆ.

*Mericarps* almost terete or laterally compressed, the commissure broad. *Calyx-teeth* or lobes usually conspicuous.

SANICULA, *Linnaeus.*

*Mericarps* ciliate from bristles which are often hooked. *Flowers* pedicelled, polygamous. *Bracts* small. *Umbels* very small, usually panicle. *Leaves* dissected, toothed.

*S. EUROPEA*, L.

Khakyen Hills.

*S. montana*, Rein.

*S. Javanica*, Bl.

*S. lata*, Ham.

\*\* *Umbels regularly compound.*

× *Primary ribs of the mericarp more or less conspicuous, secondary ones none. Vitta in the furrows usually conspicuous or obscure, very rarely none.*

AMMINEE.

*Fruits laterally compressed, or narrowed or sulcate on both sides of the commissure.*

\* *Seeds with a convex or almost flat face.*

× *Leaves simple. Flowers yellow.*

BUTLEURUM, *Linnaeus.*

*Umbels compound or rarely the flowers in heads. Calyx-teeth obsolete. Disk-lobes almost flat. Leaves entire, flat.*

B. TENUE, Don.

Nāt-toung and Hills East of Toung-ngoo at 7000 feet.

× × *Leaves variously compound. Flowers usually white, rarely yellow.*

APIUM, *Linnaeus.*

*Carpophore simple or 2-cleft at the apex. Fruit didymous or ovate, the mericarps almost straight. Petals entire, blunt or acute.*

\* A. GRAVEOLENS, L.

Cultivated in Prome and Ava.

CARUM, *Linnaeus.*

*Carpophore 2-cleft or 2-parted. Fruit ovate or oblong, the ribs rather prominent. Involucral bracts few and small, or none. Petals notched or 2-lobed. Calyx-teeth obsolete or slightly prominent. Disk-lobes conical, or the disk convex.*

\* *Fruits glabrous.*

\* C. PETROSELINUM, Bth. et H. f.

Cultivated in the drier districts.

Flowers yellowish or greenish yellow.

\*\* *Fruits hirsute or puberulous. Flowers white.*

\* C. ROXBURGHIANUM, Bth. et H. f.

var. *α* cultivated all over the country up to 2000 feet. var. *β* near Prome and the Pegu Range.

Leaves ternati-sect, lobes of the segments oblong-linear.

var. *α genuina.* All parts minutely puberulous. Fruits greyish hirsute.

var. *β glabriuscula.* All parts less puberulous or almost glabrous. Fruits slightly puberulous.

*Carum Curri*, L., Sa-mwöt, and *C. Copticum*, Bth. et H. f. (*Ptychotis Ajowan*, DC.), are enumerated by the Rev. F. Mason in his list of Burmese plants as introduced.

PIMPINELLA, *Linnaeus.*

*Carpophore 2-cleft or 2-parted. Ribs of the mericarps narrow, the vittae numerous, conspicuous or very thin. Involucral bracts few and small, or none, very rarely numerous. Petals white or yellow. Disk-lobes thick, cushion-like or conical. Calyx-teeth obsolete or very rarely small.*

P. HEYNEANA, DC.

Pegu Range.

*Anethum trifoliatum*, Roxb.

Slender almost glabrous annual. Peduncles filiform. Umbels without bracts.

P. PARISHIANA, Kz.

On Zwakabin Hill (*vide* Parish).

Robust pubescent herb. Peduncles stout. Involucral bracts linear,  $\frac{1}{2}$ — $\frac{3}{4}$  as long as the peduncles. Habit of *P. diversifolia*.

\* P. (APIUM) INVOLUCRATA, Roxb. (M.).

Cultivated.

Sa-mung-sa-bā.

Kurz does not include this species in his list, though it is cultivated in Burma and used both for culinary and medicinal purposes.

## SESELINIEÆ.

*Fruits transversely terete or compressed from the back, the commissure broad, the lateral ribs distinct, or united to the nerve-like or thickened undilated margin.*

\* *Fruit transversely sub-terete or more or less compressed from the back, the primary ribs not winged.*

× *Primary ribs of the mericarps almost equal, not winged.*

## FENICULUM, Adanson.

*Fruits not beaked, the primary ribs thin or thick, but not corky, the secondary ones wanting. Calyx-teeth obsolete. Petals entire, yellow.*

\* F. (ANETHUM) VULGARE, L.

Cultivated in Prome.

× × *Lateral ribs of the mericarps not winged, confluent with the thick, often corky margin, entire after the dehiscence. Vitta solitary in the furrows.*

## QEXANTHE, Linnæus.

*Petals notched or 2-lobed. Carpophore absent. All ribs of the mericarps very blunt and almost corky. Leaves usually pinnate or dissected. Umbels compound.*

Q. STOLONIFERA, DC.

Swampy spots in Pegu.

Leaves pinnate (rarely bipinnate). Umbels on very long peduncles.

\*\* *Fruits compressed from the back or almost terete, all the primary ribs, or only the keeled ones, more or less expanded into thick wings, the wings equal, or the lateral ones broader.*

## SELINUM, Linnæus.

*Fruits ovate, somewhat compressed from the back, the ribs equally winged or the lateral ones broader. Disk-lobes conical or depressed. Flowers white or yellowish-green.*

A species apparently of this genus is not unfrequent on the hill-pastures of the Martaban Hills East of Toung-ngoo, above 6000 feet elevation, but the plants were too much dried up to permit of identification (Kurz).

## PEUCEDANIEÆ.

*Fruit much compressed from the back, the lateral ribs dilated into wing-like or broadly swollen margins, remaining entire after the dehiscence.*

## PEUCEDANUM, Linnæus.

*Mericarps more or less convex on the middle (rarely nearly flat), the margins rather thick and sharp, or broadly winged. Vitta solitary in the furrows and conspicuous, or rarely by 2-3 and obsolete, reaching the base of the fruit or sometimes shorter.*

P. (ANETHUM) SOWA, Roxb.

Cultivated up to 2000 feet.

Sa-myek.

Glabrous, glaucous. Leaves pinnately decomposed, the lobes filiform.

P. (PASTINACA) SATIVA, L.

Cultivated.

*P. pastinaca*, Bth. et H. f.

Leaves pinnate, the leaflets puberulous beneath, broadly oblong, serrate, often lobed.

## HIRACLEUM, Linnæus.

*Petals often radiate. Mericarps flat-compressed or hardly convex at the middle,*

the margins wing-like. *Vittæ* solitary or rarely by twos in the furrows, often clavate, reaching the base of the fruit or more usually shorter.

## II. BIRMANICUM, Kz.

Pegu Range at 2500 to 3000 feet.

This plant forms a very conspicuous feature on the ridges referred to, but, unfortunately, all the specimens were so perfectly dried-up and withered that it was impossible to give a full description of the species. It is nearest to *Heracleum*, No. 5, of H. f. and Th. collection from the Khasi Hills, and eventually may be referable to it (Kurz).

× × *Secondary ribs of the mericarps filiform, somewhat prominent or winged, rarely all the ribs more or less inconspicuous. Vittæ in the furrows or below the secondary ribs conspicuous or obsolete.*

## CAUCALINIEÆ.

*Fruit almost terete or slightly compressed from the sides, or more so from the back, not winged, or rarely the primary ribs expanded into deeply lobed wings or divided into spines.*

\* *Mericarps glabrous, the ribs blunt, smooth or wrinkled.*

## CORIANDRUM, Linnaeus.

*Fruits almost globose, the broad very blunt secondary ribs hardly prominent. Involucre none.*

C. SATIVUM, L.

Bhamo and Ava. Cultivated (?).

Nān-nān.

The seeds are aromatic and carminative, and as such are largely used in certain sweetmeats and liqueurs. In their unripe state their odour is said to resemble that of bugs (whence the name, from *kops*, a bug); but this did not prevent its being a favourite garden herb with the Roman labourers, who used the seeds to flavour, what we should call a 'clutney,' to be eaten with his unleavened bread at noon.

"Ac primum, leviter digitis tellure refossa,  
Quatuor educit cum spissis allia fibris;  
Inde comas apii græciles rutamque rigentem  
Vellit, et exiguo coriandra trementia filo."

And in some previous lines we have enumerated the plants found in an ordinary kitchen garden in the days of Augustus—

"Hic *Olus*, hic late fundentes brachia *Betæ*,  
Fecundusque *Rumex*, *Malvæque*, *Inulaque* virebant;  
Hic *Cicer* et capiti nomen debentia *Porra*;  
Hic etiam nocuum capiti gelidumque *Papaver*,  
Grataque nobilium requies *Lactuca* ciborum,  
Et gravis in latum demissa *Cucurbita* ventrem."

Virgil, Moretum, 72.

\*\* *Mericarps hirsute, bristly or aculeate.*

## DAUCUS, Linnaeus.

*Seed with rather flat face. Involucral bracts usually dissected.*

\* D. CAROTA, L.

Cultivated in the drier districts.

## CUMINUM, Linnaeus.

\* C. CYMINUM, L. (M.).

Zi-ya. Cumin.

The seeds are warm, bitterish, and aromatic, and much esteemed in the East as a condiment and carminative. De Gubernatis says,<sup>1</sup> "Le cumin symbolisait, chez les

<sup>1</sup> Mythologie des Plantes, vol. ii. p. 115.

Grees, ce qui est petit," and adds a variety of curious superstitions, which need not be reproduced here. One of its reputed virtues was as a philtre or love-charm, whence the popular saying "Maudite sorcière! elle m'a donné le *cumin*, et je ne puis plus m'en délivrer."

This Order yields many plants useful to man, and some virulent poison. Among the former may be enumerated Celery (*Apium graveolens*), Parsley (*Petroselinum sativum*), Caraway (*Carum Carvi*), Aniseed (*Pimpinella anisum*), Skirrets, Water parsnips (*Sium Nisi* and *Sisarum*), Fennel (*Feniculum vulgare*), Samphire (*Orithimum maritimum*), Bastard Fennel (*Anethum graveolens*), Parsnip (*Pastinaca oleracea*), Cumin (*Cuminum cyminum*), Carrots (*Daucus carota*), Sweet Cicely (*Myrrhis odorata*), Chervil (*Anthriscus cerefolium*), Coriander (*Coriandrum sativum*); and among poisonous plants Water hemlock (*Cicuta virosa*), Lesser hemlock or Fool's parsley (*Ethusa cynapium*), Lovage or Mountain hemlock (*Lecisticum officinale*), and Hemlock (*Conium maculatum*). A strong-smelling resin (Assafoetida)<sup>1</sup> is also produced by some Persian or Western Thibetan umbelliferous plant allied to *Perula*, and is in great esteem in the East as a condiment—and is not disagreeable to many Europeans if used sparingly—else the *bon vivant* may incur the fate with which Mæcenas was threatened if he touched garlic—

"At, si quid unquam tale concupiveris  
Jocose Mæcenas, precor  
Mamum puella savior opponat tuo,  
Extremâ et in spondâ eubet."

#### FICOIDALES.

*Flowers* regular or sub-regular. *Ovary* syncarpous, inferior, semi-inferior, or superior, 1-celled, with parietal placentas. or 2- to many-celled, with basilar or axile placentas. *Embryo* albuminous and curved, or cyclical, or exalbuminous and oblique.

#### Order FICOIDÆÆ.

*Flowers* hermaphrodite or unisexual. *Calyx*-lobes 4-5. *Petals* many, or small, or none. *Stamens* few or none. *Ovary* 2- to many-celled. *Styles* free or connate. *Leaves* quite entire. Herbs or under shrubs.

#### AIZOIDÆÆ.

*Calyx* free, but with a distinct turbinate tube bearing the stamens at or below the summit. *Fruit* a capsule, circumsciss. *Leaves* opposite.

#### SESUVIUM, Linnæus.

*Stamens* 5 to many. *Ovary* 3-5-celled, with axillary many-ovuled placentas.

S. PORTULACASTRUM, L.

Tidal jungles of Pegu, Tenasserim,  
and the Andamans.

#### TRIANTHEMA, Linnæus.

*Stamens* 5 or 10, or many. *Ovary* 1-2-celled, with basilar 1- or many-ovuled placentas.

\* *Ovary* and capsule 2-celled. *Styles* 2.

T. DECANDRA, L.

Ava.

Flowers clustered. *Stamens* 10 or 11. *Ovary* 4-ovuled.

\*\* *Ovary* and capsule 1-celled. *Style* 1.

T. OBCORDATA, Roxb.

Rubbishy spots near Akyab.

<sup>1</sup> For an account of the production of *Assafoetida*, consult 'Afghanistan and its People,' by H. W. Bellew, p. 270.

Leaves obovate, rather large, glabrous or slightly pubescent. Flowers solitary. Ovary many-ovuled. Stamens about 15. Style long.

Requires comparison with *Trianthema monogyna*, L. (Kurz).

T. CRYSTALLINA, Vhl.

Ava.

Leaves linear, small, with crystalline dots. Stamens 5. Style short, simple.

#### MOLLUGINIÆ.

*Calyx* free, divided to the base or nearly so. *Petals* 3-5, or none. *Stamens* hypogynous or almost perigynous. *Fruit* a capsule or divided into 2-3 cocci.

\* *Fruit* a capsule. *Leaves* usually with stipules.

#### MOLLUGO, Linnaeus.

*Petals* 3-5, or none. *Ovary* 3-5-celled, with many ovules in each cell. *Leaves* usually spuriously whorled.

Sub-genus GLINUS, L.

*Seed* with a strophiole dilated into a small arillus.

M. (GLINUS) LOTOIDES, L.

var. *a* common in Ava and Pegu.

*Tryphera prostrata*, Bl.

M. (*Glinus*) dictamnoides, L.

*Pharnaceum pentagynum*, Roxb.

Softly pubescent or tomentose. Flowers rather large, in axillary clusters. Stamens about 10-15.

var. *a*. Branches often white tomentose. Flowers sessile or nearly so.

var. *β*. Leaves pubescent but greenish. Flowers usually pedicelled.

M. SPERGULA, L.

All over Burma up to 4500 feet.

*M. stricta*, Roxb.

*M. parviflora*, Ser.

*Glinus mollugo*, Feenzl.

*Alsine erecta*, Burm.

Glabrous or slightly pubescent. Flowers rather small, on long slender pedicels, forming axillary clusters. Stamens fewer than 10.

Sub-genus MOLLUGO, L.

*Seeds* without a strophiole.

M. STRICTA, L.

var. *β* in Martaban and Pegu.

*M. pentaphylla*, L.

*M. triphylla*, Lour.

Glabrous, the stem angular. Flowers minute, on capillary pedicels, forming cymes. Leaves thin and green, linear-lanceolate, usually acuminate at both ends.

\*\* *Fruit* 2-3-coccons, the cocci 1-seeded. *Leaves* without stipules.

#### GISEKIA, Linnaeus.

*Petals* none. *Carpels* 3-5, free. *Utricules* 5-3. *Leaves* opposite or spuriously whorled.

G. PHARNACEOIDES, L.

Ava, near Yē-nan-choung.

#### Order CACTEÆ.

*Petals* numerous, multi-seriate, epigynous, free or cohering below. *Stamens* numerous, multi-seriate, inserted at the base of the corolla. *Ovary* inferior, 1-celled, with many-ovuled parietal placentas. *Berry* pulpy. *Seeds* numerous. *Albumen* scanty or none. *Leaves* generally none, or rudimentary, rarely normal.

OPUNTIEÆ.

*Calyx-tube not produced beyond the ovary. Stem branched, jointed.*

OPUNTIA, *Müller.*

\*O. DILLENI, Ham.

Cultivated in Prome and the drier parts of Burma.

*Cactus Indicus*, Roxb.

Ka-lā-zoung.

The 'Cactus' makes an admirable hedge, and is easily propagated by cuttings. Snip off a piece and bury its end in the ground, and it will generally grow. Some nervous people, however, object to it, for its supposed property of harbouring snakes or vermin, and the authorities in some places wage a war of extermination against this useful plant. A sort of 'Cacticide' epidemic raged some years ago in Madras, and a native medical officer won both honourable mention and a tangible reward by divulging to the authorities his discovery that the 'Coccus,' or Cactus bug, was the natural and appointed destroyer of the cactus tree, and should be therefore enlisted for its destruction! The suggestion was rapturously received. The labours of gangs of 'convicts' employed in grubbing up and burning the plant were dispensed with, and in lieu thereof a departmental issue of Cactus bugs was at once ordered on the most profuse scale. For months the luckless postal runners groaned beneath the weight of parcels of the cactus plant, with healthy 'cocci' adhering, pieces of which infected plant were to be distributed in spots where the Cactus was plentiful, that the great battle of *Coccus* versus *Cactus* might be fairly fought out. It reads like a scheme disinterred from the archives of the Philosophers of Laputa, but was actually conceived and carried out in Madras, and is too curious an example of intellectual idiosyncrasy to be passed over in silence by the conscientious historian!

\*O. COCHILLINIFERA, Ham. (M.).

Ka-la-zoung-let-wā.

PASSIFLORALES.

*Flowers* usually regular, hermaphrodite or unisexual. *Ovary* usually inferior, syncarpous, 1-celled, sometimes 3- or more celled by the produced placentas. *Placentas* parietal. *Styles* free or connate.

Order DATISCACEÆ.

*Flowers* regular, diceious, rarely hermaphrodite or polygamous. *Males*: *Calyx-tube* very short or hemispherical, lobes 3-9, short, equal or unequal. *Petals* none or 8. *Stamens* 1-25, opposite the calyx-lobes. *Anthers* 2-celled. Rudiment of ovary minute or none. *Females and hermaphrodites*: *Calyx-tube* adnate to the ovary, lobes 3-8. *Stamens* as in the males, or reduced to staminodes. *Ovary* 1-celled, open or closed at the summit, placentas parietal, with many anatropous ovules in 2 or more series. *Styles* as many as placentas, simple or 2-parted, stigmatic inside, or terminated by capitate stigmas. *Capsule* membranous or coriaceous, dehiscent between the styles, many-seeded. *Seeds* minute, the testa punctate or striate. *Embryo* cylindrical, imbedded in the axis of the scanty albumen, radicle elongate, next the hilum.

TETrameLES, *R. Brown.*

*Flowers* diceious. *Petals* none. *Stamens* 4, inserted round a depressed disk, filaments elongate. *Anthers* didymous. *Calyx-tube* almost t-angular, with 4 short lobes. *Staminodes* none. Large trees.

T. NUDEFLORA, R. Br.

var.  $\alpha$  all over Pegu and Tenasserim.

T. *Grahamiana*, Wight.

var  $\alpha$  and  $\beta$  the Andamans.

var.  $\alpha$  *genuina*. Leaves more or less pubescent beneath.

var.  $\beta$  *glabra*. Leaves glabrous.

Wood brown, valueless.

## Order BEGONIACEÆ.

*Flowers* monoecious. *Stamens* numerous. *Anthers* extrorse. *Ovary* inferior, 3-celled, many-ovuled. *Capsule* with 3 cells, winged on the back, and 3 loculicidal valves. *Seeds* numerous. *Albumen* scanty or none. *Embryo* straight, axile.

BEGONIA, *Linnaeus*.

Sub-genus CASPAREA, DC.

*Capsule* fleshy and berry-like, dehiscent on the angles or broad thick wings.

B. ROXBURGHII, DC.

Chittagong.

*Casparya oligocarpa*, DC.

*B. Malabarica*, Roxb.

A robust rather glabrous branched herb. Styles 4. Berry 4-celled and 4-cornered, the angles produced into as many horn-like appendages.

Sub-genus BEGONIA, DC.

*Capsules* dry, dehiscent in a semi-circular line along their sides near the wings or angles.

\* *Styles* 2, each branch 2-cleft or variously dilated or branched. *Capsule* 2-celled. *Placentas* consisting of 2 longitudinal ovule- or seed-bearing blades.

× *Stamens* free. *Capsule* unequally 3-winged, the 2 lateral wings often reduced to a membranous rib.

B. LACINIATA, Roxb.

Hills East of Toung-ngoo at 6000 to 7000 feet.

A robust branched herb, softly paleaceous-pilose. Leaves long-petioled, lobed.

B. MEGAPTERA, DC.

Nāt-toung in Martaban (*vide* Mason).

As preceding, but more slender and quite glabrous.

B. NEMOPHILA, Kz.

Hills East of Toung-ngoo at 3000 to 4000 feet.

Robust rather simple herb, softly palaceous-pilose. Leaves long-petioled, not lobed. Petals pale rose-coloured, only about  $\frac{1}{3}$  inch long. Capsules stipitate-hirsute, the lower wing broad and rounded,  $\frac{2}{3}$  inch long.

× × *Stamens* monadelphous.

+ *Male perianth* 5-lobed, the *female* one 5-6-lobed. *Capsule* unequally 3-winged.

† *Inflorescence* axillary or arising from the base of the leaf, or an axillary bud.

‡ *Leaves* alternate or whorled, rarely reduced to a single one. *Flowers* small, white.

° *Glabrous*.

B. PROCRIDIFOLIA, Wall.

Tavoy.

Leaves alternate, the petioles 1-2 lines long.

B. VERTICILLATA, Hook.

Maulmain (*vide* Parish).

Leaves whorled, longer petioled.

° ° *Stems and petioles* pubescent.

B. MARTABANICA, DC.

Tenasserim.

*Inflorescence* glabrous. Leaves alternate, long-petioled, sparingly and minutely hirsute above.

‡ ‡ *Leaves* solitary radical or few and alternate. *Flowers* small, white.

B. SINUATA, Wall.

Tenasserim and the Andamans.

*Diploclinium biloculare*, Wight.

*B. Andamanensis*, Parish.

More or less stellate-velvety. *Inflorescence* glabrous. Leaves alternate or rarely solitary.

*B. PROLIFERA*, DC.

Maulmain (*vide* Parish).

Glabrous. Leaf solitary, from the base of which 2 or more flowering peduncles arise.

*B. PALEACEA*, Kz.

Upper Tenasserim.

Stems, etc., and the conspicuously bracted inflorescence paleaceous-pilose, the indumentum often intermixed with soft gland-hairs.

†† *Leaves and inflorescence radical.*

*B. NIVEA*, Parish.

Maulmain.

Leaves contracted into a petiole 2-3 lines long, ciliate, hispid above. Flowers nearly an inch in diameter, white.

++ *Perianth of both sexes 2-sepalled, apetalous.*

*B. FLACCIDISSIMA*, Kz.

Zwā-ka-bin Hill (*vide* Parish).

Very tender herb. Leaves alternate, minutely and sparingly pilose above. Flowers small.

\*\* *Styles 3, free or connate. Capsule 3-celled and 3-winged.*

× *Placentas entire and simple.*

*B. BRANDISIANA*, Kz.

Attaran Valley.

Glabrous, the inflorescence radical or nearly so. Leaves radical, deeply lobed. Perianth 2-sepalled, apetalous.

×× *Placentas 2-cleft.*

+ *Caulescent herbs, with alternate cauline leaves.*

*B. PARTULIFLORA*, Kz.

Upper Tenasserim (*vide* Lobb).

All parts (also the inflorescence) glabrous. Capsule 3 lines long, the wings truncate at the apex. Stamens monadelphous.

*B. MODESTIFLORA*, Kz.

Boronga Island up to 1000 feet.

Leaves sparingly and minutely bristly and glossy above, in other respects very similar to the preceding. Capsule  $\frac{1}{2}$  an inch long. Stamens free, the anthers mucronulate. Styles free.

*B. SCUTATA*, Wall.

Bhamo.

Like preceding, but leaves opaque and more pilose. Stamens monadelphous, the anthers terminated by the broad truncate connective. Styles united up to the middle.

*B. SURCULIGERA*, Kz.

Leaves minutely and sparingly pilose. Inflorescence glandular-puberulous. Stamens monadelphous. Capsule-wings half-sagittate, produced into blunt basal lobes.

++ *Scapigerous herbs, the leaves and inflorescences radical and usually solitary.*

*B. SUPERFOLIATA*, Parish.

Maulmain district.

Leaves very long-petioled, peltate at the base, papillose-dotted and glabrous.

*B. VELUTINA*, Parish.

Maulmain district.

Leaves very long-petioled, cordate (not peltate), papillose and minutely pilose above. Stamens free.

Habit of *B. subpeltata*, Wight, but differs in the 2-lamellate placentas (Kurz).

#### Order CUCURBITACEÆ.

*Flowers* monœcious, diœcious, or polygamous. *Corolla* 5-merous, imbricate. *Stamens* 5-3, of which one is usually 1-celled. *Ovary* inferior, 1-several-celled, 1-many-ovuled. *Fruit* a berry. *Albumen* none. *Embryo* straight. *Stem* furnished with tendrils. *Leaves* alternate.

## CUCURBITIÆ.

*Anthers* 2-celled, the cells straight, curved or flexuose. *Ovary* with 3 (rarely 2 or 5) placentas. *Ovules* horizontal, numerous.

\* *Anther-cells* flexuose or folded up (very rarely straight or only curved).

× *Corolla* rotate or bell-shaped, 5-petalled or 5-parted at the base. *Filaments* usually free.

+ *Petals* fringed.

HODGSONIA, *Hooker, f. et Thompson.*

*Ovules* 12, in pairs attached to each side of the 2 parietal placentas. *Seeds* large, united by pairs. *Leaves* lobed, coriaceous.

H. (TRICHOSANTHES) HETEROCALITA, Roxb. Tropical forests. Chittagong and Pegu.

TRICHOSANTHES, *Linnaeus.*

*Ovules* and *seeds* very numerous, the latter variously shaped, small or large. *Petals* fringed or rarely entire or nearly so, white. *Leaves* entire or lobed.

Sub-genus EU-TRICHOSANTHES.

*Petals* conspicuously fringed. *Male flowers* racemose.

\* *Male racemes* without or with minute bracts, the bracts hardly a line long and inconspicuous. *Seeds* imbedded in a red or yellowish pulp, grooved or tubercled, with thickened, crenate, or waved margins.

× *Leaves* more or less deeply palmately lobed.

+ *Male racemes* without bracts.

\* T. CUCUMERINA, L.

Cultivated all over Burma.

Tha-bwôt-khā.

Fringes of the petals simple and straight. Fruits ovate, acuminate. Margin of seeds thickened and crenate.

+ + *Male racemes* minutely bracted.

T. LOBATA, Roxb.

Chittagong.

Fringes of petals jagged. Fruits oblong, acuminate. Seeds thick and irregularly tubercled.

\* T. ANGUINA, L.

Cultivated (*fide* Mason).

Peh-len-mywē.

Fringes of petals simple, curled. Fruits elongate, spindle-shaped.

× × *Leaves* cordate, not lobed.

T. RENIFORMIS, Miq.

Rutland Island. Andamans.

Leaves pubescent. Seeds with a central longitudinal ribbon, the lateral lobes truncate.

\*\* *Male racemes* conspicuously bracted, the bracts leafy, 3 lines to 1½ inch long or longer. *Seeds* imbedded in a dirty dark-green pulp, smooth, with entire margins.

T (MODECCA) BRACTEATA, Lamk.

All over Burma.

Fringes of petals very long and simple. Bracts of male flowers usually smaller. Calyx-lobes broadly ovate, serrate. Leaves angular or palmately lobed. Fruits globose.

T. GRANDIBRACTEATA, Kz.

North of Mandalay and the Khakyen Hills.

Petals fringed with very long simple curled cilia. Bracts of male flowers large and broad, 1-1½ inch long. Calyx-lobes lanceolate, entire. Leaves usually palmately and very deeply lobed. Fruits large, oval-oblong, compressed.

T. CORDATA, Roxb.

The Tsittoung Valley.

Petals to near their middle cut into numerous jagged segments, not fringed. Female flowers not tubular. Fruits globose. Leaves cordate, usually not lobed.

T. MACROSIPHON, Kz.

Attaran Valley.

As preceding, but leaves larger and slightly angular, the tube of the female flowers  $1\frac{1}{2}$  inch long.

Sub-genus PSEUDO-TRICHOSANTHES.

Flowers dioecious, of both sexes solitary in the leaf-axils, the female ones very shortly peduncled or almost sessile, the males on slender pedicels.

\* *Petals with very long curled and branched fringes.*× *Corolla-lobes entire or only slightly lacerate.*

T. INTEGRIFOLIA, Roxb.

Ava and all over Burma.

Leaves reniform. Fruits globular or nearly so. Seeds elliptically oblong.

\*\* *Petals entire.*

† *Calyx-tubes of males elongate. Stamens inserted in the calyx-tube, included, the anthers cohering into an oblong head.*

GYMNOPETALUM, Arnott.

Stigmatic lobes of female flowers linear, simple. Tendril simple. Fruit small, pulpy within. Corolla yellow.

Sub-genus SCOTANTHUS, Naud.

Monœcious. Male flowers in bracted racemes. Fruit ribbed. Flowers white.

Leaves cordate, 3-5-angular. Female flowers long peduncled. Fruits ovoid.

G. BRYONIA COCHIN-CHINENSE, Lour.

Arakan.

*Momordica tubiflora*, Roxb.

G. HETEROPHYLLUM, Kz.

Tenasserim, the Andamans and Kamorta.

Leaves palmately and deeply 3-5-lobed, the lobes blunt. Fruits clavate-cylindrical.

Possibly a smaller bracted form of *G. quinquelobum*, Miq. (Kurz).

"The difference between *Trichosanthes* and *Gymnopetalum* is very slight indeed. The corolla in *T. integrifolia*, Roxb., is as often entire as it is irregularly and more or less deeply cut; the colour of the corolla thus alone remains as a distinguishing mark between the two genera!" (Kurz).

LAGENARIA, Sering.

Stigmatic lobes of female flowers 2-lobed. Tendrils 2-cleft. Fruit with a woody rim. Petiole 2-glanded at the apex.

\* L. (CUCURBITA) LAGENARIA, L.

Cultivated all over Burma, especially

*L. vulgaris* and *idolatriæ*, Ser.

Ava and Prome.

var. *a.* All parts softly, but not viscidly pubescent. Fruits flask-shaped.

var. *β.* All parts viscid-pubescent. Fruits pear-shaped.

Kurz adds from the Nicobars:

*L. vulgaris*, Savi. (var. ?).

Katchall.

The fruits are the size and shape of billiard-balls.

†† *Male calyx-tube short (very rarely long). Stamens inserted at the mouth or in the tube of the calyx, usually exserted, the anthers free or slightly cohering.*

‡ *Stamens inserted at the mouth of the calyx. Filaments exserted, recurved. Anthers free, the cells bordering the broad connective.*

LUFFA, Caranilles.

Male flowers racemose. Fruit dry, with a woody-fibrose endocarp, dehiscing by an apical circumsciss opercle. Petiole without glands.

\* *Fruit smooth, at least not muricate or echinate.*

- \* L. (MOMORDICA) CYLINDRICA, L. Common all over Burma, the Andamans,  
*L. petola* and *Cattu-Picinna*, Ser. and Kamorta.  
*L. Aegyptiaca*, Mill.  
*L. pentandra*, Roxb.  
*L. leiocarpa*, Naud.  
*L. hederacea*, Wall.

Tha-bwôt.

Fruit terete, or only with obscure darker-coloured longitudinal streaks.

- \* L. (CUCUMIS) ACTANGULA, L. Chittagong, cultivated.  
*L. fatida*, Cav.  
*Petola Bengalensis*, Rumph.

Fruit sharply 10-angular.

*Luffa amara*, Roxb., with oblong fruits only 3-4 inches long and tapering at both ends, is probably only a variety of the above (Kurz).

\*\* *Fruit echinate or muricate.*

- L. GRAVEOLENS, Roxb. Chittagong.  
 Flowers monœcious, yellow, the males and females from the same leaf-axil, very shortly pedicelled. Fruit muricate.

- L. ECHINATA, Roxb. Arakan.  
*L. bindaul*, Roxb.

Flowers dioecious, white, the males in racemes, the females solitary. Fruits densely echinate, the bristles spreadingly fibrillose or rarely ciliate.

Dr. Hooker states that the flowers in Indian specimens of this species are always yellow, not white, as Roxburgh describes and figures them. The species is common enough in the plains of Northern Bengal; but never have I seen the flowers of it other than white (Kurz).

The fruits of *Luffa*, after the fleshy matter has decayed, present a firm fibrous skeleton, which is exposed for sale in some chemists' shops in England as 'Egyptian bath-sponge,' and a very efficient abrader of the cuticle it no doubt makes.

BENINCASA, *Savi*.

Male and female flowers solitary. Fruit fleshy, berry-like, pulpy inside. Tendrils 2-3-cleft. Petiole without glands.

- \* B. CERIFERA, DC. Cultivated all over Burma and Kamorta.  
*Cucurbita Pepo*, Roxb.

°° Stamens inserted below the mouth of the calyx. Anthers conniving or cohering.

‡ Calyx furnished with 1-3 scales at the bottom.

MOMORDICA, *Linnaus*.

Calyx with 2 or 3 scales. Male flowers usually furnished with a large complicate bract subtending the pedicel. Tendrils simple.

× Monœcious. Bracts only 2-3 lines long, at about the middle of the filiform peduncle.

- \* M. CHARANTIA, L. Cultivated all over Burma.  
*M. muricata*, Willd.  
*M. Senegalensis*, Lamk.  
*Cucumis Africanus*, Ldl.  
*Amara Indica*, Rumph.

Leaves palmately 5-lobed. Calyx-lobes oblong, acute. Bracts entire, at the apex of the peduncle. Fruit few-seeded, small.

× × *Diœious*. *Bracts of the male (and sometimes of the female) flowers just below the flower and embracing the calyx,  $\frac{1}{2}$ –1 inch long or longer.*

Leaves 3- to 5-lobed. Calyx-lobes linear, acuminate. Seeds about 3 lines long.

*M. SUBANGULATA*, Bl.

Chittagong and Pegu.

Leaves cordate, not lobed, or only angular. Bracts pubescent or velvety. Calyx-lobes oblong, blunt. Seeds about 3 lines long.

*M. (MURICIA) COCHINCHINENSIS*, Lour. Tropical forests of Pegu and Tenasserim.  
*Zucca Commeriana*, Ser.

Leaves 3- rarely 5-lobed, with the lobes acuminate. Bracts often hirsute. Calyx-lobes oblong, acuminate. Seeds about an inch long.

\* *M. BIOICA*, Roxb.

Burma (*vide* Mason).

Sa-byet.

#### THLADIANTHA, Bunge.

*Calyx with a single scale. Bracts of male flowers dimorphous, the inner ones smaller and imperfect.*

*T. DUBIA*, Bunge.

Pegu Range.

*Gymnopetalum Horsfieldii*, Miq.

† † *Calyx without scales.*

#### CUCUMIS, Linnæus.

Connective produced beyond the anther-cells. *Tendrils simple.*

× *Flowers on slender pedicels, several together in the axils of the leaves.*

\* *C. SATIVUS*, L.

Cultivated.

*C. momordica*, Roxb.

Ovary muricate, spindle-shaped. Male flowers by 3–6, females solitary.

\* *C. MELO*, L.

var. *a* Chittagong. Ava and Pegu.

*C. flexuosus*, *chate* and *dudaim*, L.

Kamorta.

*C. deliciosus*, Roth.

var. *β* cultivated generally.

*C. conomon*, Thbg.

*C. utilissimus*, Roxb.

*C. cicutristriatus*, Stocks.

Ovary densely villous or pubescent, usually oblong or elliptical. Male and female flowers usually mixed.

var. *a* *C. pubescens*, Willd.; *C. Melo agrestis*, Naud.; *C. trigonus*, Bth.; *C. Maderaspatanus*, Roxb. non L. All parts much smaller. Fruits only as large as a plum, from oblong to turbinate, not edible. Flowers smaller and shorter pedicelled, usually only by 2–3 in the leaf-axils. Considered by Naudin to be the wild stock of the cultivated melons.

var. *β. culta*. All parts more robust. Fruits larger and often very large, variously shaped. Flowers nearly an inch across, on long filiform pedicels, usually by 3–5 from the leaf-axils.

#### CITRULLUS, Schrader.

*Connective not prolonged. Stigmas reniform. Tendrils usually 2–3-cleft.*

\* *C. VULGARIS*, Schrad.

Cultivated generally.

*Cucurbita citrullus*, L.

*C. fistulosus*, Stocks.

*Auguria Indica*, Rumph.

× × *Corolla bell-shaped, 5-lobed to the middle or somewhat further down.*

#### CEPHALANDRA, Schrader.

*Male flowers* solitary or nearly cymose. *Stigmas* narrow, 2-lobed or -parted. *Tendrils* simple.

C. (BRYONIA) GRANDIS, L.  
*Momordica monodelpha*, Roxb.  
*Coccinia Indica*, W. A.  
 Ken-bung (M.).

In rubbishy places all over Ava, Arakan,  
 and Pegu.

CUCURBITA, *Linnaeus*.

*Flowers* solitary. *Calyx-lobes* spreading. *Filaments* free. *Stigmas* 3, 2-lobed or 2-forked. *Tendrils* usually 2- or more-cleft.

× *Calyx-lobes* leafy.

\* C. MOSCHATA, Duch.

Cultivated in Arakan and Pegu.

Leaves more or less lobed. Petiole scarcely prickly.

\*\* *Anther-cells* straight or curved, not flexuose.

× *Style* inserted on a cupular or annular disk.

BRYONIA, *Linnaeus*.

*Male flowers* racemose or clustered. *Filaments* short, the connective not produced. *Berry* spherical, short peduncled.

B. LACINIOSA, L.

Rubbishy spots in Chittagong and Prome.

MUKIA, *Arnott*.

*Male flowers* solitary or clustered. *Calyx* bell-shaped. Connective produced beyond the anther-cells. *Berry* spherical, sessile. *Seeds* scrobiculate.

M. (CUCUMIS) MADERASPATANUS, L. non Roxb. All over Burma.

*M. scabrella*, Arn.

Tha-bwôt-khä (M.).

ZEHNERIA, *Endlicher*.

*Male flowers* usually corymbose. *Filaments* elongate. *Anthers* orbicular, the connective not produced, villous on the back. *Berry* shortly peduncled.

Sub-genus KARIVIA, Arn.

*Berry* large, nearly 2 inches long. *Seeds* numerous, almost globular.

Z. UMBELLATA, Klein.

All over Burma.

Leaves polymorphic, almost chartaceous, glabrous.

Z. HOOKERIANA, W. A.

Khakyen Hills.

*Berry* small, globose. *Seeds* few, compressed-oblong. *Leaves* herbaceous, flaccid, cordate, repand-toothed.

MELOTHRIA, *Linnaeus*.

*Male flowers* usually racemose. *Anthers* almost sessile, the connective produced beyond the anther-cells and usually 2-lobed. *Berry* usually long- and slender-peduncled.

M. (ÆCHMANDRA) INDICA, Arn.

Chittagong.

*Bryonia tenella*, Roxb.

*Cucumis marinus-viridis*, Rumph.

× × *Disk* at the base of the style absent or obsolete.

RHYNCHOCARPA, *Schrader*.

*Orary* with 1-3 placentas. *Berry* few-seeded, beaked. Connective produced beyond the anther-cells.

R. (BRYONIA) ROSTRATA, Rottl.

Paghā-myo.

*Bryonia pilosa*, Roxb.

All parts more or less pubescent. *Leaves* cordate, with rounded basal lobes. *Berry* striate, hairy.

R. DELTOIDEA, Kz.

Pegu and Tenasserim.

Leaves deltoid, with spreading acute basal lobes, rough above. Berries glabrous.

## CREMOSPERMIEÆ.

*Anthers* 1-celled. *Ovary* 1- or 3-celled. *Ovules* 2 to many, suspended.\* *Seeds* not winged.

## Sub-tribe GOMPHOGYNIEÆ.

*Stamens* 5. *Filaments* free. *Ovary* 1-celled, with 2-6 ovules suspended from, or near, the summit of the cell.

## GOMPHOGYNE, Griffith.

*Petals* oblong, erose. *Fruit* turbinate, broadly 3-angular and 3-valved at the apex. *Leaves* 5-7-foliolate.

G. (ZANONIA) HETEROSPERMA, Wall.

Ava. Taong-doung.

Capsule club-shaped, rather narrow. Seeds usually 4, about a line long, rounded, obscurely tubercled-wrinkled.

A simple-leaved species of *Actinostemma*, or more probably *Gomphostemma*, is not unfrequent along choungs in the tropical forests of the eastern slopes of the Pegu Yomah, especially at the head-waters of the Swā-choung, but I did not succeed in finding either flower or fruit of it (Kurz).\*\* *Seeds* winged.

## Sub-tribe ZANONIEÆ.

*Stamens* 5. *Filaments* free. *Anthers* oblong. *Ovary* 1-celled, with 3 thick parietal placentas. *Ovules* numerous. *Fruit* dry, 1-celled, with a broad open 3-angular mouth at the top.

## ALSOMITRA, Rœm.

*Calyx-lobes* 5. *Stamens* 4, perfect. *Styles* 3, the stigmas 2-lobed. *Leaves* 3-foliolate.

A. (ZANONIA) SARCOPHYLLA, Wall.

Waste spots from Ava to Prome.

Kyi-ā (M.).

## ZANONIA, Linnæus.

Z. ZEHNERIA, Endl. (M.).

This Order embraces a few grateful fruits, as the different sorts of melons, and some useful and wholesome though not very nutritious vegetables in the various sorts of pumpkins, gourds, and cucumbers, which from their cheapness enter largely into the dietary of the poorer classes.

The 'Colocynth,' *Citrullus colocynthis*, yields a pulp possessing highly purgative properties, and similar properties exist in the roots of several species of Bryony, e.g. *Bryonia alba* and *dioica*. The fruits of *Luffa* and *Trichosanthes* are largely used for food in India, but become purgative when ripe. The fibrous skeleton of the fruit of *Luffa* is what is familiarly known in London shops as 'Egyptian Bath-sponge.' The white gourd, *Benincasa cerifera*, presents a waxy exudation on its fruits, and is regarded as a symbol of fertility, and as such often presented in India to newly-married couples.

## Order TURNERACEÆ.

*Corolla* polypetalous, perigynous, isostemonous, contorted in bud. *Stamens* 5, sub-hypogynous. *Ovary* free, 1-celled, with 3 parietal placentas. *Capsule* with 3 semi-semiiferous valves. *Seeds* strophiolate. *Embryo* albuminous.

## TURNERA, Linnæus.

\* T. ULMIFOLIA, L.

Introduced and now feral round villages.

## Order SAMYDACEÆ.

*Flowers* regular, usually hermaphrodite. *Calyx* coriaceous, persistent, 3-7-lobed, the lobes imbricate or valvate. *Petals* 3-7, rarely more, usually resembling the calyx-lobes in consistence, perigynous and imbricate in bud, or none. *Disk* cupular, annular, or glandular. *Stamens* perigynous, indefinite, or rarely definite, usually opposite the petals and alternating with small glands or scales. *Ovary* superior, or more or less inferior, 1-celled, with 2-3 or more several-ovuled parietal placentas. *Style* simple, or 2-3- or more cleft. *Fruit* indehiscent or capsular, and opening into valves. *Seeds* often arillate, with a fleshy albumen. *Embryo* straight or nearly so, the radicle next the hilum. *Cotyledons* flat. *Leaves* usually alternating, simple. *Stipules* small or none. *Flowers* inconspicuous, in racemes, panicles, or clusters. Trees or shrubs.

## CASEARIEÆ.

*Calyx* free, 5- or 4-merous. *Petals* none. *Stamens* 6-30, inserted in a single row to the calyx-tube, usually alternating with as many staminodes.

## GUIDONIA, Plumier.

*Stamens* 6-15, alternating with as many short staminodes. *Flowers* clustered or in corymbs.

G (CASEARIA) CANZIALA, Wall.

Pegu and Martaban.

\* *Filaments* very slender, many times longer than the anthers.

† *Stamens* and *staminodes* 8 each, separately inserted.

All parts glabrous. Leaves coarsely crenate. Flowers about 2 inches across. Pedicels and calyx glabrous.

G. GLOMERATA, Roxb.

var.  $\beta$  Chittagong.

Young shoots, calyx, and pedicels, and also often the nerves beneath of the serrulate leaves, puberulous. Flowers only a line across.

var.  $\alpha$  *glabriuscula*. Leaves almost glabrous.

var.  $\beta$  *puberula*. Leaves beneath on the nerves, the petioles, etc., puberulous.

†† *Stamens* and *staminodes* 8 each, united at the base and forming a broad disk round the ovary.

\*\* *Filaments* only as long as the anthers.

G. VARECA, Roxb.

Khakyen Hills.

All parts more or less puberulous. Stamens 8.

## CASEARIA, Jacqueminot.

C. GLABRATA, Bl. (K.).

Kamorta.

var. with leaves larger and broader at the base, which is rounded or almost cordate on the one side, in this respect resembling those of *angustata*, T. and B., which may turn out to be only a form of it. Capsules fleshy elliptical, nearly an inch long, smooth and glabrous. A tree of the tropical forests.

## HOMALIEÆ.

*Calyx* free or adnate to the ovary, 4-15-merous. *Petals* as many. *Stamens* 4-15, or if more arranged in clusters, but always opposite the petals.

## HOMALIUM, Jacqueminot.

*Petals* as many as sepals. *Ovary* more or less adnate to the ovary and inferior.

\* *Stamens* solitary and opposite to the petals. *Flowers* racemose or spiked, often collected into panicles.

× *Flowers* about 2 lines in diameter. *Ovary* villous.

H. (BLACKWELLIA) TONENTOSA, Vent.

Arakan and Pegu up to 2000 feet.

*B. spiralis*, Wall.

Leaves coriaceous, tomentose or puberulous beneath. Flowers tomentose, sessile. Spikes robust, tomentose.

*H. (BLACKWELLIA) DASYANTHUM*, Turcz. Mergui.

*H. Griffithianum*, Kz.

Leaves thin chartaceous, pubescent on the nerves. Flowers tomentose, shortly pedicelled. Racemes pubescent, slender.

× × *Flowers less than a line in diameter. Spikes collected into panicles.*

*H. MINUTIFLORUM*, Kz. Martaban?

All parts, also the spikes, quite glabrous. Flowers sessile. Ovary villous.

Habit of *H. fetidum*, but the flowers very minute.

\*\* *Stamens by 2 or more opposite to the petals.*

*H. SCHLICHII*, Kz. Chittagong.

Quite like *H. Nepalense*, but stamens by threes. Ovary tomentose. Flowers longish pedicelled, in divaricate terminal glabrous panicles.

*H. FETIDUM*. Mergui.

Glabrous. Stamens by twos. Ovary glabrous. Racemes slender, glabrous.

#### Sub-order PASSIFLOREÆ.

*Flowers* hermaphrodite, or rarely unisexual, and in this case the male and female corollas conform. *Corona* conspicuous, simple or double.

#### PASSIFLORIEÆ.

*Corona of the corolla simple or double, and usually conspicuous. Petals usually herbaceous or coriaceous, rarely none.*

#### PASSIFLORA, Linnaus.

*Calyx-tube* short. *Petals* 4-5, rarely none. *Stamens* 4-5. *Styles* 3. *Leaves* simple.

Sub-genus GRANADILLA, DC.

*Involucre* 3-leaved, the leaflets entire or toothed, or dissected. *Sepals* and *petals* 5 each. *Peduncles* 1-flowered, arising together with the simple tendrils from the same leaf-axil.

\* *Involucral leaflets entire or toothed.*

\* *P. QUADRANGULARIS*, L. Cultivated.

Branches and branchlets wingedly 4-cornered. Stipules and bracts entire. Petiole with 4-6 glands. Leaves entire.

The root is vermifuge in small doses, poisonous in large. The fruit is pleasant, though rather insipid.

\* *P. LAURIFOLIA*, L. Cultivated.

Branches, etc., almost terete or slightly angular, never winged. Stipules setaceous, long. Bracts obovate, glandular-serrate at the tips. Petiole 2-glanded at the apex. Leaves entire.

\*\* *Involucral leaflets pinnatisect, the end-segments capillary or setaceous, glandular thickened at the apex (Dyosmia, DC.).*

*P. FETIDA*, Can. Waste spots and hedges all over Arakan and Pegu.

All parts hairy. Leaves 3-lobed, the petiole gland-less.

Sub-genus EU-PASSIFLORA.

*Flowers* not involucred, the bracts remote, large, small or absent. *Corona* membranous, sharply folded, frilled at the edge.

\* *Flowers bracted, the bracts small. Petals present (Decaloba, Endl.).*

† *Leaves lobed, velvety beneath.*

B. CALONEURA, Kz.

Upper Tenasserim.

Exactly as *P. Horsfieldii*, but leaves deeply 3-lobed and smaller, the lobes blunt.

The texture, nervature, and indument of the leaves are entirely those of *P. Horsfieldii*. Flowers and fruits unknown.

†† *Leaves entire, glabrous.*

\*\* *Flowers apetalous, usually without bracts (Cicca, Med.).*

P. SUBEROSA, L.

Chittagong.

Flowers small. Petiole  $\frac{1}{4}$ – $\frac{1}{2}$  inch long, 2-glanded at the apex. Leaves acute.

#### Sub-order PAPAYACEÆ.

*Flowers* hermaphrodite or unisexual. *Stamens* perigynous. *Corona* small or none.

#### MODECCIEÆ.

*Flowers* hermaphrodite, or, if unisexual, the male and female corollas conform. *Corona* small or none. *Petals* included in the calyx-tube. *Connective* often produced beyond the anther-cells.

#### MODECCA, Linnæus.

*Flowers* unisexual. *Calyx* 5-cleft. *Corona* none or fringed. *Disk-glands* 5. Tendril-bearing herbs or shrubs.

\* *Petals* inserted at the throat or to the tube of the calyx. *Stigmas* sessile (*Microblepharis*, Wight).

M. CORDIFOLIA, Bl.

The Andamans. Great Nicobar.

Leaves entire. Seeds pitted, with crenate borders.

\*\* *Petals* inserted on the bottom of the calyx. *Style* 3-cleft or styles 3, distinct (*Blepharanthus*, Wight).

M. TRILOBATA, Roxb.

All over Arakan and Burma.

Leaves 3- rarely 5-lobed. Seeds pitted, with a double-crenate border.

M. NICOBARICA, Kz. (K.).

Katchall and Nankowry.

#### PAPAYAIÆ.

*Flowers* unisexual, the male and female corollas dissimilar, rarely polygamous. *Corona* none. *Calyx* minute. *Male corolla* tubular, the female one 5-petalled. *Stamens* in two rows, inserted to the corolla-tube. *Erect trees*, with milky juice.

#### CARICA, Linnæus.

*Filaments* free. *Leaves* simple, lobed or cut.

\* C. PAPAYA, L. Cultivated, and half wild in the South. Kamorta and Katchall. *Papaya vulgaris*, D.C.

Sir J. D. Hooker remarks, "The Papaw is the insipid berry of *Carica*, the juice of whose fruit is a powerful vermifuge and antiseptic, and contains fibrin, a substance otherwise supposed to be peculiar to the animal kingdom. The whole tree has the singular property of rendering tough meat tender, by separating the muscular fibres."

The curious property which the juice of the Papaw possesses of rendering meat tender, depends on the presence of a peculiar principle,<sup>1</sup> termed by Dr. Peckolt, its discoverer, '*Papayotin*,' or, as it is also called, Papaine. The properties of this substance are analogous to '*Pepsin*.' To apply the juice to cookery, the meat which it

<sup>1</sup> New Commercial Plants, No. 3, Christy & Co., London.

is desired to render tender should be washed or soaked for a few minutes (5 to 10) in water, to which the juice of the Papaw tree has been added, or the joint wrapped in the fresh leaves of the Papaw, and in this state roasted. The juice mixed with an equal quantity of sugar is also an excellent medicine in cases of enlarged spleen. The dose is one teaspoonful of the juice made into three boluses with sugar, one bolus to be taken morning, noon, and night. The juice is said also to remove freckles.

The most curious property, however, of the active principles of the Papaw is its power of dissolving,<sup>1</sup> or digesting (for that is what it amounts to), living tissues. Two grammes of Papaine (or Papayotin) dissolved in 200 cubic centimètres of water, completely dissolved a living frog of 50 grammes weight in 24 hours, and this peculiar property of Papaine has been successfully employed in the removal and destruction of the false membrane formed in diphtheria. Tape-worms are also killed by this curious medicine, and as the tree is so common in India, its use and value deserve to be more generally known. The medicinal dose internally is 4 or 5 grammes. A liniment for Diphtheria Eczema, and Psoriasis, is made as follows: Papaine 12 grains, Borax in powder 5 grains, Water 2 drams. Pencil the parts with a brush twice a day or oftener.

#### MRYTALES.

*Flowers* regular or sub-regular, usually hermaphrodite. *Ovary* syncarpous, usually inferior. *Style* undivided, very rarely styles free. *Placentas* axile or apical, rarely basal. *Leaves* simple, usually quite entire, rarely tri-foliate in *Combretaceæ*.

#### Order ONAGRAREÆ.

*Corolla* polypetalous, epigynous, contorted in bud. *Stamens* inserted with the petals, equal or double them in number, rarely fewer. *Ovary* inferior, many-celled; many (rarely few) ovuled. *Albumen* none.

\* *Ovary* 2-6-celled, the cells many-ovuled. *Capsules* dehiscent loculicidally or septicidally, many-seeded. Usually terrestrial herbs.

#### JUSSIEA, *Linnaeus*.

*Stamens* twice as many as petals. *Ovary* 4-celled. *Capsule* septicidal.

*J. REPENS*, L.

Ponds and swamps all over Burma.

*J. Swartziana*, DC.

*J. floribunda*, Griff.

Creeping or floating herb. Flowers usually 5-merous, white, long-pedicelled. Seeds large, spongy.

*J. SUFFRUTICOSA*, L.

Mud banks and rice fields all over Burma.

var.  $\alpha$  *J. angustifolia*, Lam.

var.  $\beta$  Kamorta.

*J. exaltata*, Roxb.

*J. longipes*, Griff.

*J. Burmanni*, DC.

var.  $\beta$  *J. villosa*, Miq.

*J. fruticosa*, DC.

Erect, terrestrial. Flowers mostly 4-merous, very shortly pedicelled or almost sessile. Seeds minute, crustaceous, glossy.

#### LUDWIGIA, *Linnaeus*.

*Stamens* as many as petals. *Ovary* 3-6 celled. *Capsule* septicidal.

*L. PARVIFLORA*, Roxb.

*L. perennis* and *gracilis*, Miq.

*L. lythroides*, Bl.

<sup>1</sup> New Commercial Plants and Drugs, No. 5, Christy & Co., London.

Capsules from oblong to elongate-cylindrical, thick. Seeds densely covering the placentas.

- L. PROSTRATA*, Roxb. var. *a* Ava, Pegu, and the Andamans.  
*L. diffusa*, Ham. var. *β* Thonkyaghat.  
*Nematopyxis fruticulosa* and *pusilla*, Miq.  
 var. *a*. Plant erect, branched, leaves large.  
 var. *β*. Plant prostrate, leaves small.

Capsules almost filiform. Seeds in a single row.

\*\* *Ovary* 1-4-celled, the cells 1- (rarely 2-4-)ovuled. *Nut* 1-4-celled, 1-4-seeded.

*TRAPA*, *Linnaeus*.

*Flowers* 4-merous. *Ovary* 2-celled. *Nuts* with 2 or 4 spines or horns. Floating herbs.

\**T. BISPINOSA*, Roxb.

Tanks in Ava and Chittagong.

Nut with 2 opposite reflexed bearded spines.

The water-nut or Singhara of India is not much cultivated in Burma, but it is capable of yielding a prodigious supply of food, as, for example, in Kashmir, where it forms the staple food of some 30,000 souls for four or five months of the year. The nuts can be eaten raw, but are more palatable boiled, and have been likened to chestnuts in flavour.

#### Order LYTHRARIEÆ.

*Flowers* hermaphrodite, very rarely unisexual, regular, or rarely irregular. *Calyx* free, but often inclosing the ovary, 4-5- (very rarely 3- or 6- or more-)lobed or toothed, the lobes often alternating with as many accessory teeth. *Petals* as many as calyx-lobes, rarely wanting, inserted at the summit of the calyx-tube, usually clawed, imbricate and usually crumpled in the bud. *Stamens* as many as petals, or more or fewer, inserted in the calyx-tube. *Filaments* inflected in the bud. *Anthers* versatile, the cells opening longitudinally. *Ovary* superior, or (in a few abnormal genera) inferior, 2-6- (or rarely by abortion of the partitions 1-)celled, with usually numerous ovules attached to the axis, or very rarely parietal. *Style* simple, with a capitate or rarely 2-lobed stigma. *Fruit* a capsule, variously dehiscent, inclosed in or surrounded by the persistent calyx. *Albumen* none. *Embryo* straight. *Cotyledons* oblong, or orbicular-cordate. Herbs, shrubs or trees, with opposite, whorled, or sometimes alternate, simple leaves. *Stipules* none. *Flowers* in axillary or terminal panicles, cymes or clusters, rarely solitary.

+ *Capsule* irregularly dehiscent.

× *Seeds* glabrous. *Leaves* not black dotted.

† *Flowers* with petals, or rarely apetalous in some herbs.

° *Herbs*. *Capsule* 1-5-celled, irregularly or transversely dehiscent.

*AMMANIA*, *Linnaeus*.

*Calyx* 3-5-toothed. *Stamens* 2-8. *Disk-glands* none. *Leaves* opposite or rarely whorled.

Sub-genus *ROTALA*, L.

*Flowers* solitary (rarely and only occasionally by 2 or 3) in the axils of the leaves, or bracts, often forming spikes or racemes. *Capsule* 2-4-valved.

\* *Disk-glands* 8 under the ovary.

Sub-genus *HYDROLYTHRUM*, H. f.

*Calyx* 4-lobed. *Petals* 4. *Stamens* 4. *Disk-glands* 8. *Capsule* 2-celled. Aquatics, with whorled leaves.

A. (*HYDROLYTHRUM*) *WALLICHII*, H. f. Tavoy.

Aquatic herb of the habit of *Myriophyllum*, the leaves whorled, linear.

\*\* *Disk-glands absent (Rotala, L.).*

× *Calyx bell-shaped, thrice as deep as wide. Capsule shorter than, and included in, the calyx-tube.*

A. DENTELLOIDES, Kz.

Arakan in wet pastures.

Leaves very shortly petioled, 1-nerved, linear. Flowers solitary, sessile. Pygmy annual.

A. PEPLOIDES, Spreng.

Wet pastures all over Burma.

*A. (Peplis) Indica*, Willd.

*Ameletia elongata*, Bl.

*A. acutidens*, Miq.

*A. nana*, Roxb.

Leaves usually sessile, strongly penninerved, obovate to oblong. Flowers sessile, forming lateral and terminal leafy or bracted spikes.

A. SUBROTUNDA, Wall.

Segain and Northwards from Mandalay

Leaves sessile, almost orbicular, penninerved. Flowers shortly and slenderly pedicelled, forming shorter or longer slender racemes.

A. (AMELETIA) ROTUNDIFOLIA, Wight.

Bhamo and Khakyen Hills.

Leaves sessile, orbicular or nearly so, penninerved. Flowers sessile, in terminal peduncled bracted simple or compound spikes.

× × *Calyx hemispherical, about as deep as wide. Capsule protruded from, or at least as long as, the calyx-tube.*

A. PYGMEA, Kz.

Pegu Range, Western Slopes.

Leaves linear, 1-nerved, very shortly petioled. Calyx 4-angular, 4-toothed, about  $\frac{1}{4}$ – $\frac{1}{2}$  line long. Petals none. Pygmy herb.

A. SIMPLICIUSCULA, Kz.

Ponds and rice fields in Chittagong.

Leaves oblong to linear-oblong, 1-nerved, very shortly petioled. Calyx short, 4-toothed, about  $\frac{1}{3}$  line long. Flowers very shortly pedicelled. Pygmy herb.

A. PENTANDRA, Roxb.

Wet pastures all over Burma.

*Rotala Roxburghiana*, Wight.

*Sellowia uliginosa*, Roth.

*A. nana*, DC. non Roxb.

Leaves oblong to linear, sessile, 1-nerved, or the lateral nerves very faint. Calyx usually 5-toothed,  $\frac{1}{2}$ –1 line long. Petals 5.

Sub-genus AMMANIA, L.

Flowers pedicelled or partly sessile, axillary, clustered or in cymes, the latter sometimes reduced to 1 or a few flowers only. Capsule irregularly bursting.

× *Leaves narrowed at the base, petioled or sessile.*

A. BACCIFERA, L.

Fallows and road-sides all over Burma up to 3000 feet.

*A. vesicatoria*, Roxb.

*A. Indica*, Lamk.

*Cryptotheca apetala*, Bl.

Flowers minute, apetalous, on slender pedicels, forming sessile or very shortly peduncled cymes or clusters.

× × *Leaves sessile, with a cordate, sagittate or dilated base. Petals present.*

A. MULTIFLORA, Roxb.

Rice fields in Chittagong.

*Cryptotheca dichotoma*, Bl.

*A. microcarpa*, DC.

Capsule under a line long. Stamens 4, or fewer. Petals not crumpled. Calyx 4-toothed, without accessory teeth. Cymes slender.

A. AURICULATA, Willd.

Rice fields in Chittagong.

Capsule about  $1\frac{1}{2}$  line long. Stamens 6-8. Petals not crumpled. Calyx 4-toothed, without accessory teeth. Cymes slender.

A. OCTANDRA, L.

Rice fields in Chittagong.

*Amanella linearis*, Miq.

*Diplostemon octandrum*, Miq.

Capsule about 2 lines long. Stamens 8. Petals large, crumpled. Calyx 4-toothed, with as many horn-shaped accessory teeth. Cymes and pedicels short, stout.

°° *Trees or shrubs.*

PEMPHIS, *Forster.*

*Calyx* 12-toothed, ribbed. *Petals* 6. *Stamens* 12. *Ovary* 3-celled. *Capsule* 1-celled, transversely circumsciss.

P. ACIDULA, Forst.

Rocky coasts of Tenasserim and the Andamans.

*P. angustifolia*, Roxb.

*MacClellandia Griffithiana*, Wight.

LAWSONIA, *Linnaeus.*

*Calyx* 4-parted. *Petals* 4. *Stamens* 8. *Ovary* and *capsule* 4-celled, the latter irregularly bursting.

\* L. INERMIS, L.

Cultivated all over Burma.

*L. alba*, Lamk.

*L. spinosa*, L.

Indian privet.

Mason writes: "This is the camphire of the English Bible, and the cypress shrub of the Greeks and Romans. 'The cypress plant,' says Rosenmuller, 'is held in particularly high esteem by the Greeks, the Arabs, and the Turks; and they think that they make an agreeable present when they offer a person a posy of its flowers.'"

There is a little confusion here. Kupros or *Cyprus* is given in dictionaries as *Eastern privet* (*Cyprus shrub*), but it has nothing in common with Kuparessos, or the *Cypress tree*, which was no shrub, but associated in descriptive pieces with lofty and conspicuous trees, as, for example, in that pretty description (sketched in a style suggestive of the Poly-Olbion of our own Drayton) of Peneos attending the wedding of Peleus and Thetis—

"Confestim Penēos adest, viridantia Tempe,  
Tempe, quæ sylvæ cingunt superimpendentes,  
Nereidum linguens, claris celebranda choreis,  
Non vacuus, namque ille tulit radicitus altas  
Fagos, ac recto proceras stipite Laurus,  
Non sine nutanti Platano, lentâque rore  
Flammati Phaëthontis, et aëriâ Cupressu."

*Catullus*, Nupt. Pel. et Thet. l. 285.<sup>1</sup>

The plant makes a good hedge, and its leaves crushed and applied to the extremities give that colour to the skin and nails which Orientals admire, not only

<sup>1</sup> Penēos comes from Tempê's green retreat;  
(Tempê, whose sword sustains the Nereids' feet;  
When mirthful they in tuneful strains contend,  
To laud that vale o'erhanging woods defend.)  
Nor giftless comes; for ranged about are seen  
The spreading Beech, the Laurel's deathless green,  
The fluttering Planes, the Poplars straight and tall,  
That mourn no more their darling Phaëthon's fall.  
And lofty Cupresses, with roots upturn,  
Th' Emathian Hall to deck on that auspicious morn.

in their own persons, but in the manes and tails of their horses, which they habitually thus decorate.

†† Flowers apetalous. Trees or shrubs.

CRYPTERONIA, Blume.

*Calyx* 4-5-cleft. *Stamens* 4-5. *Ovary* and *capsule* 2-celled, the latter 2-valved.

C. (HENSLOWIA) PANICULATA, Miq. *E.T.* var. *α* Chittagong. var. *β* Tropical  
Anan-hpyu (Kuruz),<sup>1</sup> or Bō. forests from Arakan to Tenasserim.

*Calyx* 1-1½ line in diameter. Leaves quite glabrous.

var. *α* *glabra*, Planch. Rachis of racemes glabrous, at least in fruit.

var. *β* *pubescens*, Griff. Rachis of racemes densely puberulous, not glabrescent.

×× *Seeds* pilose. *Calyx-tube* tubular, curved. *Stamens* declinate. *Leaves* black-dotted beneath.

WOODFORDIA, Salisbury.

*Calyx* 6-lobed. *Petals* 6, or none. *Stamens* 12, long-exserted. *Ovary* and *capsule* 2-celled, the latter elongate, sessile, loculicidally 2-valved.

W. (LYTHRUM) FRUTICOSA, L. var. *α* Ava. Pegu. Khakyen Hills.

W. *floribunda*, Salisb.

*Grislea tomentosa*, Roxb.

A very ornamental tree common in Prome, with bright red calyces, which, with the leaves, are collected for dyeing and tanning, and infused (as tea) are considered to be restorative. The gum resembles tragacanth, swelling up in water, and is used in calico printing to cover such parts as are not intended to receive the dye, and also in the manufacture of the native confection 'Luddoo.'

++ *Capsule* regularly opening into 3-8 valves, or berry-like and indehiscent. Trees or shrubs.

× *Capsule* dry or leathery, dehiscent.

LAGERSTÆMIA, Linnaeus.

*Calyx* bell-shaped, 4-6- rarely 7-cleft. *Petals* 4-6. *Stamens* numerous, in 2 or more rows. *Capsule* dry, almost woody, 3-6-celled and valved. *Seeds* laterally winged.

Sub-genus SIBIA, DC.

*Calyx* terete, without ribs or furrows.

\* *Inflorescence* and *calyx* glabrous.

L. PARVIFLORA.

Ava.

Leaves whitish glaucous beneath. Flowers hardly ½ inch across.

\* L. INDICA, L.

Cultivated. (Wild in Yunnan.)

Leaves green. Flowers 1½-2 inches in diameter.

\*\* *Inflorescence* and *calyx* covered with a rusty-coloured tomentum.

L. CALYCLATA, Kz.

Tropical forests East of Young-ngoo.

Flowers almost racemose, in panicles. *Calyx* by ½ or ⅔ shorter than the capsule.

Sub-genus ADAMBEA, Lamk.

*Calyx* furrowed, plicately ribbed or angular, the angles acute or almost winged.

\* *Ribs* or *angles* twice as many as *calyx-lobes*, the shorter ones terminating at the sinuses of the lobes, those of the longer ones extending over the lobes. *Petals* large.

<sup>1</sup> Kurz writes *Hpu*, which may mean either 'hpyu' or 'bo.'

+ *Inflorescence and calyx covered with a floccose tomentum. Calyx-lobes terminating in a bristle or short mucro.*

L. FLORIBUNDA, Jack. Tropical forests of Tenasserim and the Andamans.

Pyimmā-hpyoo (Kurz).

Adult leaves glabrous, acuminate. Tomentum rusty-coloured. Petals on short claws, not fringed.

L. TOMENTOSA, Presl. All over Pegu and Tenasserim.

Lai-za (Kurz).

Adult leaves puberulous beneath, acuminate. Tomentum whitish or yellowish. Petals on long slender claws, ciliolate.

×× *Inflorescence and calyx pruinous, or minutely whitish or greyish puberulous, all other parts glabrous.*

L. HYPOLEUCA, Kz. The Andamans.

Leaves whitish glaucous beneath. Calyx 10-12-angular, the angles acute.

L. FLOS-REGINÆ, Retz. All over Burma.

*L. reginæ*, Roxb.

*Adumbea glabra*, Lamk.

*Ketmia Indica*, Burm.

Pyimmā or Pyeng-mā.

Leaves green. Calyx plicately-sulcate, the ribs very obtuse and broader than the furrows.

L. MACROCARPA, Wall. From Ava to Tenasserim.

Kōng-pyimmā (Kurz).

Leaves green. Calyx longitudinally furrowed, without ribs.

\*\* *Angles of calyx as many as plain lobes and alternating with them. Petals minute.*

L. VILLOSA, Wall. Tropical forests of Pegu and Martaban.

Young-ka-lay (Kurz). (Perhaps Yōng-ga lē.)

All softer parts greyish pubescent. Angles of calyx almost winged. Flowers small.

Several species of *Lagerstræmia* yield useful timber, especially *L. flos-reginæ*, or Pyeng-mā or Pyim-mā, which is in large demand.

#### DUABANGA, Hamilton.

*Calyx* 4-7-parted, thick coriaceous. *Petals* 4-7. *Stamens* numerous, in a single row. *Capsule* leathery, 4-8-celled and valved. *Seeds* appendaged at both ends.

D. (LAGERSTRÆMIA) GRANDIFLORA, Roxb. All over Burma and the Andamans.

*D. Sonneratioides*, Buch.

×× *Capsule* berry-like, indehiscent.

#### SONNERATIA, Linnaeus.

*Calyx* bell-shaped, 4-8-lobed. *Petals* 4-8, or none. *Stamens* numerous. *Berry* many-celled.

\* *Stigma* infundibuliform-capitate, small.

× *Petals* linear-lanceolate, dark purple.

S. ACIDA, L. E.T.

All over Burma and the Andamans.

Lamoo.

*Calyx* terete, 6-8-lobed. Leaves obovate, broad. Timber worthless.

× × *Petals none.*

*S. (MANGIUM) ALBA*, Rumph.

Sea-shore of the Andamans.

Calyx in bud elliptically oblong, acute, the tube at first obscurely, then strongly 6-8 angular.

The roots of *S. acida* and *S. alba*, and perhaps of other species also, send up from out the nut, wherein they are implanted, long spindle-shaped excrescences. These are of a firm close texture, almost devoid of fibrous structure, and can be cut into thin slices and are admirably adapted for insect boxes and setting boards, as the material receives readily the finest pin. Doubtless they would serve many purposes for which cork is used in Europe.

*S. GRIFFITHII*, Kz.

Pegu and Tenasserim.

Ta-hpyoo (Kurz).

Calyx in bud ovoid, obtuse, the tube terete.

\*\* *Stigma large, nearly 3 lines in diameter, conically umbrella-shaped.*

*S. APETALA*, Buch.

From Chittagong to Tenasserim.

Kam-balā (Kurz).

Calyx 4-lobed. Petals none. Leaves oblong to lanceolate.

Wood red, strong, not hard. Good for building and other purposes.

The timber of *Lagerstrœmia*, *Crypteronia*, and some others is valuable. Henna, a reddish orange dye, is the produce of *Lawsonia*, and a similar dye is obtained from the flowers of *Woodfordia*.

#### Order GRANATÆ.

*Calyx-lobes* valvate. *Petals* 5 to 7, epigynous, imbricate in bud. *Stamens* many, many-seriate. *Ovary* with 2 superimposed tiers of cells, upper tier with parietal, lower with central placentation. *Berry* traversed by membranous septa. *Seeds* with fleshy testa, exalbuminous. *Cotyledons* convolute. *Leaves* sub-opposite, simple, exstipulate, not gland-dotted. Shrubs.

*PUNICA*, *Linnaeus*.

\* *P. GRANATUM*, L.

Cultivated in Prome and Ava.

Tha-lai.

The Pomegranate is a native of Asia Minor, ranging to the Western Himalayas, but cultivated in all temperate regions. The finest in India are imported from Kabul. The fruit is mildly acidulous, and makes a pleasant sherbet. The bark and rind possess considerable astringency, and are used in tanning, and in fine powder boiled with milk for dysentery. The bark of the roots is anthelmintic, and given for tape-worm. The fruit, in decorative art, is highly symbolical, on which subject see Pugin's *Glossary of Ecclesiastical Ornaments*, *Mythologie des Plantes*, vol. ii. p. 166, and Inman, *Ancient Faiths*, vol. iv. p. 612.

#### Order MELASTOMACÆ.

*Flowers* regular, hermaphrodite. *Calyx-tube* inclosing the ovary, and either cohering with its angles, leaving intermediate cavities, or entirely free or more or less adnate to it. *Limb* entire, or 3-6-lobed or toothed, usually imbricate in bud. *Petals* 3-5, rarely 6, imbricate (usually contorted). *Stamens* usually twice as many, sometimes only as many as petals, and inserted with them, the filaments curved down in the bud. *Anthors* 2-celled, opening by 1 or 2 pores at the top, or very rarely dehiscing longitudinally, the connective often variously extended or thickened. *Ovary* inclosed in the calyx-tube and adnate to it, or more or less free, with 2 to 6 or rarely more cells, with the placenta in the axis, or rarely 1-celled by the abortion of the partitions. *Style* simple, with a minute stigma. *Orules* several, rarely 2 only, to each placenta, anatropous. *Fruit* inclosed in the calyx, or combined with

it, a berry, or a capsule with as many openings as there are cells, usually many-rarely few- or 1-seeded. *Albumen* none. *Embryo* straight or curved, the cotyledons plano-convex or thick and variously folded, radicle short. Herbs or shrubs, very rarely trees, with opposite, simple, 3-11-nerved leaves (very rarely 1-nerved and penninerved). *Stipules* none. *Flowers* often gaily coloured, usually in terminal panicles or clusters, rarely axillary or solitary.

The berries of many species of this Order are edible, but dye the mouth black, whence the name *Melastoma*.

#### Sub-order MELASTOMEÆ.

*Ovary* 2- or more-celled, the placentas attached to the middle or base of the axial angle, usually elongate, rarely sessile. *Seeds* usually numerous and minute, rarely few and large. *Leaves* usually 3-7-nerved from the base.

\* *Placentas* attached to the middle of the axial angle. *Anthers* opening by 1 or 2 apical pores.

× *Capsule* dry or rarely sappy, dehiscing by apical valves, rarely irregularly rupturing.

#### OSBECKIÆ.

*Ovary* with a conical or convex free apex. *Connective* usually produced beyond the base of the anthers. *Capsule* dry or berry-like. *Seeds* minute, cochleate.

#### OSBECKIA, Linnæus.

*Anthers* usually all equal or nearly so. *Fruit* a capsule.

\* *Petals* 8. *Stamens* 3.

× *Flowers* small. *Calyx-tube* bell-shaped. *Anthers* short or abruptly beaked.

*O. CHINENSIS*, L. All over Pegu.

*O. linearis*, Bl.

*O. Zeylanica*, DC.

*Calyx* not ribbed, glabrous or more or less covered with long fringed scales. *Anthers* prolonged into a bristle-like beak.

var. *a genuina*. *Flowers* sessile. *Calyx-tube* not or sparingly ciliate-sealy, about 3 lines long or longer, the lobes broad, about as long as the tube.

var. *β* *O. linearis*, Bl.; *O. Zeylanica*, DC. *Calyx* somewhat smaller and shorter, almost spherical, more or less covered with long-hairy scales, sometimes (in bud) appearing densely pilose. *Flowers* nearly twice as large, on short pedicels, the calycine lobes shorter and narrower.

× × *Flowers* rather large and conspicuous. *Calyx-tube* elongate urceolate, in fruit produced into a tubular neck overtopping the bristle-crown of the capsule.

*O. (MELASTOMA) CRINITA*, Roxb.

Chittagong and hills East of Tonng-ngoo at 4000 to 7000 feet.

Bristly hairy. *Calyx* covered with peltate stellate-bristly scales, the ciliate lobes linear-subulate, alternating with as many minute teeth conform with the lobes. Branches 4-cornered.

*O. ROSTRATA*, Don.

var. *a* Chittagong and Pine forests of Martaban at 3500 to 5000 feet. var. *β* Pegu. var. *γ* Rangoon and Taong-doung (Ava?).

Almost glabrous or minutely bristly. *Calyx* sparingly sprinkled with minute ciliate scales, or smooth, the lobes lanceolate, usually ciliate, alternating with minute ciliate teeth. Branchlets 4-cornered.

var. *a pulchella*, Roxb. The 4-cornered stems and branchlets and leaf-nerves minutely bristly. *Calyx-tube* covered with ciliate scales.

var.  $\beta$  *longicollis*, Trian. Leaves, the 4-cornered stem and branches glabrous, the latter usually bristly fringed between the petioles. Calyx and its lobes quite glabrous, or only the latter ciliate.

var.  $\gamma$  *ternifolia*, Trian. Pretty glabrous, branches 8-cornered, calyx less stellate-bristly, without additional teeth between the lanceolate-linear calyx-lobes.

\*\* *Petals* 5. *Stamens* 10.

O. NEPALENSIS, Hook.

Khakyen hills.

More or less densely pubescent. Petiole very short or the leaves almost sessile. Bracts broadly obovate. Calyx loosely covered with rotundate fringed scales.

O. ASPERICAULIS, H. f.

Tenasserim (?).

More or less appressed bristly, the branches much tubercled. Petiole  $\frac{2}{3}$ -1 inch long. Bracts lanceolate. Calyx appressed setose.

OXANTHERA, Blume.

*Anthers* equal. *Fruit* a berry.

O. BRACTEATA, Korth.

Tenasserim.

MELASTOMA, Linnaeus.

*Anthers* always unequal. *Fruit* a berry.

× *Leaves* more or less appressed bristly hairy or pubescent.

+ *Calyx* covered with closely appressed chaffy scale-like bristles.

M. MALABATHRICUM, L. E.S.

In waste spots all over Burma.

*Trembleya rhymanthera*, Griff.

Myet-pyai.

Scales of calyx about  $\frac{1}{2}$  line long or longer, often rather broad, the calycine lobes shorter, often only half as long as the tube. Leaves usually appressed-strigose on both sides, usually acute.

A small procumbent form is common at Kamorta.

I have no clear idea as to the differences between the various species of this alliance. Bentham reduces all the 40 species enumerated by Naudin as "species magis ad *M. Malabathricum* vergentes ideoque difficilins distinguendæ," while Triana keeps most of them distinct, without assigning diagnostic characters to them (Kurz).

M. NORMALE, Don. E.S.

Khakyen Hills and Martaban up to 5000 feet.

*M. Nepalense*, Lodd.

Scales of calyx up to a line long, chaffy, ciliate or finely cleft, the calycine lobes about as long as the tube, ovate to lanceolate, acuminate, alternating with as many short subulate teeth. Leaves on both sides, or beneath only, softly appressed-pubescent, usually acuminate.

+ + *Calyx* covered with squarrose spreading scale-like bristles about 2 lines long.

M. HOUTTEANUM, Naud. E.S.

Pegu Range, Martaban, and the Andamans.

Leaves softly appressed-pubescent on both sides.

M. CORDIFOLIA, Roxb.

Chittagong.

M. CURVA, Roxb.

Chittagong.

M. POLYANTHUM, Bl., also occurs at the Nicobars.

OXYSPORIEÆ.

*Connective* acute or spurred behind, not appendaged in front. *Seeds* angular or ob'long to club-shaped.

OXYSPORA, De Candolle.

*Calyx* costate. *Stamens* 4, equal, or 8 and usually unequal. *Ovary* and the club-shaped capsule adnate to the calyx. *Flowers* laxly cymose, in terminal panicles.

O. (MELASTOMA) CERNUA, Roxb. E.S.S. Chittagong.

Glabrous. Branchings of panicle 4-cornered or 4-winged. Bracts persistent. Connective without any appendage.

ALLOMORPHIA, Blume.

*Calyx* costate. *Stamens* 8 or 10, nearly equal. *Ovary* free or adnate to the bottom of the calyx. *Capsule* ovoid, included in the urceolate costate calyx. *Flowers* clustered or almost whorled, in narrow terminal panicles.

A. HISPIDA, Kz.

Upper Tenasserim.

Habit of *A. Griffithii*, the stems, petioles and the 9 strong ribs beneath densely covered with long brownish bristles. *Calyx*-teeth minute.

A. UMBELLATA, H. f. E.S.

St. Matthias Island, Mergui Archipelago.

Quite glabrous. Leaves 5-ribbed. *Calyx*-lobes with a thick wing-like appendage on the back.

OCHTHOCHARIS, Blume.

*Calyx* terete and smooth. *Stamens* 10, equal. *Ovary* and capsule adnate to the calyx, the latter globular, smooth. *Cymes* axillary, or collected into terminal panicles.

O. JAVANICA, Bl.

Tenasserim.

ANERINCLEISTUS, Korthals.

*Calyx* terete. *Anthers* 8, equal. *Capsule* 4-valved at the top, almost free. *Flowers* in axillary fascicles or umbellets.

A. HELFERI, H. f.

Tenasserim (or the Andamans).

*Calyx* softly appressed-pubescent.

A. GRIFFITHII, H. f.

Mergui Archipelago.

*Calyx* very densely and spreadingly hirsute.

SONERILIEÆ.

*Ovary* broadly curved out and depressed at the 3-5-cornered top. *Connective* rarely produced at the base. *Capsule* opening at the top into 3-5-cornered valves, rarely terete. *Seeds* minute, straight, angular, never cochleate.

SONERILA, Roxburgh.

*Flowers* 3-merous. *Stamens* 3 or 6. *Capsule* 3-celled. Herbs, or rarely under shrubs, sometimes stemless.

\* *Capsules* terete or trigonously-terete.

× *Anthers* elongate.

S. LINEARIS, H. f.

Maulmain at 3000 feet.

Annual, 2 feet high, glabrous, or nearly so. Leaves narrow-linear, serrulate.

× × *Anthers* short.

S. STRICTA, Hook.

Maulmain.

Annual,  $\frac{1}{2}$  foot high, puberulous. *Calyx* slightly downy and glandular-hairy.

\*\* *Capsules* sharply 3-gonous or 3-quetrous.

× *Anthers* short.

S. TENERA, R. Br.

Laterite rocks and Pagodas all over Pegu and Tenasserim, North of Tavoy.

Small annual, 1-5 inches high, sparingly and spreadingly gland-hairy. Leaves 4-8 lines long, ovate to oval. *Capsule* usually with a few hairs.

× × *Anthers long-acuminate.*

+ *Caudescent herbs.*

† *Stem short and very thick, scared.*

S. BRANDISIANA, Kz.

Thoung-yeen.

Quite glabrous. Leaves lanceolate, decurrent, 4-7 inches long.

†† *Stems elongate, slender and leafed.*

S. PICTA, Korth.

Mergui.

S. MACULATA, Roxb.

Tenasserim, between 3000 and 5000 feet.

*S. angustifolia*, Roxb.

Herb, 1-1½ foot high, sparingly hairy. Leaves 3-4 inches long, more or less cordate at the base, decussately opposite. Capsules glabrous.

var. *α genuina*. All parts sprinkled with hairs. Leaves bristly serrulate, usually ovate and equilateral, above elegantly white-blotched.

var. *β emaculata*, Roxb. As preceding, but the leaves uniformly green.

var. *γ angustifolia*, Roxb. Leaves usually acute or acuminate at the very unequal base, not blotched, but often purplish coloured beneath.

S. SECUNDA, Wall.

Tavoy.

As preceding, but leaves whorled.

++ *Scapigerous stemless herbs.*

S. VIOLEFOLIA, H. f.

Maulmain.

Leaves 5-7-plinerved. Calyx 4-toothed. Petals oblong, acuminate.

SARCOPYRAMIS, Wallich.

Flowers 4-merous. Stamens 8. Capsule 4-celled, included in the succulent calyx. Succulent glabrous herbs.

S. LANCEOLATA, Wall.

Ava Hills and Nāt-toung in Martaban

*S. grandiflora*, Griff.

at 6000 to 7000 feet.

× × *Berry sappy or coriaceous, irregularly rupturing.*

#### MEDINILLIÆ.

Ovary wholly, or only its angles, adnate to the calyx, the convex or conical top free. Stamens conform, or the alternating ones reduced to curiously-shaped staminodes, inserted on the limb or thrust into the cavities formed by the adhesion of the ovary-angles to the calyx. Anthers usually recurved.

× *Stamens very unequal.*

ANPLECTRUM, A. Gray.

Anthers 4 or 8, the connective usually not appendaged in front, shortly spurred behind. Ovary 4-crested at the top. Panicles often axillary.

A. (MELASTOMA) CYANOCARPUM, Bl.

Hills East of Toung-ngoo.

A. (?) BARBATUM, Wall.

Tenasserim (Chappedong).

Kurz adds from the Nicobars:

OPANTHERA NICOBARENSIS, T. et B.

Katchall and Great Nicobar.

\*\* *Placentas inserted to the base of the axial angle or to the walls of the cells. Anthers opening by longitudinal slits.*

#### ASTRONIÆ.

Ovules numerous. Berry coriaceous or succulent, many-seeded, the seeds minute.

## PTERNANDRA.

*Calyx* smooth or scaly, the limb truncate, obscurely 4-lobed. *Stamens* 8. Trees or shrubs.

*P. CAPITELLATA*, Jack. Tenasserim (or the Andamans).

Flowers in small stout almost simple cymes.

*P. CÆRULESCENS*, Jack. Tenasserim. Kamorta.

*Eurykia Jackiana*, Walp.

*Apteuxis trinervis*, Griff.

*Eurykia paniculata*, Miq.

Flowers in branched rather slender axillary and terminal panicles.

## Sub-order MEMECYLEÆ.

*Ovary* 1-celled, with a free central placenta, to which 6 or more ovules are attached in a whorl. *Berry* succulent or coriaceous, 1-seeded. *Embryo* large, the cotyledons much folded and leafy.

MEMECYLON, *Linnaeus*.

*Anthers* 8, equal. Trees or shrubs, with pinninerved or rarely 3-nerved leaves.

\* *Calyx* inside without radiate lamella-like nerves, or the nerves very obsolete.

*M. UMBELLATUM*, Burm. E.S.

Boronga Island.

*M. tinctorium*, Koen.

*M. ramiflorum*, Lamk.

Myen-khae-ta-nyet.

Leaves sessile or nearly so, opaque, drying yellowish. Cymes sessile, umbel-like. *Calyx* conspicuously 4-toothed.

Wood very strong and tough, and close-grained. Leaves and flowers yield a yellow dye (Knrz).

\*\* *Calyx* radiately nerved within, the nerves simple or forked, raised and lamella-like, like the gills of a mushroom.

× *Berry* ovoid or ovoid-oblong. Cymes and pedicels very short and robust.

*M. CÆRULEUM*, Jack. E.S.

var. γ Tenasserim.

*M. lutescens*, Presl.

*M. Manillanum*, and *M. laurifolium*, Naud.

*M. floribundum*, Bl.

*M. cordatum*, Griff.

Leaves sessile or very shortly petioled, with the base rounded or cordate.

×× *Berry* globose, from the size of a pea to that of a cherry.

† Cymes short and sometimes reduced. Leaves usually thick coriaceous, without visible lateral nerves or veins, petioled.

△ Berries the size of a pea or smaller.

† Branchlets more or less terete, sometimes marked with obsolete lines.

○ *Calyx* up to a line in diameter, not tubercled.

*M. LEVIGATUM*, Bl. E.T.

Tavoy.

*M. pachyderma*, Wall.

Leaves attenuate at the base, very acuminate, glossy. Petiole 1–2 lines long. Pedicels hardly a line long, thick. Cymes very short, almost sessile.

*M. PLEBEIUM*, Kz. E.T.

Bhamo. Pegu. Thoung-yeen.

Leaves attenuate at the base, sharply acuminate. Pedicels 1–1½ line long. Umbel-like cymes shortly peduncled.

♀ ♀ *Calyx about  $1\frac{1}{2}$  line across, tubercled.*

*M. PUNCTATUM*, Presl. *E.S.* Tenasserim.

Pedicels short and thick. Calyx undulate-truncate, with a hemispherical tubercled base. Leaves bluntish or reflex, shortly acuminate.

†† *Branchlets sharply 4-lined or almost 5-winged and appearing more or less 4-cornered.*

*M. SCUTELLATUM*, Naud. *E.S.* var.  $\beta$  Pegu and Tenasserim.  
var.  $\alpha$  in Siam.

Calyx smooth, about  $1\frac{1}{2}$  line across, expanded, obsolete undulate-lobed. Cymes almost sessile or shortly peduncled. Leaves as in preceding species.

var.  $\alpha$  *subsessile*. Umbellets on peduncles less than a line long or almost sessile. Pedicels about a line long. Leaves smaller.

var.  $\beta$  *brevi-pedunculatum*. Umbellets on peduncles 1 to 2 lines long, the pedicels usually 2 lines long. Leaves larger.

*M. PAUCIFLORUM*, Bl. *E.T.* Tropical forests of Chittagong, Tenasserim and the Andamans.

Calyx about  $\frac{1}{2}$  line wide, sharply 4-toothed. Leaves only  $\frac{1}{2}$ – $1\frac{1}{2}$  inch long. Pedicels about a line long. Cymes much reduced, almost sessile, few-flowered.

△ △ *Berries the size of a cherry, sappy.*

*M. CERASIFORME*, Kz. *E.T.* Chittagong.

+ + *Cymes more or less ample, peduncled. Berries the size of a pea or smaller.*

† *Leaves rather thin-coriaceous, the lateral nerves more or less conspicuous and arcuately anastomosing towards the margin.*

*M. CELASTRINUM*, Kz. *E.T.* Tropical forests of Martaban.

Cymes simple, the pedicels slender. Calyx  $1$ – $1\frac{1}{2}$  line wide. Leaves those of *M. cerasiforme*.

var.  $\alpha$  *genuinum*. Leaves glaucous-green, coriaceous. Cymes stiff peduncled.

var.  $\beta$  *Brandisianum*. Leaves of a thinner texture, more (often caudately) acuminate. Cymes short or very short, simple or the lateral branchings almost reduced. Peduncles 2–4 lines long, pedicels more slender.

*M. GRIFFITHIANUM*, Naud. *E.S.* Tropical forests East of Toung-ngoo  
*M. Horsfieldii* and *Lampongum*, Miq. and Tenasserim.

Umbellets in thyrsoid cymes, the pedicels 1–2 lines long. Calyx  $\frac{2}{3}$  line wide, the limb sinuate 4-angular.

†† *Leaves more or less thick-coriaceous, the lateral nerves not or barely visible.*

° *Leaves sessile, with a cordate base.*

*M. PULCHRUM*, Kz. *E.T.* Andamans.

Leaves large. Cymes lax, peduncled, rather slender. Pedicels 2–3 lines long, slender.

° ° *Leaves petioled, more or less tapering, very rarely rounded, at the base.*

△ *Branchlets sharply 4-cornered. Leaves tapering at base.*

*M. ELEGANS*, Kz. *E.S.* Andamans.

Cymes rather short-peduncled, but slender. Leaves 3–4 inches long.

△ △ *Branchlets terete or with only faint lines.*

*M. OVATUM*, Smith, *E.S.* Chittagong to Tenasserim.

*M. grande*, Wall.

*M. lucidum*, Presl.

*M. prasinum*, Naud.

Leaves attenuate at the base, blunt or retuse. Petiole 1-2 lines long. Pedicels  $\frac{1}{2}$ -1 line long, slender. Cymes simple or compound, peduncled.

M. EDULE, Roxb. *E.T.*

Tenasserim, the Andamans and Cocos.

*M. ramiflorum*, Griff.

Leaves rounded at the base, smooth and shining. Petiole 2-4 lines long. Pedicels 2-3 lines long. Cymes simple or compound, peduncled.

Kurz adds from the Nicobars :

M. SUBTRINERVIVM, Miq.

Tropical forests of Kamorta.

var. *grandifolia*, Kurz.

Leaves 8-10 inches long.

"A small tree which I identify with Miquel's *M. subtrinervium*, on the supposition that the berries in Miquel's plant would, when full grown, reach a similar size. As a species it is a very distinct one, being one of the few that have the berry not globular" (Kurz).

The genus *Memeylon* is in need of a thorough revision. The species are extremely difficult of correct identification without access to the very authentic specimens for the most part deposited in European herbaria, and hence inaccessible to the Indian botanist. Triana's account of the genus is barely more than a compilation. I have, therefore, kept the Burmese forms all separate pending a comparison and identification of the same with those already described (Kurz).

Mason adds :

M. AMPLEXICAULE.

(*fide* Parish).

#### Order MYRTACEÆ.

*Flowers* regular, hermaphrodite, or rarely by abortion polygamous. *Calyx-tube* more or less adnate to the ovary, the limb 4-5- (very rarely 3- or more than 5-) parted or toothed, or reduced to a narrow border, or entirely wanting, imbricate, or open in bud. *Petals* usually as many as calyx-lobes, much imbricate in bud, the outer ones sometimes larger in bud than the inner, or rarely all cohering and falling off in an entire operculum. *Stamens* indefinite, usually numerous, or rarely few and definite, inserted in 1 or several series on a thinner or thicker disk lining the calyx-tube above the ovary or close round the ovary-summit. *Filaments* free or rarely united at the base, or separated into as many bundles as calyx-lobes. *Anthers* versatile, or basifixed, longitudinally dehiscent, or rarely opening in terminal pores. *Ovary* inferior, or rarely almost superior, but inclosed in the calyx-tube, 2- or more- (very rarely 1-) celled, with 2 or more uni- or multi-seriate ovules, attached to the parietal or axile placentas. *Style* simple, with a small entire or rarely lobed stigma. *Fruit* inferior, very rarely all or almost wholly superior, and supported by the calyx-tube, crowned with the persistent calyx-limb or its scar, either loculicidally capsular, with as many valves as ovary-cells, or indehiscent and berry or drupe-like. *Perfect seeds* often few, rarely numerous. *Albumen* none or almost none. *Embryo* and *Cotyledons* various. *Trees* or shrubs, very rarely under shrubs. *Leaves* simple, opposite or rarely alternate, usually gland-dotted. *Flowers* solitary or variously arranged, into axillary or terminal inflorescences. *Bracts* 1 or more. *Bractlets* 2, often minute, and very fugaceous.

#### LEPTOSPERMIEÆ.

*Ovary* 2-5- rarely more-celled. *Fruit* a capsule, either opening at the summit in as many valves as there are cells, or very rarely indehiscent.

\* *Stamens* united into 5 separate bundles.

#### MELALEUCA, Linnaeus.

*Staminal bundles* alternating with the petals. *Flowers* in heads or spikes. *Leaves* alternating.

M. LEUCADENDRON, L. *E.T.*

Mergui (rare).

*M. Cajuputi*, Roxb.

The leaves yield by distillation the light green, limpid and volatile *Cajuput* oil, which is so beneficial both applied externally and exhibited internally in Rheumatism and Gout. Combined with camphor liniment it is often singularly efficacious when rubbed over the affected part. It is a diffusible stimulant and excites the action of the heart (Waring).

TRISTANIA, *R. Brown.*

*Staminal bundles* opposite the petals. *Flowers* in cymes or corymbs. *Leaves* broad, alternate, rarely opposite.

\* *Calyx-lobes blunt or almost so.*

T. MERGUENSIS, Griff. *E.S.*

Mergui.

*Leaves* sessile or nearly so, rigidly coriaceous, glossy on both sides. *Flowers* sessile or nearly so. *Calyx* about 3 lines across.

T. BURMANICA, Griff. *E.T.*

Pegu Range and Tenasserim up to 4000 feet.

Toung-yoh-pyu-zing (Kurz).

*Leaves* petioled, thin coriaceous, opaque beneath. *Flowers* pedicelled. *Calyx* only  $1\frac{1}{4}$  line across. *Capsule* exserted.

\*\* *Calyx-lobes subulate-acuminate.*

T. GRIFFITHII, Kz. *E.T.*

Mergui.

*T. conferta*, Griff. vix R. Br.

*Leaves* crowded, narrowed at both ends. *Flowers* large. *Capsule* hardly exserted.

#### MYRTIÆ.

*Ovary* 2- or more-celled. *Fruit* an indehiscent berry or drupe, very rarely opening by an apical opercle. *Leaves* opposite, dotted (*Eu-Myrticæ*).

× *Stigma* peltate or capitate. *Testa* of seeds hard. *Cotyledons* small.

+ *Ovules* 2-6 in each cell.

DECASPERMUM, *Forster.*

\* *Ovary* 5- or rarely 4-celled. *Embryo* long and narrow, curved, circular or spiral.

D. (NELITRIS) PANICULATUM, Ldl. *E.T.*

var. *a* Martaban and Tenasserim

*Eugenia polygama*, Roxb.

at 3000 and 4000 feet.

*N. pallescens*, Miq.

+ + *Ovules* numerous, in 2 or more series.

RHODAMNIA, *Jack.*

*Ovary* 1-celled, with 2 parietal placentas. *Leaves* 3-nerved.

R. TRINERVIA, DC.

var. *a* Tenasserim.

var. *a* *R. cinerea*, Griff. non Jack.

Kamorta.

*R. concolor*, Miq.

*Leaves* green on both sides, beneath thinly puberulous or almost glabrescent.

var.  $\beta$  *R. spectabilis*, *subtriflora*, and *Muelleri*, Bl.

*R. nageli*, Miq.

*R. cinerea*, Jack.

*Leaves* beneath covered with a minute silvery pubescence.

PSIDIUM, *Linnaeus.*

*Ovary* 2-7- (usually 4-5)-celled, the placentas often 2-lamellate. *Leaves* penni-nerved.

\* *P. GUYAVA*, L.Cultivated in Burma and likewise wild on  
Kamorta and Katchall.

Ma-la-ka-pu (Kurz).

var. *a* *P. pyriferum*, L. Peduncles 1-flowered. Fruits pear-shaped.var. *β* *P. pomiferum*, L. Peduncles usually 2-flowered, with a third flower in  
the axil of the forking. Fruits globular or ovoid.× × *Stigma* simple, minute. *Testa* of seed membranous.*EUGENIA*, *Linnaeus*.*Ovary* 2-3-celled, with several ovules in each cell. *Embryo* thick and fleshy,  
either indivisible or with 2 thick fleshy cotyledons, the radicle short. *Flowers*  
4- rarely 5-merous, solitary or in cymes or panicles. *Leaves* penninerved.Sub-genus *SZYGIUM*, Gaertn.*Calyx* smooth inside, without intra-staminal thickened ring. *Calyx-limb* often  
obsolete and turning truncate after defloration. *Petals* free or often cohering in a  
deciduous calyptra. *Flowers* usually small. *Berries* often small, globular to ovoid  
and cylindrical, more or less sappy, 1- rarely 2-seeded.\* *Calyx* elongate and cylindrical, or shorter and obversely conical (*Acmena*, Wight).× *Flowers* in simple or almost simple axillary racemes, sometimes much reduced.  
*Calyx* much elongate. *Berries* ovoid.*E. CLAVIFLORA*, Roxb. *E.T.*Tropical forests of Tenasserim, the Andamans,  
Kamorta, and Great Nicobar.

Tha-byē (generic).

*Calyx* tubular-narrowed,  $\frac{1}{2}$ -1 inch long, the lobes broad and rounded. *Berries*  
about an inch long, ovoid-oblong, crowned by the calyx-lobes.*E. LEPTANTHA*, Wight. *E.T.*Tropical forests of the Pegu Range, Tenasserim,  
and the Andamans.*Calyx* club-shaped,  $\frac{1}{3}$ - $\frac{1}{2}$  inch long, the limb truncate. Berry clavate-oblong,  
only  $\frac{1}{3}$ - $\frac{1}{2}$  inch long, crowned by the cup-shaped truncate calyx-limb.× × *Flowers* in more or less corymb-like axillary and terminal panicles. *Calyx*  
more or less obconical.+ *Calyx* at base contracted pedicel-like.*E. GRATA*, Wall. *E.T.*

Tenasserim. Rangoon.

*Calyx* smooth. *Leaves* somewhat glaucous and rather opaque beneath. *Berries*  
black.*E. ZEYLANICA*, Wight non Roxb. *E.T.*Tropical forests of Tenasserim and  
the Andamans.*Jambosa bracteata*, Miq.

Tha-byē-pouk (Kurz).

*Calyx* (dried) granular-rough. *Leaves* rather glossy beneath. *Berries* white.++ *Calyx* sessile, not narrowed pedicel-like at base.*E. CONTRACTA*, Wall. *E.S.*

Tropical forests of Tenasserim.

*Leaves* more or less linear, net-veined between the remote indistinct irregular  
lateral nerves.The Martaban specimens dry blackish and have the net-venation less prominent.  
They may possibly form a large and long-leaved variety of *E. cuneata*, Wall.Another species from Tenasserim, nearly allied to the above, has larger leaves of a  
thinner texture and very lax net-venation. It is no doubt new, but the inflorescences  
are too young for description. It has white, while the above has red-brown  
bark (Kurz).*E. BRACTEOLATA*, Wight. *E.T.*

Tenasserim.

*Leaves* more or less oblong, somewhat glaucous beneath, not net-veined  
between the close-set parallel lateral nerves.

\* \* *Calyx hemispherical to funnel shaped, sessile or contracted pedicel-like at the base.*

× *Leaves usually opaque, green, the lateral nerves more or less distant, somewhat irregular, net-veined between. Inflorescence usually lateral from the older branches.*

+ *Calyx sessile, not tapering pedicel-like at the base.*

† *Leaves green on both sides.*

*E. OPERCULATA*, Roxb. *E.T.* Swamp forests of Pegu and Martaban.

Petiole  $\frac{1}{2}$ – $\frac{2}{3}$  inch long. Leaves broader, not decurrent. Flowers more than 3 together. Panicle longer peduncled, the last ramifications very short.

*E. OBOVATA*, Wall.

Ava. Bhamo.

Thi-tha-byē (Kurz).

As preceding, but leaves more obovate. Panicle very short peduncled or almost sessile, more lax. Flowers often by threes.

*E. PANIALA*, Roxb. *E.T.*

Chittagong.

Leaves acuminate decurrent on a short petiole, more acuminate.

†† *Leaves glaucous or glaucescent beneath.*

*E. CINEREA*, Wall. *E.T.*

Tropical forests of the Southern Pegu Range and Tenasserim.

Branchlets terete or nearly so. Panicles more or less peduncled. Calyx soon truncate, the lobes obsolete.

Possibly not different from the following species, which I know only from Roxburgh's description and figure (Kurz).

+ + *Calyx narrowed into a longer or shorter pedicel like base. Panicle short, sessile or nearly so, usually branched already from the base.*

† *Calyx-lobes well developed, up to  $\frac{1}{2}$  line long.*

*E. PRECOX*, Roxb. *E.T.*

Chittagong.

Similar to *E. cinerea*, the branchlets greyish. Calyx-lobes  $\frac{1}{2}$  line long.

*E. CERASOIDES*, Roxb. *E.T.*

Chittagong and Tenasserim. var.  $\beta$

Tha-byē-chin (Kurz).

Khakyen Hills.

Branchlets brownish. Racemes sometimes corymb-like, slender, short.

var.  $\beta$  *angustifolia*. Leaves on shorter and thicker petioles, linear to oblanceolate-linear, with fewer more remote and arcuate nerves. Panicles shorter and stouter, the ultimate branchings much reduced. The pedicel-like base of calyx shorter. Berries the size of a pepper-corn, globose, almost sessile, crowned by the truncate calyx-limb. Probably a distinct species (Kurz).

†† *Calyx soon truncate, the lobes obsolete.*

*E. TETRAGONA*, Wight. *E.T.*

Khakyen Hills, 3000 to 4000 feet.

Branchlets brown, 4-cornered, often winged, especially while young.

*E. BALSAMEA*, Wight.

Burma (*vide* Mason).

Branchlets white, terete. Panicles cyme-like, short.

× × *Leaves usually glossy, often drying blackish or brownish, the lateral nerves all thin and vein-like, more or less crowdedly parallel-running.*

+ *Calyx narrowed into a longer or shorter pedicel-like base.*

† *Inflorescence lateral from the older branchlets.*

*E. FRUTICOSA*, Roxb.

Chittagong. Pegu Range and Tenasserim.

Tha-byē-ni (Kurz).

Calyx a line long, almost sessile. Ramifications of panicle sharply 4-cornered. Berries ovoid, the size of a pea. Branchlets brownish.

\* *E. JAMBOLANA*, Lamk. *E.T.*

Ava. Tenasserim and the Andamans.

Tha-byē-hpyu.

Calyx 2 lines long, tapering into a thick pedicel-like base. Ramifications of the panicle obsoletely 4-cornered. Berries ovoid-oblong,  $\frac{1}{2}$  inch long. Branchlets white.

†† *Inflorescence terminal (and often also axillary on the same branch).*

‡ *Branchlets brown.*

◦ *Leaves bluntish acuminate to blunt.*

*E. CYMOSA*, Lamk. *E.S.*

Tenasserim.

*E. toddaloides*, Wight.

*Jambosa tenuispis*, Miq.

Leaves thin coriaceous, the lateral nerves thin but distinct. Petiole 3 lines long, slender.

*E. MYRTIFOLIA*, Roxb. *E.S.*

Maulmain.

Leaves firmly coriaceous, the lateral nerves obsolete. Petiole thick, not above a line along.

◦◦ *Leaves long and sharply acuminate.*

*E. (MYRTUS) ACUMINATISSIMA*, Bl. *E.T.*

Tenasserim (or the Andamans).

Leaves almost chartaceous, pale-coloured beneath. Petiole about 2 lines long.

‡‡ *Branchlets white.*

*E. VENUSTA*, Roxb. *E.T.*

Tippera Hills and Touk-ya-ghat, East of Toung-ngoo.

*Syzygium Gardneri*, Thw.

Tha-byē-khā (Kurz).

Leaves bluntish-acuminate, almost chartaceous, elegantly transversely veined.

++ *Calyx not or scarcely contracted at the base, sessile. Leaves blackish or reddish in drying.*

† *Branchlets white.*

*E. RUBENS*, Roxb. *E.T.*

Chittagong and Tenasserim.

*Jambosa Wightiana*, Bl.

Leaves chartaceous. Calyx-lobes about a line long. Petals 2 lines long or longer. Filaments 4-5 lines long.

If my identification prove correct, then it is only the length of the stamens and a thinner texture of the leaves that separate this species from *E. thumra*. The petals and sepals, too, are nearly twice the size.

*E. THUMRA*, Roxb. *E.T.*

Tropical forests of the Pegu Range and Tenasserim.

Tor-tha-byē.

Leaves coriaceous, the lateral nerves strong and prominent. Calyx-lobes and petals shorter. Filaments 2-3 lines long. Berries obovoid.

† *Branchlets red-brown.*

*E. OBLATA*, Roxb. *E.T.*

Tropical forests of Martaban and Tenasserim.

Tha-byē-ni.

Like preceding, but lateral nerves thin and vein-like. Berries almost globular, the size of a large cherry.

*E. (SYZYGIUM) OCCUSA*, Miq. (K.).

Katchall.

Sub-genus JAMBOSA, DC.

*Calyx* inside usually with a circular or 4-angular intra-staminal ring, or the stamens inserted on the thickened ring itself. *Flowers* often large. *Calyx-lobes* conspicuous and persistent. *Berries* usually large, more or less turbinate or ovoid, the endocarp thick and fleshy. *Seeds* large.

\* *Calyx-lobes in fruit spreading.*

× *Calyx less than  $\frac{1}{2}$  inch long.*

+ *Flowers sessile in terminal and often also in axillary panicles.*

† *Leaves glossy, firmly coriaceous, the lateral nerves thin and parallel.*

E. GRANDIS, Wight.

Pegu and Tenasserim.

*E. cymosa*, Roxb. non Lam.

Toung-tha-byē (Kurz).

Leaves 5-6 inches long, blunt or nearly so. Panicle corymb-like, peduncled.

Berry obovoid-pear-shaped, about an inch long.

var. γ *E. lepidocarpa*, Wall.

Upper Tenasserim.

*Syzygium Palembangicum*, Miq.

Leaves only 2-3 inches long, decurrent at the base, bluntish acuminate.

E. PACHYPHYLLA, Kz. *E.T.*

Upper Tenasserim at 3000 feet.

Leaves cuneate at the base. Panicles sessile, reduced and cluster-like, the ramifications very short and thick, joint-like.

†† *Leaves opaque, coriaceous, the lateral nerves curved and distant.*

E. TRISTIS, Kz. *E.T.*

Loungkim, Tenasserim.

Leaves long-petioled. Panicle terminal, corymb-like.

++ *Flowers pedicelled. Leaves more or less chartaceous, the lateral nerves curved.*

E. LANCEIFOLIA, Roxb. *E.T.*

Chittagong.

Panicles axillary and terminal. Calyx-base thick, pedicel-like, the true pedicel very short or almost wanting. Leaves thin coriaceous.

E. ALBIFLORA, Duthie. *E.T.*

Ava (probably).

Panicle almost corymb-like, little branched from the base. Calyx-base clavate-narrowed, the true pedicel 3-6 lines long. Leaves coriaceous.

E. KURZII, Duthie. *E.T.*

Hills East of Toung-ngoo and Sikkim  
and Khasya Hills.

*E. cerasiflora*, Kz.

Racemes simple, slender, lateral or axillary. Calyx-base filiform and pedicel-like, the true pedicels long and filiform. Leaves membranous.

× × *Calyx an inch long or longer.*

E. FORMOSA, Wall. *E.T.*

Tropical forests of Chittagong and

*E. ternifolia*, Roxb.

Upper Tenasserim.

Leaves large, almost sessile, rounded at the base. Corymbs lateral and terminal.

\*\* *Calyx-lobes in fruit incurved or inflexed.*

× *Flowers sessile or nearly so.*

E. (JAMBOSA) MACROCARPA, Miq. *E.T.*

Pegu Range and Tenasserim.

Leaves rounded at the base, the petiole very short. Corymbs terminal.

E. AMPLEXICAULIS, Roxb. *E.T.*

Chittagong.

Leaves sessile with a cordate base, blunt. Branchlets white, terete. Corymbs small, lateral.

Specimens from the tropical forests of Upper Tenasserim come nearest to this species. They differ apparently by the sharply 4-angular branchlets and bluish

acuminate or bluntish leaves. The inflorescence is terminal, but otherwise quite agrees with Roxburgh's figure. The shape of the leaves is very variable, some of them almost agreeing with those of *E. aquia* (Kurz).

\* *E. MALACCENSIS*, L. *E.T.* Planted in Tenasserim.

*Jambosa domestica*, Rumph.

Tha-hpyu-tha-byē.

Leaves acuminate at both ends. Panicle cluster-like, reduced and lateral.

× × *Flowers truly or spuriously pedicelled.*

+ *Leaves opposite.*

† *Leaves rounded at the base. Fruits obversely turbinate, waxy, white or rose-coloured.*

\* *E. (JAMBOSA) AQUEA*, DC. *E.T.* Cultivated from Chittagong to Tenasserim.

Branchlets usually 4-cornered and often winged white or pale rose-coloured. Leaves acuminate, the intramarginal nerve as strong as the lateral.

*E. JAVANICA*, Lamk. *E.T.* The Andamans. Katchall.

Branchlets terete, brown. Leaves bluntish, the intramarginal nerve faint.

†† *Leaves narrow, acute at the base, petioled.*

\* *E. JAMBOS*, L. *E.T.* Cultivated all over Burma.

*Jambosa vulgaris*, DC.

Berries almost globular or ovoid, dull-yellow.

+ + *Leaves whorled by threes, narrow, obtuse at the base.*

*E. POLYPETALA*, Wall. *E.T.* Chittagong.

*E. angustifolia*, Roxb.

Leaves linear or linear-lanceolate, almost sessile. Petals 4-16.

Mason gives the following vernacular names for several species of *Eugenia*: Tha-byē-htan-shit, Tha-byē-hsat-khyac, Tha-byē-ta-o-kyē, Tha-byē-ni, Kywai-laik-tha-byē, Tha-byē-set-galē.

The wood of many species of *Eugenia* is dark-brown or reddish, heavy, and close-grained, but of inferior quality, brittle, and liable to warp and decay. Possibly some species might yield a good timber for furniture if properly seasoned. But as ornamental and roadside trees the *Eugenias* have but few superiors, from the dense foliage they possess; but whether they would flourish in such spots, remains to be seen.—W.T.

#### Sub-order *LECYNTHIDEÆ*.

*Leaves* alternate, not dotted. *Calyx* nearly valvate, rarely imbricate.

#### BARRINGTONIA, *Forster*.

*Stamens* all perfect. *Ovary* 2- or 4-celled, with numerous ovules in each cell. *Fruit* fibrous or fleshy, often angular, 1- or very rarely 2-4-seeded.

B. (MAMMEA) ASIATICA, L. *E.T.* The Andamans, Tenasserim, and the Nicobars. *B. speciosa*, Forst.

*Agnota Indica*, Miers.

Kych-gyi.

B. CONOIDEA, Griff. *E.S.* Coast forests of Tenasserim.

*Butonica alata*, Miers.

Leaves serrulate. Racemes rather erect, puberulous.

Miers brings part of this species to his *B. alba*, and in this case, as elsewhere, accuses the editor of Griffith's Posthumous Papers of having confused the plates, but in this he is greatly in error (Kurz).

Sub-genus STRAVADIUM, JUSS.

*Calyx* already in bud 3-4-celled, the lobes imbricate.

\* *Ovary* 4-celled. *Rachis* of raceme very thick.

+ *Calyx-tube* winged. *Fruits* narrowly winged on the corners. *Flowers* sessile.

B. (DOXOMMA) ANGUSTA, Miers. *E.T.* Tenasserim. Tavoy (Parish).

*Calyx*-lobes rounded, 2 lines long. Leaves obtuse or acute at the base, not decurrent.

B. PTEROCARPA, Kz. *E.T.*

Tropical forests of the Pegu Range and Tenasserim.

*Doxomma magnificum*, Miers.

Kyeh (generic).

*Calyx*-lobes triangular-ovate, more or less acute, more than 3 lines long. Leaves long-decurrent.

Very nearly allied to the preceding, from which it differs in the few characters above given. The unripe fruits a good deal resemble those of *Doxomma Cochinchinense*, Miers, but this species has very long slender petioles.<sup>1</sup>

Sub-genus BUTONICA, Rumph.

*Calyx* closed in bud, entire, valvately rupturing into 2 to 4 lobes. *Ovary* 4-celled. *Flowers* pedicelled.

\* *Fruit* angular, without appendages, 1-seeded.

B. RACEMOSA, DC. *E.T.*

The Andamans, Tenasserim, and Nicobars.

*Butonica rubra, inclyta*, and *Zeylonica*, Miers.

Flowers about an inch in diameter, in long slender pendulous racemes. Leaves crenulate, very shortly petioled.

\*\* *Fruit* conically pyramidal, with short wing-like basal appendages.

+ + *Calyx-tube* terete or angular, not winged.

× *Flowers* sessile.

B. MACROSTACHYA, Kz. *E.T.*

Southern Tenasserim.

*Doxomma sarcostachys* and *acuminatum*, Miers.

Leaves elongate, entire, long-petioled. *Calyx* angular.

× × *Flowers* pedicelled.

B. (CAREYA) PENDULA, Griff.

Tenasserim.

Leaves elongate, long-petioled. *Calyx* terete.

\*\* *Ovary* 2-celled. *Rachis* of raceme slender. *Fruits* sharply 4-angular.

B. (EUGENIA) ACCTANGULA, L.

All over Burma.

*Stravadium demissum* and *pubescens*, Miers.

*St. Rheedii*, Bl.

*St. coccineum*, DC.

Glabrous or pubescent. Flowers rather small, red. Leaves crenulate, shortly petioled.

CAREYA, Roxburgh.

Outer or inner series, or both, without anthers. *Fruit* globose to ovoid, many-seeded, the seeds imbedded in pulp. *Ovary* 4-celled.

Sub-genus CAREYA, Roxb.

Outermost and innermost series of stamens reduced to filaments. *Embryo* consolidate.

<sup>1</sup> "B. agnote valde affinis sed differt foliis longe decurrentibus et calycis lobis" (Kurz).

\* *Flowers sessile. Trees.*

*C. ARBOREA*, Roxb.

All over Burma.

Ban-bwē.

Petals blunt or rounded, concave. Ovules in 2 rows in each cell.

Wood described as reddish-brown, tough and durable. Weight 55 lbs.

*C. SPHERICA*, Roxb.

Chittagong Hills.

Petals acute, the borders revolute. Ovules in 6 rows in each cell.

Sub-genus *PLANCHONIA*, Bl.

Only the innermost row of stamens reduced to filaments. Cotyledons 2, distinct.

*C. (PIRIGARA) VALIDA*, Blume.

The Andamans.

*Planchonia littoralis*, Bl.

Fruits ellipsoid, angular-ribbed.

*LEUCYMMÆA SALICIFOLIA*, Presl.

Maulmain (*vide* Helfer).

A genus which is entirely enigmatic to me. The gamopetalous corolla and the insertion of the very numerous stamens on the bottom of the calyx form a puzzling combination of characters. If the corolla be incorrectly described, we may guess *Myrtaceæ* as its probable affinity (Kurz).

More than 50 species of this Order, all woody plants, are found in Burma. Astringent principles prevail in the bark, and it is therefore often used for tanning purposes. Fragrant aromatic or pungent volatile oil abounds also in the *Myrtaceæ*. The buds of *Caryophyllus aromaticus* yield our cloves. All-spice or pimento-pepper is derived from *Pimenta*. Several furnish good dessert fruits, like guava, jambo, rose-apple. Heavy, usually brown-coloured timber is obtained from the various species of *Eugenia* and *Careya* (Kurz).

#### Order COMBRETACEÆ.

*Flowers* hermaphrodite, rarely polygamously dioecious, or unisexual. *Calyx-tube* terete, or angular, more or less narrowed above the ovary, the limb usually bell-shaped, 4-5- (rarely more-)toothed, lobed, or parted, valvate, or very rarely imbricate, persistent or deciduous. *Petals* none, or as many as calyx-lobes, usually small, imbricate, or valvate. *Stamens* as many or twice as many as calyx-lobes, rarely numerous, in a single or triple series, inserted on the calyx, or epigynous. *Filaments* straight, or inflexed in bud, sometimes alternating with glands or staminodes. *Anthers* versatile, and opening longitudinally, or adnate and opening by 2 valves. *Epigynous disk* none, or lobed. *Ovary* inferior, 1-celled, with 2 or more, or very rarely a single pendulous ovule. *Style* filiform, or scarcely any, with an entire terminal stigma. *Fruit* various, dry or drupaceous, indehiscent, or very rarely dehiscent, winged or not. *Seed* solitary, pendulous. *Albumen* none. *Cotyledons* convolute, or folded, very rarely flat, radicle short, superior. Trees or shrubs, often climbing, with alternate or opposite, rarely whorled, simple or rarely 3-foliate leaves. *Stipules* none. *Flowers* usually small, in axillary or terminal inflorescences. *Bracts* usually small. *Bractlets* sometimes larger, often wanting.

#### Sub-order COMBRETEÆ.

*Calyx-lobes* valvate. *Stamens* without alternating glands at the base, the filaments often inflexed in bud. *Anthers* versatile, opening in longitudinal slits. *Ovary* with 2 to 12 suspended ovules. *Flowers* in racemes, spikes, or heads.

\* *Calyx-limb deciduous.*

× *Calyx-tube* short, constricted, but not produced beyond the ovary.

TERMINALIA, Linnæus.

*Petals* none. *Stamens* inflexed in bud, exserted. *Flowers* spiked or paniced.

Sub-genus MYROBALANS, Gaertn.

*Fruit* a fleshy drupe, compressed or obsoletely angular, the putamen bony.

\* *Spikes simple, solitary in the leaf-axils.*

° *Spikes quite glabrous.*

\* *T. CATAPPA*, L. Andamans, the Nicobars, and cultivated all over Burma.  
*T. Moluccana*, Lamk.

Glabrous or pubescent. Petioles very short, the base of the broad leaves more or less rounded. Drupes  $1\frac{1}{2}$ –2 inches long, compressed.

The kernels of this tree are known on breakfast-tables in Calcutta as ‘country almonds,’ and are pleasant to eat.

*T. PROCERA*, Roxb. Tropical forests of the Andamans.

As preceding, but glabrous, the base of the leaves more or less acuminate. Drupes about an inch long, obsoletely 5-angular, ovoid-oblong, red inside.

*T. KURZIANA*, Theobald. Kamorta.

*Terminalia* (sp. nov. Kurz, J.A.S.B. 1876, p. 130).

Leaves narrower and more cuneate than in *T. catappa*. Flowers and fruit not known.

200° *Spikes puberulous or tomentose.*

*T. BELERICA*, Roxb. All over Burma up to 2000 feet.

*T. fatidissima*, Griff.

Thyt-sein.

Leaf-buds rusty villous. Leaves obovate, on 2–3 inch long petioles, usually silky pubescent. Drupes obovoid, silky puberulous.

\*\* *Spikes more or less panicled at the end of the branchlets, puberulous or tomentose.*

*T. CHEBULA*, Retz. Chittagong.

*T. reticulata*, Roth.

Young shoots and under side of the oblong leaves rusty villous, the petiole short. Ovary villous. Drupes oval, glabrous.

*T. TOMENTELLA*, Kz. Pegu and Tenasserim.

Hpān-gā.

As preceding, but ovary quite glabrous, the flowers and fruits much smaller, the leaves more coppery villous beneath.

*T. CITRINA*, Roxb. Tenasserim and the Andamans.

var. *Malayana*. Nankowry.

Very young shoots rusty villous. Leaves smooth and glabrous, acuminate, the petiole short. Drupes oblong-lanceolate, obsoletely 5-cornered, glabrous.

Sub-genus PENTAPTERA, Roxb.

*Fruit* a dry nut, with a chartaceous or fibrous-coriaceous pericarp, compressed, or 3–5-cornered, winged.

\* *Nuts usually 3-cornered, the angles expanded into 2 equal, or 3–1 unequal wings (Chuncoa, Pav.).*

× *Nuts large, equally 2-winged,  $1\frac{1}{2}$ –2 inches long. Spikes simple, axillary.*

*T. (PENTAPTERA) BIALATA*, Roxb. Andamans.

Lēu.

All parts glabrous. Spikes puberulous or tomentose. Leaves obovate, the petiole 2–3 inches long. Nut 3-cornered, with 2 large equal spreading wings, about 3–3½ inches across.

T. (PENTAPTERA) PYRIFOLIA, Presl. Pegu and Tenasserim.

Lên.

As preceding, leaves smaller and shorter petioled. Nuts equally 2-winged, only  $\frac{1}{2}$ – $\frac{3}{4}$  inch across.

× × Nuts small, unequally 2-3-winged. Spikes forming terminal panicles.

T. MYRIOCARPA, Heurck and Muell. E.T. Khakyen Hills.

Fruits much smaller than in preceding, equally 2-winged, almost glabrous, pale coloured.

\* \* Nuts 4- or 5-cornered, all the angles expanded into equal wings.

T. ALATA, Roth. All over Pegu and Martaban.

*Pentaptera tomentosa*, Roxb.

*T. elliptica*, Willd.

Htonk-kyân.

All parts more or less greyish tomentose. Leaves strongly net-veined beneath, the petiole short, furnished with 2 stalked turbinate glands.

T. CRENULATA, Roth. Arakan, Pegu Range, and Tenasserim up to 2000 feet.

*Pentaptera glabra*, Roxb.

*T. Arjuna*, Bedd.

Htonk-kyân.

All parts glabrous. Leaves not prominently net-veined beneath, the petiole short, with 2 stalked turbinate glands. Spikes panicle, like the calyxes, puberulous or almost tomentose.

var. *macrocarpa*, Wall.

As preceding, but the panicle spikes and outside of calyx quite glabrous.

Several *Terminalias* afford splendid timber. *T. crenulata*, the *Htonk-yan* (or *Arjun* in India), is an admirable brown wood, weighing 70 lbs., and of the largest scantling. Kurz (following Brandis) says 58 lbs., which I am confident is an error. *T. tomentella*, or *Hpân-gâh*, is an equally fine wood, very similar, and weighing 64 lbs. It is procurable of the largest scantling; and the yellowish sap wood is in large trees scarcely inferior to the dark brown heartwood. *T. pyrifolia* or *Lên* yields a poor timber, but is a highly ornamental and umbrageous tree, deserving of planting along roads and as an ornamental tree round houses.

Myrobalans are the dried unripe fruit of different species of *Terminalia*, and are classed as Chebulic (*T. chebula*), Citrine (*T. citrina*), Belleric (*T. bellerica*), and Emblic (*Emblia officinalis*). Good myrobalans yield 40 per cent. of tannic acid, but if allowed to ripen before being gathered are very deficient in tannin. Owing to the expense of grinding the myrobalans in England, Mr. Christy<sup>1</sup> remarks: "If a properly prepared extract of these different varieties could be obtained in India, there would be a very large demand for it by the tanners of England." To prepare the extract<sup>2</sup> the raw material, either myrobalans, barks or other products, must be ground or pulverized and macerated in sufficient cold water just to cover it for 24 hours. The first solution should now be pumped off and used with a fresh charge, and this may be repeated four times. The liquid fully charged with tannin may now be concentrated. This is recommended to be done in copper or earthen vessels, iron being wholly inadmissible, but the concentration could equally well be carried on in India (save in the rains) in open shallow brick pans which, if asphalted, would form most efficient evaporating pans by the sun's heat alone. If artificial heat is used, it must be carefully regulated and the specific gravity recommended for such

<sup>1</sup> New Commercial Plants and Drugs, Christy and Co., London.

<sup>2</sup> For fuller particulars consult Christy, *l.c.*

extract, for exportation, is 1·261; but, if the condensation is effected by the sun's heat, no limit of condensation need be fixed. If gun metal stamps were employed to reduce the materials to powder, they might be wetted, and the inconvenience thereby avoided, usually experienced from the irritating dust created.

To ascertain the presence of tannin in any wood, bark, leaf or fruit, prepare an infusion, and add thereto a warm solution of gelatine or isinglass; if tannin is present, a white precipitate will be formed. Mr. Christy also observes: "Should colonists or any enterprising firm be still uncertain as to the value of any tanning material, and how far it would be wise to convert it into extract, or otherwise, they can obtain more accurate information and the best advice on the subject by forwarding samples to me, and I will report not only as to the amount of tannic acid contained, but how far the material is suitable for the English market, and give advice as to the proper condition in which it should be forwarded."

COMBRETUM, *Linnaeus*.

*Petals* very rarely wanting. *Stamens* straight in bud. *Flowers* usually racemose or paniced. Usually scandent shrubs.

Sub-genus POIVREA, Comm.

*Flowers* 5-merous. *Stamens* 10, all equal or alternately shorter. *Fruits* usually 5-, rarely 4- or 6- or 8-cornered or winged.

\* *Calyx* funnel-cup-shaped.

× *Petals* none.

C. APETALUM, Wall. T.

Ava and Prome.

Nabu-nweh (Kurz).

Leaves only 1½-3 inches long. Panicles greyish velvety, the floral leaves not discoloured. The native name indicates a 'creeper.'—W.T.

× × *Petals* present.

C. (POIVREA) ROXBURGHII, DC. E.S.S.

All over Burma up to 3000 feet.

*C. decandrum*, Roxb.

Tha-ma-kā-nweh.

Leaves large, opposite. Panicles rusty or tawny tomentose, the floral leaves white-discoloured. Fruits with 5 chartaceous wings.

C. TRIFOLIATUM, Vent. E.S.S.

Swampy forests all over Burma.

*Terminalia lanceifolia*, Griff.

*Embryogonia lucida*, Bl.

Leaves often whorled by 2-4, smooth, coriaceous. Panicles greyish tomentose, without floral leaves. Fruits with 5 sharp thick almost wing-like corners.

C. TETRAGONOCARPUM, Kz. E.S.S.

Swampy forests of Pegu.

Similar to the preceding, but leaves strongly nerved and net-veined. Fruits sharply 4-cornered.

\*\* *Calyx*-tube tubular, the limb abruptly salver- or cup-shaped.

C. OVALE, R. Br. S.

Pegu Range and Hills East of Toung-ngoo.

Kyet-tet-nweh (Kurz). Non 'verum,' fide Clarke, sed *C. pilosum* var.

Racemes, petioles, and branchlets greyish or rusty puberulous or velvety.

C. PILOSUM, Roxb. W.C.

Khakyen Hills, Pegu and Tenasserim.

Panicles, petioles, and branchlets all rusty pilose. Fruits 5-winged, puberulous.

Sub-genus COMBRETUM, DC.

*Flowers* 4-merous. *Stamens* 8, equal or alternately shorter. *Fruits* usually 4-, rarely 5-winged or cornered.

\* *Calyx shorter or longer tubular-bell-shaped (the limb never abruptly cupular). Fruits winged, the wings chartaceous and broader than the diameter of the nut.*

× *Flowers shortly pedicelled.*

- C. EXTENSUM, Roxb. W.C. All over Burma. Car Nicobar.  
*C. rotundifolium*, Roxb.  
*C. Horsfieldii*, Miq.  
*C. platyphyllum*, Heurck and Muell.  
*C. formosum*, Griff.

Mō-ma-kā-nweh.

All parts glabrous, the leaves opposite. Inflorescence and flowers velvety.

× × *Flowers all sessile.*

- C. SQUAMOSUM, Roxb. S.S. Pegu and Tenasserim. Katchall.  
*C. lepidotum*, Presl.

All younger parts, the inflorescence, and leaves beneath coppery or rusty lepidote. Leaves large, opposite.

A 'sport' from Prome, with abnormal much-bracted inflorescences, has all the scales developed into yellowish hairs, so as to appear hirsute all over (Kurz).

- C. CHINENSE, Roxb. E.W.C. Chittagong and Hills East of Toung-ngoo  
*C. Griffithii*, Heurck and Muell. up to 3000 feet.

Leaves usually whorled in threes (at least in the older branchlets), glabrous, when young minutely lepidote. Inflorescence and young shoots puberulous.

- C. DASYSTACHYUM, Kz. E.W.C. Tropical forests of the Pegu Range  
and Martaban.

As preceding, but branchlets, petioles, and inflorescence all rusty tomentose. Leaves more or less pubescent beneath, never lepidote.

\*\* *Calyx funnel-cup-shaped. Fruits winged or angular.*

× *Fruits 4- or 5-winged, the wings chartaceous. Leaves and fruits small.*

† *Nuts smooth and glabrous.*

- C. (PENTAPTERA) PYRIFOLIUM, Wall. non Presl. Ava.

Young shoots rusty pubescent, the leaves and the 4- or 5-winged fruits glabrous. Branchlets terete.

- C. QUADRANGULARE, Kz. S.S. Tenasserim.

All parts, also the 4-winged fruits, silvery lepidote. Branchlets 4-cornered.

† † *Nuts fibrillose-hirsute.*

- C. WALLICHII, DC. S.S. Tropical forests of Chittagong. Khakyen Hills.

Leaves beneath resinose-dotted. Inflorescence brown-lepidote. Young shoots pubescent.

× × *Fruits 4-cornered, the angles thick and rounded.*

- C. COSTATUM, Roxb. Tenasserim.

Inflorescence and young branchlets rusty puberulous, the former also lepidote. Leaves large, strongly nerved, and parallel-veined.

× × *Calyx-tube elongate and produced beyond the ovary.*

ANOGEISSUS, Wallich.

*Calyx-tube* 2-winged at the base. Stamens 10, exserted. Leaves alternate. Flowers in heads, small.

\* *Beak as long as or longer than the nut.*

- A. (CONOCARPUS) ACUMINATA, Roxb. var. *a* from Chittagong to Tenasserim  
Yōng. up to 3000 feet. var. *β* swampy  
forests of Ava and Pegu.

This tree is cognizable by the bark, which consists of herbaceous green tubercles covered with a smooth grey epidermis which is easily scraped off. By this mark the tree can be recognized from all others in Burma, but in the plains (the var. *β*) the bark becomes white marmorate and conchoid (as in *Emblica officinalis*). I should certainly have specifically separated this swampy variety had I not met with trees that bore both kinds of bark. The wood is inferior (Kurz).

QUISQUALIS, *Linnaeus*.

*Calyx-tube* very long and slender, the limb small. *Stamens* 10, exserted. *Leaves* opposite. *Flowers* showy, in racemes.

- \* Q. INDICA, L. vars. *a* and *β* all over Burma, var. *γ* Khakyen Hills.  
Q. longiflora, Presl.  
Q. villosa, Roxb.

Da-weh-hmaing. Chinese honey-suckle. Rangoon creeper.

A scandent shrub with beautiful white, orange, or red flowers, which towards evening exhale a powerful perfume. It can be raised either from seed or cuttings, and is a luxurious and beautiful creeper for a house front.

\*\* *Calyx-limb persistent.*

CALYOPTERIS, *Lamarek*.

*Calyx-tube* 5-ribbed, not produced beyond the ovary, the limb enlarging. *Stamens* 10, included. *Leaves* opposite. *Flowers* racemose. Climbers.

- C. (GETONIA) NUTANS, Roxb. All over Burma up to 2000 feet.  
C. floribunda, W.A. non Roxb.

Kywôt-nē-uwch.

Leaves pubescent, rarely almost glabrous. Longer stamens  $\frac{1}{4}$ - $\frac{1}{2}$  as long as the acute calyx-lobes.

Wight and Arnott state that *C. nutans* with short stamens does not occur in Hindustan, but all the specimens which I have seen from there belong to *C. nutans*, none to *C. floribunda*, Lamk.

LUMNITZERA, *Willdenow*.

*Calyx-tube* elongate, narrowed beyond the ovary. *Stamens* 5 or 10, exserted. *Leaves* alternate. *Flowers* racemose. Trees or erect shrubs.

- L. RACEMOSA, Willd. Tropical forests all over Burma, the Andamans,  
Petaloma alternifolia, Roxb. and Great Nicobar.

Hmaing or Yen-yai.

Flowers white. Stamens 10, about as long as the petals.

- L. (PYRRANTHUS) LITOREUS, Jack. Mangrove swamps, Mergui, and a  
L. coccinea, W.A. straggler at Kamorta.  
L. pentandra, Griff.

Flowers crimson. Stamens 5-10, twice as long as the petals.

Sub-order GYROCARPEÆ.

*Calyx-lobes* valvate or imbricate. *Stamens* alternating with as many glands or staminodes. *Filaments* straight in bud. *Anthers* adnate, opening by a slit along the inner edge or by 2 valves. *Ovary* with a solitary pendulous ovule. *Leaves* alternate. *Flowers* cymose.

ILLIGERA, *Blume*.

*Calyx-lobes* valvate, deciduous. *Fruit* extended into 2 or 4 lateral wings. Climbers with 3-foliolate leaves.

- |                                 |        |   |
|---------------------------------|--------|---|
| I. APPENDICULATA, Bl.           | W. C.  | Tropical forests of Pegu, Tenasserim, and the Andamans. |
| <i>Coryzadenia trifoliata</i> , | Griff. |   |

GYROCARPUS, *Jacqueminot*.

*Calyx-lobes* imbricate, 2 of them persistent and enlarging, wing-like. *Nut* 2-winged at the top. Erect trees, with entire or lobed leaves.

- |                           |   |
|---------------------------|---|
| G. JAQUINI, Roxb.         | Coast forests of Tenasserim, the Andamans and Nicobars. |
| Pyn-leh-thyt-kouk (Kurz). |   |

## Order RHIZOPHOREÆ.

*Calyx-tube* usually adnate to the ovary, sometimes produced beyond it, rarely quite free, the limb 4-14-lobed, valvate. *Petals* as many as calyx-lobes and alternating with them, the margins usually induplicate, and embracing the stamens. *Stamens* as many or twice as many as petals, or more, inserted with them at the base of the free part or lobes of the calyx. *Anthers* erect or versatile, 2-celled, opening longitudinally. *Ovary* more or less inferior, or rarely quite superior, 2- or more-celled, with 2 or few pendulous ovules in each cell, or rarely 1-celled by obliteration of the partition. *Style* simple, with an entire or lobed stigma. *Fruit* inferior, or inclosed in the calyx. *Seeds* solitary or few, with or without albumen. The Rhizophors form an important agency in binding the muddy shores of tropical countries especially along estuaries. The bark of many is astringent, and good for tanning purposes. It is also often used for dyeing black. The timber of *Bruguiera* and others is hard and durable.

## Sub-order RHIZOPHOREÆ.

*Ovary* inferior. *Albumen* none. *Seeds* germinating on the tree, the thick radicle rapidly enlarging and protruding from the summit of the fruit. Salt-loving shrubs or trees.

\* *Ovary-cells with 2-6 ovules.*

RHIZOPHORA, *Linnaeus*.

*Calyx* 4-cleft. *Petals* entire. *Anthers* 8-12, nearly sessile. *Ovary* 2-celled, the cells 2-ovuled.

- |  |        |  |
|--|--------|--|
| R. MUCRONATA, Lamk.                        | E. T.  | Mangrove swamps in Arakan, Tenasserim, and the Nicobars. |
| <i>R. mangle</i> ,                         | Roxb.  |  |
| <i>R. stylosa</i> and <i>macrorrhiza</i> , | Griff. |  |

Hpyu (generic).

Flowers pedicelled, the petals villous along the borders. Stamens 8.

- |                        |        |  |
|------------------------|--------|--|
| M. CONJUGATA, L.       | E. T.  | Mangrove swamps in Arakan, Tenasserim, and the Andamans. |
| <i>R. candelaria</i> , | Griff. |  |

Flowers sessile, the petals quite glabrous. Stamens 8-12.

The timber of this genus deserves notice, being heavy and close-grained, and the bark of value for tanning.

CERIOPS, *Arnott*.

*Calyx* 5-6-cleft. *Petals* notched, appendaged. *Stamens* 10-12. *Ovary* 3-celled, the cells 2-ovuled.

- |                                  |   |
|----------------------------------|---|
| C. (RHIZOPHORA) DECANDRA, Griff. | Littoral forests all over Burma and the Andamans. |
| <i>C. Roxburghiana</i> ,         | Arn.  |

Kap-yaing.

Cymes compact, on very short peduncles. Petals bristly fringed towards their tips.

*C. CANDOLLEANA*, Arn.

Mangrove swamps in the Andamans and Nicobars.

Cymes rather lax. Petals terminated by 2 or 3 club-shaped appendages.

*KANDELIA*, *Wight et Arnott*.

*Calyx* 5-6-cleft. *Petals* cut. *Stamens* many, the filaments capillary. *Ovary* 1-celled, with 6 ovules.

*K. RHEEDEI*, W.A.

Littoral forests of Pegu and Tenasserim.

\*\* *Ovary-cells with a solitary ovule.*

*BRUGUIERA*, *Lamarck*.

*Calyx* 8-14-cleft. *Petals* 2-cleft, appendaged. *Stamens* 16-28, the filaments filiform. *Ovary* 2-4-celled.

Sub-genus *KANILIA*, Bl.

*Calyx-tube* almost club-shaped, the limb 8-cleft. *Petals* 8, bearing bristles at the tips. *Stamens* 16, the filaments filiform and longer than the cordate or ovate anthers. *Fruit* cylindrical.

*B. (RHIZOPHORA) PARVIFLORA*, Roxb.

Littoral forests of Tenasserim and the Andamans.

Hyu-soung.

*Calyx-tube* narrowed at the base, ribbed, the lobes very short and stiff.

*B. (RHIZOPHORA) CARYOPHYLLOIDES*, Griff.

Mouth of the Salween.

*Calyx-tube* obtuse at the base, smooth, the lobes nearly as long as the tube.

Sub-genus *MARGIUM*, Bl.

*Calyx-tube* almost bell-shaped, the limb 10-14-cleft. *Petals* 10-14. *Stamens* 20-28, the anthers linear, longer than the filaments. *Ovary* 3-4-celled. *Fruit* turbinate.

*B. GYMNORHIZA*, Lamk.

Littoral forests of Arakan, Tenasserim, the Andamans and Nicobars.

*B. Wightii* and *Rheedii*, Bl

*B. parietosa* and *B. 10-angulata*, Griff.

*B. eriopetala*, Wight.

#### Sub-order *LEGNOTIDEÆ*.

*Ovary* inferior, almost superior or free. *Embryo* imbedded in a fleshy albumen. *Seeds* germinating in the ordinary way.

\* *Ovary inferior. Calyx bell-shaped beyond the ovary.*

*CARALLIA*, *Roxburgh*.

*Calyx-lobes* short, erect. *Stamens* 10-16. *Ovary-cells* 2-ovuled. *Flowers* cymose.

*C. LUCIDA*, Roxb.

Pegu and Tenasserim up to 4000 feet.

*C. integerrima*, DC.

The Nicobars.

*C. Zeylanica*, Arn.

Ma-ni-ok-kā.

Leaves usually entire, petals not embracing the filaments.

*C. LANCEIFOLIA*, Roxb.

Tenasserim.

*C. confinis*, Bl.

Leaves serrulate. Petals embracing the filaments.

\*\* *Ovary superior or nearly so, with a broad base adnate to the calyx.*

*GYNOTROCHES*, *Blume*.

*Calyx* without bractlets. *Stamens* 8-10, filaments elongate. *Ovary-cells* 4-ovuled.

*G. AXILLARIS*, Bl.

Upper Tenasserim.

## ROSALES.

*Flowers* usually hermaphrodite, regular or irregular. *Carpels* one, or more, usually quite free in bud, sometimes variously united afterwards with the calyx-tube, or inclosed in the swollen top of the peduncle. *Styles* usually distinct.

## Order HAMAMELIDEÆ.

*Flowers* regular or irregular, hermaphrodite or unisexual. *Perianth* in male flowers sometimes wanting. *Calyx-tube* more or less adnate to the ovary, the limb truncate, or 4-5-lobed, valvate or imbricate. *Petals* as many, more, or fewer than calyx-lobes, or none. *Stamens* 4 or more, definite or indefinite, perigynous, 1-seriate. *Filaments* free. *Anthers* 2-celled, the cells opening laterally in various ways. *Ovary* inferior or half-inferior, rarely superior, consisting usually of 2 or rarely more carpels, usually free at the apex, and beaked, with 2 suspended ovules in each carpel, or rarely more, on axile placentas. *Style* usually persistent. *Fruit* a capsule, the carpels usually diverging at the apex, and each one opening in 2 short valves. *Albumen* thin fleshy. Trees or shrubs with usually alternate, simple or tri-lobed leaves. *Flowers* small, usually collected in heads, rarely racemose or spicate.

BUCKLANDIA, *R. Browne.*

*Flowers* polygamous, in heads, the calyces confluent. *Calyx-tube* almost campanulate, adhering to the ovary, the limb repand-5-lobed. *Petals* in hermaphrodite flowers linear-spatulate, often converted into stamens, in females reduced to 4 and rudimentary. *Stamens* 10 to 14, the filaments unequal, subulate. *Anthers* unequally 2-valved, the connective apiculate. *Ovary* semi-inferior, bifid at top, 2-celled with 6 biseriate ovules in each cell. *Styles* 2, recurved thick. *Capsule* nearly free, woody, 2-valved and 2-celled, the valves bifid, the cells 6-seeded or less, the fertile seeds winged upwards.

C. (LIQUIDAMBER) TRICUSPIS, Miq.

Hills East of Toung-ngoo, from 4000  
to 7200 feet.

*B. populnea*, R. Br.

A superb evergreen tree up to eighty feet in height. Leaves broadly ovate, glossy and coriaceous. Flower-heads small, greenish, compact on thick peduncles, covered with a rusty or coppery pubescence. Capsules as large as a pea, almost globular, seated on the cup-shaped calyces united into a solid head. Wood brown, heavy and close-grained, but soon attacked by insects. It is marked with the microscopic disks characteristic of all coniferous woods, and of many Hammelidæ and Magnoliaceæ.

ALTINGIA, *Noronh.*

*Flowers* unisexual, in heads supported by a single bract. In males, *Calyx* and *corolla* none. *Stamens* packed into a globular head. *Filaments* short. *Anthers* 4-cornered. In females, *Calyces* confluent, without limb. *Petals* none. *Anthers* rudimentary. *Ovary* semi-inferior, 2-celled, with many ovules in each cell. *Placenta* axile. *Carpels* produced into subulate recurved caducous styles. *Capsules* united into a globular head, each capsule opening superiorly by 2 valves. A single seed only fertile, winged and angular, the rest sterile. *Leaves* alternate, simple, glandular, serrate and deciduous.

A. EXCELSA, Noronh.

Tenasserim and Khakyen Hills.

*Sedgwickia cerasifolia*, Griff.

Nan-ta-yōk.

Mason writes: "The tree is indigenous on the Tenasserim Coast, and in some sections is quite abundant. A considerable stream in the province of Mergui derives its name from this tree, in consequence of its growing so thick on its banks. It seems to have escaped the notice of Dr. Helfer, for if I recollect right, it is not once alluded to in any of his reports, nor has it ever been brought to notice by any one,

if we except a Catholic priest, a resident of Rangoon, who has introduced it in a little Burmese medical treatise, that was lithographed a few years ago by Col. Burney, who took a lithographic press with him into Burma. This gentleman, however, seems to have mistaken the tree, for he describes it as the one that produced the Balsam of Peru (*Myrospermum Peruiferum*), and which belongs to a different natural family."

*Liquidamber altingia* is a large forest tree in Java, and one of those which yield liquid storax, a balsam containing benzoic acid, and possessing considerable influence over the mucous surfaces, and acting as a stimulating expectorant.

#### Order SAXIFRAGEÆ.

*Flowers* usually hermaphrodite and regular. *Calyx* 5- rarely 4-12-merous, free or adnate to the calyx, the lobes valvate or imbricate. *Petals* usually 4 or 5, rarely none, perigynous, rarely epi- or hypo-gynous, imbricate or valvate. *Stamens* as many or twice as many as petals, rarely indefinite. *Filaments* free. *Anthers* usually didymous. *Intrastaminal disk* often present, and sometimes passing into staminodes or glands. *Ovary* more or less adnate to the calyx, or if free usually attached to a broad base, either 2- to 5-celled, or with 2 to 5 parietal placentas, very rarely contracted at the base, or apocarpous, with several or very rarely a solitary ovule in each cell, or to each placenta. *Styles* as many as ovary-cells, free or rarely united. *Fruit* a capsule, or rarely berry-like and indehiscent. *Seeds* usually small, with or rarely without albumen. *Embryo* straight, small, or rarely rather large. Herbs, rarely shrubs or trees, with alternate or opposite, simple or compound leaves. *Stipules* present or not.

#### ESCALLONIEÆ.

*Trees or shrubs. Leaves alternate. Stipules none. Stamens as many as petals.*

#### POLYOSMA, Blume.

*Ovary* inferior, 1-celled. *Style* simple. *Fruit* a 1-seeded berry.

P. WALLICHII, Benn.

Tropical forests of the Andamans.

Very near to *P. ilicifolia*, Bl., but the flowers are smaller and the fruits different.

#### Order DROSERACEÆ.

*Petals* 5, hypogynous, imbricate. *Stamens* 5, rarely more. *Anthers* extrorse. *Ovary* usually 1-celled, and with parietal placentation. *Capsule* with semi-placentiferous valves. *Embryo* albuminous.

#### DROSERA, Linnaeus.

*Stamens* 4-8. *Styles* 2-5, simple, 2-parted, or many-cleft. *Ovary* 1-celled. Glandular-pilose herbs, scapiferous or not.

× *Leaves* radical or nearly so, rosulate. *Scapes* leafless.

D. BURMANI, Vhl.

Chittagong. Rare in Promo.

*Leaves* obovate-spathulate. *Flowers* white or pale rose.

× × *Leaves* scattered. *Scapes* leafy.

D. INDICA, L.

Pegu and Tenasserim.

*Leaves* linear. *Flowers* purple.

D. PELTATA, Sm.

Nāt-toung East of Toung-ngoo at 7000 feet.

*D. lunata*, Ham.

Upper Tenasserim from 1500 to 3000.

*D. Lobbiana*, Turcz.

The most familiar example of this Order is the Venus fly-trap (*Dionaea muscipula*), with its sensitive and insecticidal leaves, which close over the unwary fly which alights thereon.

## Order CRASSULACEÆ.

*Petals* usually free, perigynous or sub-hypogynous. *Stamens* as many as the petals. *Carpels* as many as the stamens, distinct, with a gland or scale at the base of each carpel, 2- to many-ovuled, follicular when ripe. Usually succulent herbs.

SEMPERVIVUM, *Linnaeus*.

\*S. TECTORUM, L. (M.).

Ywet-kych-pen-pouk. House-leek.

The juice of the house-leek is said to remove corns, and also makes a refreshing drink, and mixed with oil forms an outward application for burns. The juice of other species of *Crassulaceæ* is also refreshing, and is credited with corn-removing and vulnerary properties, as the Stonecrops (*Sedum*), *Crassula reflexum*, and *C. rubens*, and Navel-wort (*Umbilicus pendulinus*), once in repute as an application for hard nipples.

BRYOPHYLLUM, *Salisbury*.

*Calyx* large, inflated, shortly 4-cleft.

B. (COTYLEDON) PINNATA, Lamk.

Rubbishy spots all over Burma.

*Kalanchoe pinnata*, Perr.

*B. calycinum*, Salis.

*Cotyledon rhizophylla*, Roxb.

Ywet-kych-pen-pouk.

Roxburgh's name for this plant has reference to its curious habit of producing young plants on the edges of the leaves, and is, so to speak, *viviparous*, the little plantlets detaching themselves and dropping with ready-formed roots into the soil below. Said to have been introduced into India from the Moluccas by Lady Clive (Mason). It now, however, grows like a weed in some places in Bengal and Burma. It is thus described<sup>1</sup>: "A succulent tropical plant, whose leaf produces buds furnished with root, stem, and leaves, at the extremities of its lateral nerves; these buds, which spontaneously fall off and root in the earth, may be likened to embryos that do not need to be fertilized before developing; and the leaf of *Bryophyllum* may be regarded as an open carpel, on which the seeds have been developed by nutritive action alone. This fecundity of *Bryophyllum* completes the analogy between the true bud and the fertilized embryo."

A similar instance of vegetable *parthenogenesis* may be seen in the Watercress (*Nasturtium officinale*), and Lady's smock (*Cardamine pratensis*).

KALANCHOE, *Adanson*.

*Calyx* 4-parted.

× *Panicles glandular-puberulous*.

K. (COTYLEDON) LACINIATA, L.

Ava.

Leaves pinnatifid, the lobes flattened, lobed or cut.

× × *Panicles quite glabrous*.

K. ACUTIFLORA, Ham.

Ava.

*K. varians*, Wall.

*K. subamplectans*, Wall. non Harv.

Leaves simple or pinnately 3-foliolate, crenate.

K. TERETIFOLIA, Harv.

Pegu. Ava.

Leaves pedately 3-pinnatisect, the segments almost terete, sulcate.

<sup>1</sup> Descriptive and Analytical Botany, by Le Maout and Decaisne, p. 7.

## Order ROSACEÆ.

*Flowers* usually regular, or hermaphrodite. *Calyx* free, and inclosing the ovaries, or adnate to the ovary, the limb equal or in *Chrysobalanæ* unequal, 4-rarely 5- or more lobed, with the addition (in a few genera) of as many external accessory lobes. *Disk* filling the calyx-tube. *Petals* as many as true calyx-lobes, equal, or rarely unequal, imbricate. *Stamens* indefinite, rarely few, free, inserted with the petals at the base of the calyx-lobes. *Ovary* of 12 or more carpels, usually distinct at the time of flowering, but sometimes combined into a single, 2-5-celled inferior ovary, with 1 or 2 rarely more ovules in each carpel. *Styles* elongate or sessile, stigmas distinct. *Fruit* various, superior or more or less inferior, sometimes inclosed in the persistent calyx-tube, fleshy or dry, indehiscent or capsular, or the carpels collected on a fleshy or dry torus. *Albumen* usually none. Trees, shrubs, or under shrubs with simple or compound leaves. *Stipules* usually present. *Flowers* in axillary or terminal cymes or solitary, rarely in simple racemes.

To this Order belong Apples<sup>1</sup> (*Pyrus malus*), Pears (*P. communis*), the Rowan or Mountain Ash (*P. aucuparia*), the Hawthorn (*Crataegus oxyacantha*), Medlars (*Mespilus germanica*), Loquat (*Eriobotrya Japonica*), Raspberry (*Rubus Idea*), Blackberry (*R. fruticosus*), Strawberry (*Fragaria vesca*), Almond (*Amygdales communis*), Peach (*Persica vulgaris*), Nectarine (*Persica lœvis*), Apricot (*Armeniaca vulgaris*), Sloe (*Prunus spinosa*), Cherries (*Cerasus*), and the Queen of flowers, the Rose.

The above enumeration by no means exhausts the list of fruits and other products we owe to this fine Order. The wood of several Pears and Cherries is close-grained, and in considerable request for wood-engraving and cabinet-work. Various herbs, once used in medicine, but now neglected, may also be mentioned. Dog-rose (a confection of which still holds a place in the Pharmacopœia), Agrimony (*Agrimonia*), Great Burnet (*Sanguisorba officinalis*), Salad Burnet (*Poterium sanguisorba*), Lady's mantle (*Alchemilla vulgaris*), Avens (*Gewin urbanum*), regarded as distasteful to, and an antidote against evil spirits, Drop-wort (*Spirœa filipendula*), Mead-wort, corrupted in later times to Meadow-sweet (*S. ulmaria*), used for flavouring beer and wines, and last, and not least in interest, Kouso (*Brayera anthelmintica*), whose flowers are the best known remedy for tapeworm, and which indirectly, through the mischievous indiscretion and meddling of a missionary, led to the Abyssinian war, one of those hateful and inglorious episodes into which our curiously mixed devotion to God and Mammon is constantly betraying us.

A. *Carpels solitary or united into a solid 2- or more-celled ovary. Fruit indehiscent.*  
 † *Ovary superior. Fruit a drupe. Calyx or its lobes usually deciduous.*

## CHRYSOBALANIEÆ.

*Flowers usually irregular. Style basilar. Oculi 2, ascending. Radicle inferior.*

## PARANARIUM, Jussieu.

*Petals 5 or 4. Stamens perigynous. Filaments filiform. Anthers small. Ovary and drupe 2-celled.*

P. (PTEROCARYA) SUMATRANA, W. Jack. Upper Tenasserim (?).

## PARASTEMON.

P. TROPHYLLUS, DC. Kamorta.

A beautiful tree 30-40 feet high, with a dense round crown. Drupes lovely rosy.

## PRUNIEÆ.

*Flowers regular. Style almost terminal. Oculi 2, suspended. Radicle superior.*

<sup>1</sup> The name, both in English and Latin, indicates that it was known to the Arian tribes before their separation, as both *apple* and *pomum* have reference to the juicy character of the fruit. *Ab phal*, water-fruit, apple, and *ponum*, from the root of *potum*, p<sup>o</sup>table, having a cognate sense.

PRUNUS, *Linnaeus*.

*Calyx* 5-lobed. *Petals* 5, usually conspicuous. *Drupe* with a bony putamen.

+ *Leaf-shedding trees or shrubs. Flowers appearing before or along with the young foliage. Vernation of leaves conduplicate or convolute.*

Sub-genus AMYGDALUS, L. (ARMENIACA, Juss.)

*Flowers* solitary or clustered. *Drupe*s densely velvety or tomentose.

\* P. (AMYGDALUS) PERSICA, L. Cultivated about Bhamo up to 3500 feet.

Leaves narrow, 2-glandular at the base. Stone wrinkled.

Sub-genus PRUNUS.

*Flowers* solitary, fasciated or racemose. *Drupe*s glabrous.

\* *Drupe*s usually pruinous. *Vernation of leaves convolute.*

P. TRIFLORA, Roxb.

Khakyen Hills.

Glabrous. Flowers rather small, usually by threes. Petals  $\frac{1}{2}$  inch long. Calyx-tube 1-1 $\frac{1}{2}$  lines long, lobes usually somewhat longer.

There is a leaf-specimen of another *Prunus* from the Khakyen Hills which differs from *P. pseudo-cerasus*, Ldl., only very slightly in the smaller size and in the serrature of its leaves (Kurz).

P. PUNBUM, Roxb.

Khakyen Hills.

*P. sylvatica*, Roxb.

Almost glabrous. Flowers rather large, by 2 or 3 from bracted buds. Petals nearly  $\frac{1}{2}$  inch long. Calyx-tube 3 $\frac{1}{2}$  lines long, the lobes nearly as long.

\*\* *Drupe*s smooth, not pruinous. *Vernation of leaves conduplicate* (*Cerasus*, Juss.).

+ + *Evergreen trees. Flowers racemose* (*Pygeopsis*).

P. (CERASUS) MARTABANICA, Wall.

Tropical forests of Tenasserim and the Andamans.

*Drupe*s an inch long. Lateral nerves very faint or almost obsolete.

PYGEUM, *Gaertner*.

*Calyx* 5-15-toothed. *Petals* 5-10, minute or none. *Drupe*s often transversely didymous, coriaceous.

\* *Ovary tawny villous.*

P. ARBOREUM, Endl.

Tenasserim.

*P. parviflorum*, T. and B.

Leaves beneath more or less tawny villous.

\*\* *Ovary glabrous or sparingly hirsute.*

P. ACUMINATUM, Colebr. non Wight.

Chittagong.

Glabrous. Nerves and veins conspicuous and deeply immersed, so as to render the surface of the leaves almost wrinkled.

P. PERSIMILE, Kz.

Tenasserim.

Young branchlets, petioles, and nerves beneath pubescent. Nerves and veins thin, little visible. Allied to *P. latifolium*; general appearance exactly that of *P. Lampongum*, Miq.

The genus *Pygeum* is so closely allied to the section *Pygeopsis* of *Prunus* with evergreen foliage as to make it difficult to keep it distinct. Indeed, *Pygeum* and *Pygeopsis*, combined, stand pretty much in the same relation to *Prunus* as *Eriobotrya* does to *Pirus* (Kurz).

†† Ovary inferior. Fruit an apple or a 1-5-pyrenous drupe.

POMIÆ.

\* Ovary-cells 1-5, with 2 ovules in each cell. Leaves simple to lobed and pinnate. Flowers regular.

PYRUS, *Linnaeus*.

Calyx-limb deciduous or persistent. Ovary and apple 2-5-celled, the endocarp often cartilaginous. Leaf-shedding trees or shrubs.

\* Flowers usually by pairs from the axils of the leaves, or spuriously racemose from the non-development of young foliage. Ovary-cells many ovuled.

P. INDICA, Roxb.

Ava and Khakyen Hills.

Young parts, pedicels, and calyx densely white-woolly. Petals an inch long. Fruits pear-shaped, 1-1½ inch long, crowned by the calyx-limb.

\*\* Flowers corymbose or panicle at the end of the branchlets or in the axils of the upper leaves. Ovary-cells 2-ovuled.

P. PASHIA, Don.

Khakyen Hills.

P. variolosa, Wall.

Flowers corymbose, on slender pedicels 1-2 inches long. Fruits globose, the size of a bullet.

P. GRANDULOSA, Bertol.

Hills East of Toung-ngoo at 7000 feet.

P. Karensium, Kz.

Flowers panicle, very shortly and stoutly pedicelled. Fruits as in preceding.

ERIOBOTRYA, *Lindley*.

Calyx-limb persistent. Ovary and berry 1-5-celled, the endocarp and septa thin.

× Leaves entire.

E. (PHOTINIA) INTEGRIFOLIA, Ldl. Nāt-toung, East of Toung-ngoo at 7000 feet.

P. Notoniana, W.A.

P. congenifolia, Ldl.

Calyx and panicle puberulous. Berries the size of a pea. Evergreen tree.

E. MACROCARPA, Kz.

Tropical forests of Kambalu Toung in the Pegu Range at 2000 feet.

Quite glabrous. Fruit an apple of the size of a bullet.

The fruits look more like apples, but the tree is evergreen. The very same tree occurs also in the outer hills of the Sikkim Himalaya (Kurz).

× × Leaves coarsely crenate, at least towards the apex. Inflorescence rusty or tomentose woolly-tomentose.

E. DUBIA, Ldl.

Chittagong, Bhamo, and hills East of Toung-ngoo at 6000 feet.

Mespilus Bengalensis, Roxb.

Leaves glabrous. Calyx about a line long.

\* E. (MESPILES) JAPONICA, Thib.

Cultivated.

The 'Loquat.'

Leaves woolly-tomentose beneath. Calyx 3-4 lines long.

B. Carpels usually numerous, rarely few, connate or more usually distinct and inserted on a torus or inclosed in the calyx-tube. Fruit-carpels indehiscent, or rarely dehiscent (in *Spirea*, etc.).

† Carpels distinct, within the persistent calyx-tube, which forms a compound spuriously inferior fruit.

## ROSACEÆ.

*Calyx without bractlets. Petals usually 5. Carpels many, 1-ovuled. Achenes dry, inclosed in the fleshy calyx-tube.*

*Rosa, Linnæus.*

Shrubs, often prickly, with unpaired pinnate leaves and showy flowers.

*Styles all free.*

\* *Calyx-throat pervious and not closed by the disk.*

\* *R. INDICA.*

Flowers large, usually corymbose. Calyx glabrous or sparingly glandular. Leaflets glabrous, glaucous beneath. Carpels about 40 to 50.

\* *R. DAMASCENA.*

As preceding, but leaves solitary. Carpels about 15.

*R. MICROPHYLLA.*

Leaflets small. Flowers solitary. Calyx-tube and the globular fruits densely echinate.

\*\* *Calyx-throat completely closed by the disk.*

*R. INVOLUCRATA, Roxb.*

Country North of Mandalay.

Calyx, younger bractlets, and the globular fruits densely tomentose. Flowers white.

Several species of roses (especially *R. Indica* and *R. damascena*) are found planted around khyoungs chiefly, in almost every one of the larger villages of Pegu (Kurz).

There is perhaps no flower more universally esteemed for its fragrance than the Rose, and this feeling seems to have been coeval with the cultivation of the flower. Some indication of this is, I think, afforded by the use of such an epithet as 'rosy-fingered,' applied by Homer to the Dawn, for the Rose is by no means the only flower which might claim, from its mere colour, to be introduced in a descriptive epithet, but no sooner is the mind turned to the contemplation of a red flower than the Rose, from the unchallenged perfection of its scent, fills the mirror of our thoughts, and is unconsciously adopted as a type for the colour it most commonly displays. And with regard to this point, it must be remembered that it is the old-fashioned roses, such as our 'cabbage-rose,' which at once display the perfection of scent united with a typical rosy colour, the former quality being woefully deficient in many roses now in vogue, displaying yellow tints rather than rosy ones. The Attar of Roses, or the essential oil of the flowers, is one of the most delicious perfumes known, and the dearest, and one extremely difficult to procure free from adulteration, which is not surprising when we remember that it has been said that it requires 100,000 flowers to furnish 180 grains or 1 rupee's weight of oil. The old poetic fancy of the birth of the Rose from the life-blood of Adonis is too pretty to be passed over:—

“*Αἰ αἰ τὰν Κυθέρειαν, ἀπώλετο καλὸς Ἀδωνίς.  
 Δάκρυον ἃ Παφία τοσσὸν χεῖρ, ὅσσον Ἀδωνίς  
 Αἷμα χεῖρ' τὰδε πάντα ποτὶ χθονὰ γέγραται ἀνθῆ.  
 Αἶμμα ῥόδον τικτεῖ, τὰ δὲ δάκρυα τὰν ἀνεμῶναν.*”

*Bion Idyl. I. l. 62.<sup>1</sup>*

†† *Carpels distinct, on a conspicuous torus, when ripe forming a superior compound dry or sappy fruit.*

<sup>1</sup> Woe! Woe! for love's own Queen, since stretched in death  
 Adonis lies, the beautiful, whose blood  
 Poured forth, like water on the thirsty earth  
 Is matched by tears from Aphrodite's eyes.  
 Where fell those tears, Anemones upspring  
 And where each ruddy drop, Lo! blooms a Rose.

## RUBIÆÆ.

*Stamens and carpels numerous. Oculs 2, suspended. Calyx without bractlets. Shrubs or under shrubs, often prickly, with compound, rarely simple, leaves.*

## RUBUS, Linnaeus.

Characters of the Tribe.

\* *Carpels few, only 3-6. Leaves simple.*

R. PYRIFOLIA, Sm.

Hills of Ava.

R. hexagona, Roxb.

R. Indica, Lesch.

Petioles very short. Flowers in large terminal panicles.

\*\* *Carpels numerous, forming a sort of sappy berry.*

× *Leaves entire or lobed.*

+ *All softer parts and the under side of the lobed leaves covered with a dense tomentum usually intermixed with longer hairs. Calyx-lobes entire.*

R. MOLUCCANA, L.

var.  $\alpha$  and  $\beta$  Hills of Martaban over 2500 feet. var.  $\gamma$  probably Ava, also Kamorta and Nankowry.

Bracts and stipules pinnatisect, the segments long, thin, and often filiform.

var. *genuina*. Leaves beneath clothed with a short tomentum intermixed with a few longer hairs only, the basal lobes usually diverging. Calyx velvety and at the same time densely tawny and appressedly hirsute, the lobes acuminate.

var.  $\beta$  *alceaefolia*, Poir. Leaves softly pubescent beneath, the basal lobes usually much converging. Calyx densely tawny or yellowish appressed hirsute, the lobes acuminate.

var.  $\gamma$  *abnormalis*. Stems covered with spreading tawny hairs. Leaves of var.  $\alpha$ . Calyx shortly and densely greyish or whitish tomentose, without any admixture of longer hairs, the lobes acute or almost blunt.

++ *All parts, except the inflorescence, without tomentum, glabrous or pubescent.*

R. FERON, Wall.

Ava (?).

R. Molluccana, Roxb.

Calyx-lobes pectinate-toothed.

× × *Leaves digitately 3-5-foliolate.*

R. PENTAGONA, Wall.

Nät-toung, East of Toung-ngoo, over 6000 feet.

Branchlets almost terete. Leaflets green, shortly puberulous. Stipules and bracts linear entire, shortly glandular-pubescent. Flowers white.

I formerly combined *R. alpestris* and this species, but Mr. O. Kuntze, of Leipzig, who revised the species of *Rubus* in HBK., has pointed out to me the differences between the two (Kurz).

R. ALPESTRIS.

Branchlets terete. Leaflets glabrous or pubescent. Stipules and bracts usually cut into 1-2 linear segments, glabrous, or only very sparingly and shortly glandular-hairy. Flowers red.

Kurz's remark to the last species leaves us in doubt if the present species occurs in Burma.

× × × *Leaves pinnately 3-foliolate or unpaired-pinnate.*

° *Fruits tomentose.*

R. LASIOCARPA, Sm.

Hills East of Blamo.

R. albescens and racemosa, Roxb.

*R. Mysorensis*, Heyne.

*R. Horsfieldii*, Miq.

Leaves unpaired pinnate, the leaflets beneath white or yellowish tomentose. Flowers white.

°° *Fruits glabrous.*

*R. FLAVA*, Ham.

*R. Gourceephul*, Roxb.

Ava. Khakyen Hills. Hills East of Toung-ngoo (*vide* Mason).

Leaves pinnately 3-foliolate, the leaflets white or yellowish tomentose beneath. Petals white.

*R. ROSEFOLIA*, Sm.

var. *a* Martaban Hills at 3000 feet.

var. *β* Hills East of Blamo.

Leaves unpaired-pinnate, uniformly green. Petals white.

var. *a* *R. aspera*, Don. Stem, branches, and petioles more prickly and covered with long stiff blackish gland-hairs. Calyx and peduncle tomentose-pubescent, with long spreading gland-bristles. Leaves more or less appressed hairy. Flowers usually in poor corymbs.

var. *β* *glabriuscula*. Stems, branches, and petioles glabrous or with few short gland-hairs only. Peduncles and pedicels usually shortly glandular-pubescent, rarely almost glabrous. Calyx glabrous or sprinkled with few short gland-hairs, velvety-tomentose inside. Leaves more glabrous. Flowers much larger, usually solitary on leaf-opposed long pedicels.

#### POTENTILLIÆ.

*Stamens and carpels 4 or more, the latter with a solitary ovule; style usually ventral, marcescent or caducous. Calyx usually with bractlets. Unarmed herbs or under shrubs, with compound or simple leaves.*

#### FRAGARIA, *Linnaeus*.

*Calyx* with 5 bractlets. *Stamens* numerous. Ripe carpels crustaceous, seated on a fleshy sappy torus; styles ventral. Herbs with 3-foliolate leaves.

*F. INDICA*, Andr.

Chittagong. Blamo.

*F. Malayana*, Roxb.

*Duchesnea fragarioides*, Sm.

Dr. Mason remarks: "I have raised very fine strawberries in my garden at Tavoy, but the plants require considerable care."

#### POTENTILLA, *Linnaeus*.

*Calyx* with 4 or 5 bractlets. *Torus* in fruit dry, rest as in preceding. Herbs or under shrubs with variously compound leaves.

*P. (DUCHESNEA) SUNDAICA*, Miq.

Khakyen Hills.

*P. Kleiniana*, W. A.

#### Order LEGUMINOSÆ.

*Flowers* hermaphrodite, irregular or regular. *Calyx* various, quinque-merous, regular or irregular, imbricate or valvate, rarely the sepals all free. *Corolla* of 5 or rarely fewer petals, or wanting altogether, perigynous, or rarely hypogynous, irregular and more or less papilionaceous, or regular, the lobes or petals imbricate or valvate. *Stamens* 10, rarely fewer, or indefinite, united in 1 or 2 sheaths, or free. *Ovary* of a single excentric carpel, with 1 or more ovules on the ventral suture. *Style* simple. *Fruit* a pod, opening along one or both sutures, or indehiscent, from chartaceous to fleshy and woody. *Arillus* more or less developed, or wanting. *Cotyledons* large, the radicle short. *Albumen* none or scanty, very rarely copious. Trees, shrubs or herbs, sometimes climbing, with alternate, or very rarely opposite,

compound or simple leaves. *Stipules* and *stipulets* usually present. *Flowers* various, solitary, or variously arranged in axillary or terminal inflorescences.

This vast Order is second only to the *Gramineæ* in importance to man, as all the edible pulses, which in the East play so important a part in the dietary of the masses, belong to one of its tribes (*Papilionaceæ*). This Order also yields valuable Woods, Dyes, Fibres, Drugs and some virulent poisons. Among edible species may be specified: Peas, *Pisum sativum*; Beans, *Faba vulgaris*; Sword beans, *Canavalia ensiformis*; French beans, Broad beans, Gram, *Cicer arietinum*; *Phaseolus vulgaris*; Mung or Urad, *P. mungo*; Mōht, *P. aconitifolius*; Sōnā mung, *P. aureus*; Kālā mung, *P. max*; Hari mung, *P. Roxburghii*; Scarlet runner, *P. multiflorus*; and many other varieties, some of which, as *P. adenanthus*, are cultivated for their tubercous rhizome, like *Pachyrhizus bulbosus* and the American species *Apios tuberosa*, *Psoralea esculenta* and *P. hypogæa*; Lentils, *Ervum lens*; Arhar, *Cajanus indicus*; Kulthi, *Dolichos uniflorus*; Lobia, *D. Sinensis*; Ban-sēm, *D. lablab*; Kasur, *Lathyrus sativus*; Ground nuts, *Arachis hypogæa*, and many other species. Among fodder plants may be specified: Vetches, *Vicia sativa*; Melilot, yielding an odoriferous hay, *Melilotus officinalis*; Lucern, *Medicago sativa* and *lupulina*; Clover, *Trifolium pratense* and *repens*, and Lupines, *Lupinus albus*, *varius* and *luteus*. Among substances useful in manufactures may be mentioned Indigo, *Indigofera tinctoria*; Gum Arabic, the produce of several species of *Acacia*; Katechu or Kath, extracted from *A. catechu*; Copal, the resin of *Hymenæa verrucosa*; Logwood, *Hæmatoxylon Campechianum*; Sappanwood, *Cæsalpinia sappan*; Brazil wood, *C. echinata*; and Sun hemp, *Crotalaria juncea*. Valuable timbers are yielded by various species of *Acacia*, *Albizzia*, *Cassia*, *Pterocarpus*, *Dalbergia*, *Xylia*, *Milletia*, *Tamarindus*, and others of less importance. Among Medicinal products may be enumerated Balsam of Copaiba, yielded by some Tropical American trees, *Copaifera officinalis*, *coriacea* and *cordifolia*; Cassia, the pulp surrounding the seeds of *C. fistula*. Tamarinds. Dragon's blood and Gum-kino, produced by species of *Pterocarpus*, *Butea* and *Drepanocarpus*. Tragacanth, a gum yielded by several species of *Astragalus*; Liqnorice, extracted from the roots of several species of *Glycyrrhiza*, and the Calabar bean, *Physostigma venenosum*, a most violent poison, but which possesses the curious property of causing contraction of the pupil, and Goa powder, prepared from *Andira araroba*, which owes its efficacy in skin diseases to the presence of Chrysophanic acid.

Oils, gums, dyes, woods, fibres, fruits, seeds, fodder, and ornamental flowers are yielded by other Leguminosæ too numerous to enumerate. Among ornamental trees, however, may be named as indigenous to Burma the singularly handsome *Amherstia* from the Salween Valley.

For some strange and now unknown cause Beans were once regarded as impure, and rejected as food by the followers of Pythagoras. Some of the supposed reasons for this abstention from Beans are such as cannot be more particularly alluded to here, but may be gathered from the interesting article on this subject in the 'Mythologie des Plantes,' by De Gubernatis, vol. ii. p. 132. Whatever may have been the original reason for the estimation in which beans were once held, we know that they were regarded as sacred to the dead. "Les légumes, nous l'avons déjà remarqué à plusieurs reprises, ont presque tous une signification phallique et funéraire. Festus nous apprend que le Flamen ne pouvait ni toucher, ni nommer les fèves, 'Fabam nec tangere, nec nominare diali Flaminii licet, quod ea putatur ad mortuos pertinere; nam et lemuralibus jacitur larvis, et parentalibus adhibetur sacrificiis, et in flore ejus, luctus litteræ apparere videntur.' Les Lémures, c'est-à-dire les ombres vagabondes de ceux qui avaient mal vécu, d'après la superstition romaine, s'approchaient pendant la nuit des maisons et y jetaient des fèves" (De Gubernatis, l.c. p. 136). To guard against this invasion, black beans, as we learn from Ovid, were used to propitiate the spirits of the nether world.

"Nox ubi jam media est somnoque silentia præbet  
Et canis et variæ conticuistis aves;  
Ille memor veteris ritus timidusque decorum  
Surgit; habent gemini vincula nulla pedes:

Signaque dat, digitis medio cum pollice junctis,<sup>1</sup>  
 Occurrat tacito ne levis umbra sibi;  
 Quumque manus pure fontanâ perluit undâ,  
 Vertitur, et nigras accipit ore fabas,  
 Aversusque jacit, sed dum jacit 'Hæc ego mitto,  
 His, inquit, redimo meque meosque fabis.'  
 Hoc novies dicit, nec respicit; umbra putatur  
 Colligere et nullo terga vidente sequi."

*Fæsti* V. 429.

Some copies read 'ante' in place of 'ore,' but the beans in this case may have been intentionally deposited in the mouth with regard to the silence-loving shades to which they were offered. In support of this view may be adduced the amusing account given by Ovid of the offerings made to Tacita.

"Eecce anus in mediis residens annosa puellis  
 Sacra facit Tacitæ; vix tamen ipsa tacet.  
 Et digitis tria thura tribus sub limine ponit,  
 Qua brevis occultum mus sibi fecit iter.  
 Tum cantata ligat cum fuseo licia rhombo;  
 Et septem nigras versat in ore fabas;  
 Quodque pice astrinxit, quod acu trajecit aenâ,  
 Obsutum mænæ torret in igne caput.  
 Vina quoque instillat; vini quodecumque relictum est,  
 Aut ipsa, aut comites, plus tamen ipsa, bibit.  
 'Hostiles linguas inimicaque vinximus ora,'  
 Dicit discedens, ebriaque exit anus."

*Fæsti* II. 571.

An amusing mode of fortune-telling by beans is thus described by De Gubernatis: "En Sicile (Noto) et en Toscane (Campagne de Florence), les jeunes filles qui désirent un mari apprennent leur soit par les fèves; voici comment: elles mettent dans un petit sac trois fèves, l'une entière, une autre sans l'œil, une troisième sans écorce, et elles les seconent; puis elles en tirent une, si elles ont la chance de tomber sur la fève entière, un mari riche et bien portant leur est garanti; si elles tombent sur la fève sans œil, leur mari sera infirme et gêné; si elles ont le malheur d'attraper la fève sans écorce, le seul mari qui se présentera pour les épouser sera un pauvre diable sans le sou."—*Mythologie des Plantes*, vol. ii. p. 136.

#### Sub-order *EU-LEGUMINOSÆ*.

*Flowers* more or less irregular, rarely almost regular, and in this case the standard-petal slightly larger and innermost in bud. *Petals* imbricate in bud. *Stamens* definite, variously connate or rarely free.

#### *PAPILIONACEÆ*.

*Uppermost petal (standard) outside in bud.*

\* *Stamens free from the base or slightly connate at the very base only.*

<sup>1</sup> The thoughtful student will not fail to remember that the Pope of Rome still blesses the faithful with three fingers, on the centre one of which is a ring, evidently a variation of the procedure alluded to by Ovid.

For some very pointed remarks (which cannot here be reproduced) on Christians still persisting in the use of symbols of a Pagan and indecent character, see Inman's 'Ancient Faiths embodied in Ancient Names,' vol. ii. p. 651, but the cause of what seems so surprising to the writer is not far to seek. It is simply ignorance. Not one person in a hundred has any conception of the original significance of religious symbols, and it is about the last subject regarding which people may look for any enlightenment from their religious teachers, many of whom, however, it must in fairness be allowed, are as ignorant on such matters as the bulk of the laity. It is an utterly tabooed subject, save with a few restless philosophers who have acquired the inconvenient habit of logical thought!

Sub-tribe SOPHORIEÆ.

*Leaves pinnately 1-many-foliolate. Pods indehiscent or dehiscent.*

\* *Leaves pinnate. Bracts and bractlets small, deciduous.*

SOPHORA, *Linnaeus*.

*Pods moniliform, terete or winged, usually indehiscent. Arillus none. Leaves without stipulets.*

S. TOMENTOSA, L.

Pegu and the Andamans.

S. OCCIDENTALIS, L.

Then-bo-ma-ji (Kurz).

ARILLARIA, *Kurz*.

*Pods fleshy-coriaceous, short, dehiscent. Arillus crimson, enveloping the whole seeds. Leaves with stipulets.*

A. ROBUSTA, Roxb.

Lower Pegu and Martaban.

Kway-tanyin or Thyt-wā-gyi (?).

\*\* *Stamens variously united into a tube, or into a slit sheath or into two separate sheaths with the vexillar stamen free or adnate.*

+ *Pods jointed, dehiscent or not, very rarely obsolete or not jointed, in which case the valves are usually marked with transverse veins or lines. In a few genera the pods consist of a single joint.*

Sub-tribe HEDYSARIEÆ.

*Leaves often pinnately 3-1-foliolate, rarely pinnate.*

\* *Stamens united into a single slit sheath, the vexillary 10th one free.*

+ *Ovules solitary. Pods 1-jointed.*

LESPEDEZA, *Michaux*.

*Pods indehiscent. Flowers clustered or in racemes, usually axillary.*

\* *Flowers in axillary almost sessile clusters.*

L. SERICEA, Miq.

Khakyen Hills.

Hedysarum junceum, Roxb.

Appressed silvery silk-hairy. Leaflets linear-cuneate.

\*\* *Flowers in axillary and terminal racemes often collected into terminal panicles.*

× *All parts densely and softly pubescent. Bracts deciduous.*

L. PINETORUM, Kz.

Martaban, 4000 to 6000 feet.

Softly tomentose. Racemes sessile. Calyx-teeth almost filiform and flexuose.

× × *Branchlets and under side of leaves appressedly greyish puberulous.*

L. DECORA, Kz.

Martaban, 4000 to 6000 feet.

Racemes glandular-pubescent. Bracts persistent.

L. PARVIFLORA, Kz.

Nāt-toung East of Young-ngoo (*fide* Mason).

Racemes tawny pubescent, not glandular. Bracts deciduous.

Allied to *L. elliptica*, Bth., from which it differs by its much smaller flowers, its subulate calyx-teeth, the different vestiture of its inflorescence, and its deciduous bracts (Kurz).

+ + *Ovules 2 or more. Pods 2- or more-, rarely (by abortion) 1-jointed.*

° *Pods not jointed, compressed or inflated.*

† *Pod inflated like that of Crotalaria.*

PYCNOSPERA, *R. Browne*.

Herbs with pinnately 3-foliolate leaves. Flowers in racemes.

P. HEDYSAROIDES, R. Br.  
P. nervosa, W.A.

Tenasserim.

†† *Pod compressed.*

PSEUDARTHRIA.

*Pods* flat with straight sutures. *Flowers* in terminal racemes. Herbs.

P. VISCIDA, L.

Upper Tenasserim.

° ° *Pods distinctly jointed.*

† *Pod-joints in a line, not folded up.*

DESMODIUM, Desvaur.

*Pod-joints* flat or slightly convex, dehiscent or indehiscent. *Racemes* terminal or axillary and terminal. *Leaves* 3- rarely 1-foliolate.

A. *Pod-joints* dehiscing along the ventral suture.

Sub-genus PLEUROLOBIUM, DC.

*Pod-joints* dehiscing along the more or less indented suture, distinctly separated or continuous, and the separation indicated by a transverse line only. *Inflorescence* in a young state conspicuously imbricate-bracted.

\* *All bracts deciduous. Pods continuous, the joints marked only by transverse lines. Erect shrubs or herbs.*

D. GYROIDES, DC.

Arakan, Pegu, and Tenasserim.

D. pseudo-gyroides, Miq.

Shrub, the leaflets one-coloured. *Flowers* purple. *Pod-joints*  $2\frac{1}{2}$  lines long by 3 broad, densely and shortly hirsute.

D. CYTRANS, Lamk.

From Chittagong to Tenasserim.

Annual or biennial, the leaves as often 1- as 3-foliolate, with the two lateral leaflets much reduced, leaflets white variegated. *Flowers* pale yellow, turning pale brick-coloured. *Pod-joints* about  $2\frac{1}{2}$  lin. long and broad, shortly and sparingly hirsute.

\*\* *Lowermost bracts of young inflorescences more or less persistent. Pods distinctly jointed.*

D. HETEROCARPUM, L.

D. polycarpum, DC.

Hedysarum purpureum, Roxb.

D. patens, Wight.

*Leaves* 3-foliolate, the leaflets elliptical to oblong. *Fruiting pedicels* erect. *Racemes* elongate.

var. *a genuinum*. Branches and leaves beneath only thinly appressed-pubescent. *Pods* glabrous with fringed edges, or sparingly and minutely stiff-hairy.

var. *β trichocaulon*, Bak. Branches densely and spreadingly pilose, the leaves beneath appressed pilose. The rest as in var. *a*.

var. *γ capitatum*, DC. Branches and leaves beneath more or less silvery pubescent, the leaflets smaller. *Pods* puberulous.

var. *a* common in all leaf-shedding forests, especially the mixed ones, entering also the savannahs and cultivated lands, all over Burma and the adjacent islands.

var. *β* Ava hills. var. *γ* Arakan.

D. RETROFLEXUM, L.

Tenasserim.

*Leaves* 1-3-foliolate, the leaflets more or less orbicular. *Fruiting pedicels* refracted. *Racemes* shorter than the leaves.

Sub-genus SAGOTIA, Walp.

*Pod-joints* dehiscing along the lower more or less indented suture. *Young inflorescence* not conspicuously bracted.

\* *Flowers in many-flowered terminal and axillary racemes which often form terminal panicles. Erect annual herbs.*

*D. OBLONGUM*, Wall.

Ava and Pegu.

Stems and under side of leaves sparingly and appressedly greyish pubescent. Panicle glandular-puberulous. Pods glabrescent.

*D. AFRICANS*, Grah.

Coast of Arakan and Tenasserim.

*D. auricomum*, Grah., Wall. Cat. 5704.

Stems and peduncles spreadingly tawny pilose. Pods tawny pilose.

\*\* *Flowers few, axillary or in leaf-opposed racemes. Prostrate or diffuse herbs.*

*D. MICROPHYLLUM*, Thbg.

Yoonzaleen at 2500 feet.

*D. parvifolium*, DC.

Flowers in leaf-opposed and spuriously terminal simple or branched racemes. Leaflets very small.

*D. REPTANS*, Burm.

Pegu and Tenasserim.

*D. heterophyllum*, DC.

*D. triflorum*, W.A.

Flowers usually yellowish, by 1-4 on a longer or shorter axillary peduncle, which is longer than the leaves.

*D. TRIFLORUM*, L.

From Chittagong to Tenasserim;  
(introduced into the Andamans).

*Hedysarum stipulaceum*, Burm.

Flowers usually purple or rose-coloured, by 1-6 in the leaf-axils.

B. Pod-joints not dehiscing in any way.

\* *Flowers in terminal and axillary racemes, often collected into panicles. Bracts small, deciduous or rarely persistent.*

Sub-genus *Eu-DESMODIUM*, DC.

Shrubs, under shrubs or herbs, the leaves 1-3-foliolate. Petiole not winged. Pods various, many-jointed, the joints variously shaped, but never quite square.

\* *Pods and ovary quite glabrous, the joints more or less deeply indented on the lower suture, the basal one very shortly stalked.*

× *Leaves simple, broader than long, oblate to reniform.*

*D. OBLATUM*, Bak.

Along streams in Ava, Pegu Hills and Martaban.

*D. reniforme*, Wall. Cat. "vix DeCan. certissime non Burm."

Flowers 3 lines long, sky-blue, on capillary glandular pedicels  $\frac{1}{3}$ - $\frac{1}{2}$  inch long. Pod-joints deeply indented at the lower suture.

*D. RENIFORME*, L.

Flowers small, white, on pedicels  $1\frac{1}{2}$ -2 lines long. Pod-joints slightly indented at the lower suture.

All Burmese specimens seen by me belong to the preceding species. I myself gathered the true Burmannian plant only in the Terai-lands of Sikkim (Kurze).

× × *Leaves oblong to oblong-lanceolate.*

*D. SUBSTIPULACEUM*, Bl.

Nāt-toung East of Toung-ngoo (*vide* Mason).

*D. stipulaceum*, Miq.

*Hedysarum mucronatum*, Bl.

Leaves simple, or the lower ones 3-foliolate. Racemes slender, in diffuse terminal panicles. Pod-joints elliptical, 2 lines long by  $1\frac{1}{2}$  broad.

This species greatly resembles the American *D. stipulaceum*, DC. It differs in its stouter stature and its broad ovate (not linear-subulate) calyx-lobes. The pod-

joints are glabrous and net-veined, not hooked-pilose like those of Hasskarl's *D. Aparius*, which Miquel combines with *D. stipulaceum*, while Baker would make it synonymous with *D. spirale*.

\*\* *Pods and ovary variously clothed with glandular or glandless, straight or hooked hairs.*

× *Pod-joints 4-5 times longer than broad, or if shorter stalk-like narrowed at the base.*

+ *Pod-joints pedicel-like narrowed or abruptly constricted at the base, securiform or crescent-shaped, puberulous.*

° *Pod-joints crescent-shaped, abruptly constricted at both ends.*

*D. concinnum*, DC.

Martaban from 4000 to 6000 feet.

*D. pendulum*, Wall.

Leaves oblong, acute or blunt, strongly parallel-nerved. Pod-joints broadly lunate, tumid, and only 2 lines long, coriaceous, the basal one refracted on a stalk 2 lines long thickened club-like at the apex.

*D. (URARIA) oboordatum*, Miq.

Maulmain. Sumatra.

Leaves divaricately oboordate. Pod-joints membranous, broadly lunate, acute and divaricate at both ends, very flat. Spreading or trailing herb.

°° *Pod-joints securiform, the basal one long-stalked.*

*D. scalpe*, DC.

Hill forests of Martaban at 4000 to 5000 feet.

*D. strangulatum*, W. A.

Calyx about a line, the corolla 5 lines long; stalk of basal pod-joint about 1-½ line long.

Baker identifies the *D. trichaulon* of Hasskarl's Pl. Jav. rar. 367 with the above, but this he could only do by simply guessing, for the description does not in the least agree, and the dehiscence pods at once indicate its true affinity (Kurz).

*D. podocarpum*, DC.

Ava Hills.

Calyx and corolla half the size. Stalk of basal pod-joint slender, ½ inch long.

If *D. laxum*, DC., is correctly referred to the above species (as to which I entertain grave doubts), this name has precedence (Kurz).

++ *Pod-joints truncate at both ends, oblong to linear-oblong and sessile.*

° *Leaves pinnately 3-foliolate.*

*D. recurvatum*, Grah.

Chittagong, Arakan, Pegu, and Kondul.

*Hedysarum diffusum*, Roxb. non Willd.

*D. laxiflorum*, DC.

Pod-joints only 1½-2 lines long by ½-¾ line broad, densely hooked puberulous, not narrowed at the ends.

°° *Leaves simple, the petiole short.*

*D. teres*, Wall.

Ava. Taong-doung.

The petiole very short. Pod-joints 10-12, about 3 lines long and hardly a line broad, shortly glandular-pubescent.

×× *Pod-joints narrow, as long or only twice as long as broad.*

+ *Shrubs or more usually erect or spreading perennials. Pod-joints usually as long as broad, more or less rotundate with truncate ends.*

° *Leaves simple. Pod-joints indented at the lower suture, about a line long.*

*D. gangeticum*, L.

From Pegu, Tenasserim, and the Nicobars.

*Hedysarum collinum*, Roxb.

*D. latifolium*, Wight.

Perennial, erect, slightly appressed-pubescent. Racemes elongate and very slender. Pod-joints sparingly and shortly hispid. Leaves acute.

*D. FLEXUOSUM*, Wall.

Prome Hills.

As preceding, but diffuse, the leaflets broader and usually blunt.

This, as already suggested by Bentham, is hardly more than a diffuse variety of *D. Gangeticum*, with broader leaves and spreadingly hirsute branches (Kurz).

*D. LATIFOLIUM*, Roxb.

Ava. Prome. Pegu. Martaban.

*D. lasiocarpum*, DC.

Shrub, densely pubescent. Racemes tomentose, rather short and robust. Pod-joints densely and shortly grey hirsute. Leaves blunt.

°° *Leaves 3-foliolate. Pod-joints about a line long and broad.*

*D. SEQUAX*, Wall.

Hills East of Young-ngoo at 4000 to 5000 feet.

*D. sinuatum*, Bl.

*D. dasylobum*, Miq.

Erect shrubby perennial. Leaflets somewhat repand, glaucescent beneath, acute or acuminate. Branchlets almost terete. Pod-joints densely covered with hooked stiff hairs.

*D. DIFFUSUM*, Willd.

Prome Hills.

*Hedysarum auriculatum* and *quinquangulatum*, Roxb.

*D. quinquangulare*, Wight.

Diffuse perennial, the branches sharply 5-6-angular. Leaflets entire, blunt. Pod-joints sparingly covered with white hooked stiff hairs.

++ *Shrubs or woody under shrubs. Pod-joints usually about twice as long as broad, more or less indented on one or both sutures.*

° *Bracts of the young inflorescence scarious and large, forming imbricate cones, very deciduous, but the basal ones usually remaining persistent.*

† *Basal pod-joint sessile.*

*D. FLORIBUNDUM*, Don.

Upper Tenasserim between 4000 and 5000 feet.

*D. multiflorum*, DC.

*D. dubium*, Ldl.

Racemes sessile or peduncled, rather short. Pod-joints  $1\frac{1}{2}$ -2 lines long and nearly as broad, indented on the lower suture, appressed hirsute. Branchlets sharply angular, often villous on the corners.

†† *Basal pod-joint shortly but distinctly stalked.*

*D. TILLOFOLIUM*, Don.

Tenasserim.

Racemes slender, long-peduncled, forming spreading terminal panicles. Pod-joints  $\frac{1}{4}$  inch long and 3 lines broad, puberulous, slightly indented. Branchlets terete.

*D. KARENSIUM*, Kz.

Khakyeon Hills and Martaban at 4000 to 5000 feet.

Racemes very slender and usually shorter than the leaves, sessile or branched from the base. Pod-joints 4 lines long by  $2\frac{1}{2}$  broad, more or less indented at the lower suture, sparingly and shortly hirsute. Branches angular.

°° *Bracts of the young inflorescence narrow, herbaceous, not conspicuous, and imbricating (Catenaria, Bth.).*

*D. LABURNIFOLIUM*, DC.

Ava Hills.

Flowers  $\frac{1}{2}$  inch long, often in axillary slender racemes. Pod-joints oblong, nearly 4 lines long, densely and shortly hooked-hairy, the basal one stalked.

Sub-genus *PREROLOMA*, Desv.

Shrubs. *Leaves* 1-foliolate, the petiole winged. *Bracts* minute. *Pods* very flat, many-jointed, the joints not or hardly indented and almost square.

*D. TRIQUETRUM*, L.

var.  $\alpha$  common all over Burma over 5000 feet. var.  $\beta$  at lesser elevations (Kurz).

Mōk-hsō-hlan-mā.

Branchlets sharply triquetrous. Pods glabrous or pubescent along the sutures or all over.

var. *a. genuinum*. Pods more or less greyish hirsute or villous, larger and usually somewhat curved. Flowers larger.

var. *β pseudo-triquetrum*, DC. Pods glabrous or pubescent only on the edges, shorter and straight. Flowers smaller.

\*\* *Flowers clustered or in sessile or peduncled umbels in the axils of the leaves or in the axils of bract-like floral leaves.*

Sub-genus DENDROLOBIUM, W. A.

*Flowers* in dense sessile or peduncled axillary umbels or clusters. *Bracts* minute or deciduous. *Leaves* pinnately 3-foliolate. *Pods* 5-1-jointed, appressed pubescent.

\* *Pods normally 2-1-jointed. Under shrubs (Dicerna).*

D. BIARTICULATUM, F. Muell. Ava. Menghoon and Paghā-myo.

Flowers by 2-4 or fewer, clustered in the leaf-axils, and passing into terminal leafy racemes.

\*\* *Pods 2-5- (only occasionally 1-)jointed. Shrubs or trees (Dendrolobium proper).*

D. CEPHALOTES, Wall. Arakan. Pegu. Ava.

*Hedysarum umbellatum*, Roxb.

*D. congestum*, Wall.

Flowers in sessile clusters. Pod-joints only 2 lines long.

D. UMBELLATUM, L. The Nicobars, Andamans and Tenasserim, re-appearing on the limestone hills of Segain (Ava).

Flowers in peduncled umbels. Pod-joints about 4 lines long.

Sub-genus PHYLLODIUM, Desv.

*Flowers* clustered or umbellate, in the axils of bract-like large floral leaves, which are complicately 2-foliolate, persistent, and placed distichously. *Leaves* pinnately 3- or rarely 1-foliolate. *Pods* 2-4-jointed.

\* *Pods pubescent or villous-pubescent.*

D. GRANDE, Kz. Ta-goung (Ava).

Leaflets 3-5 inches long, acuminate. Pods villously pubescent.

D. VESTITUM, Bth. Tenasserim.

Leaflets 1-2 inches long, rounded or almost retuse.

\*\* *Pods glabrous except on the margin.*

D. PULCHELLUM, Bth. All over Burma and the Andamans.

Leaves pinnately 3- or occasionally 1-foliolate, the petiole only 2-3 lines long. Pods glabrous, net-veined.

Kurz also adds from the Nicobars:

D. POLYCARPUM, DC. Kamorta and Great Nicobar.

D. HETEROPHYLLUM, DC. Kamorta.

The bark of several species of *Desmodium* yields a good fibre for ropes, and also a material for the manufacture of paper.

ALYSICARPUS, Necker.

*Pod-joints* more or less turgid. *Calyx* deeply divided and almost glumaceous. *Leaves* often 1-foliolate.

\* *Calyx shorter than the first pod-joint.*

A. MONILIFER, DC. Ava. Maulmain.

Pod-joints inflated-globular, without wrinkles or veins.

*A. VAGINALIS*, L.

From Chittagong to Tenasserim; var.  $\beta$  affects the drier forests (Kurz).

Pod-joints slightly compressed, thickened at the truncate ends, obsoletely wrinkled-net-veined.

var.  $\alpha$  *genuina*. Leaves all, or only the cauline ones, narrow.

var.  $\beta$  *nummularifolius*, Miq. Leaves all more or less oval or almost orbicular, usually small, and sometimes very small or minute.

\*\* *Calyx much longer than the first pod-joint, the teeth much imbricate in fruit.*

*A. BUPLEURIFOLIUS*, L.

Pegu and Ava.

*Hedysarum gramineum*, Retz.

Calyx-lobes lanceolate, acuminate. Pods as long or twice as long as the calyx, the joints (fully ripe) almost smooth, obliquely 4-angular.

*A. RUGOSUS*, DC.

Pegu.

*Hedysarum bupleurifolium*, Roxb.

*A. Wallichii*, W. A.

Glabrous. Calyx-lobes broader and acute. Pod inclosed in the scarious calyx, the joints broader than long, strongly and transversely wrinkled.

*A. STYRACIFOLIUS*, DC.

Ava.

*Hedysarum glutaceum*, Koen.

As preceding, but stems silk-hairy, the calyx-lobes and bracts fringed with long silky hairs. Pod-joints twice the size.

MECOPS, Bennett.

Pod 2-jointed, between uncinat-subulate bracts, the pedicels abruptly deflexed from the tips. Leaves simple.

*M. NIDULANS*, Benn.

Pegu and Tenasserim.

†† *Pod-joints folded one upon the other.*

LOUREA, Necker.

*Calyx enlarged in fruit. Flowers in racemes. Leaves 1-3-foliolate.*

\* *Glabrous herbs. Calyx glabrous.*

*L. PANALICULATA*, Wall.

Ava, Taong-doung.

Terminal leaflet barely twice as broad as long, obversely reniform.

\*\* *More or less puberulous or pilose herbs. Calyx pubescent or villous.*

*L. RENIFORMIS*, Lour.

Limestone Hills of Segain and Paghā-myo.

Leaflets obversely reniform to oblate. Racemes simple, terminal.

\* *Flowers in elongate, slender lax racemes, the upper ones collected into terminal panicles.*

× *Bracts subulate, persisting at the flowering. Pedicels in fruit straight, but reflexed.*

URARIA, Desvaux.

*Calyx not changed in fruit. Flowers in racemes. Leaves 3-1-foliolate, or pinnate.*

*U. CORNIFOLIA*, Wall.

Ava and Prome.

Calyx-lobes  $1\frac{1}{2}$  line long, long-tawny-pilose. Stipules lanceolate,  $\frac{1}{2}$  inch long. Pods densely hooked-hispid.

×× *Bracts very deciduous long before opening of the flowers. Pods minutely puberulous. Pedicels in fruit arcuate.*

*U. CAMPANULATA*, Wall.

Ava. Taong-doung.

Pods glossy. Calyx about 2 lines long, in fruit rather ample, and almost inclosing

the pod. This species connects *Uraria* and *Lourea*, two genera rather too artificially separated (Kurz).

*U. HAMOSA*, Wall.

Chittagong, Ava, Pegu.

*Desmodium Horsfieldii*, Miq.

Pods opaque. Calyx  $1\frac{1}{2}$ –2 lines long, very much shorter than the pod.

*Doodia simplicifolia*, Roxb., seems to be only the simple-leaved form of this species, which Wallich distributed under the name of *U. leptostachya*.

\*\* *Flowers in dense thick simple or almost simple racemes.*

× *Bracts all very deciduous and falling long before opening of the flowers.*

° *Upper leaves pinnately 5–9-foliolate.*

† *Leaflets narrow.*

*U. PICTA*, Desv.

Grass land of Arakan and Ava.

Leaflets white-variegated, blunt or bluntish, the net-venation beneath strong and close. Pod-joints leaden-coloured, polished. Seeds pale-coloured.

*U. ACUMINATA*, Kz.

Pegu and Martaban.

Leaflets glaucous-green, one-coloured, long and very sharply acuminate, the net-venation very thin and lax. Pod-joints glossy. Seeds brown.

†† *Leaflets broad.*

*U. CRINITA*, L.

Chittagong to Tenasserim.

Leaflets with prominent and close net-venation. Pod-joints opaque.

var.  $\beta$  *macrostachya*, Wall. More robust, the leaves larger. Racemes  $1-1\frac{1}{2}$  feet long.

°° *Leaves 1- and 3-foliolate (often on the same plant).*

*U. LAGOPUS*, DC.

Chittagong.

*U. lagopoides*, Royle.

Rather stout plant, usually tawny pilose. Pods opaque, net-veined.

×× *Bracts all persistent at flowering time and conspicuous.*

*U. ALOPECUROIDES*, Roxb.

Bank of the Irrawaddy between Prome and Ava.

Robust, the racemes elongate and brown-pilose. Pods glossy black.

*U. LAGOPOIDES*, L.

Chittagong.

Slender, the racemes short and greyish-pilose. Pods pale-coloured, opaque.

\*\* *Stamens 10, all united into a single tube, or into 2 separate sheaths of 5 each.*

+ *Stamens all united into a single complete tube. Anthers dimorphous.*

*ARACHIS*, *Linnaeus*.

*Calyx-tube* filiform, the 4 upper lobes united, the lowermost thin and free. *Petals* and *stamens* inserted at the mouth of the calyx-tube. *Pod* ripening under the soil. *Leaves* abruptly pinnate.

*A. HYPOGAEA*, L.

Myō-leh.

Indigenous to South America, but cultivated all over the East for its edible kernels and the oil extracted from them, which is excellent. The wrinkled pod, which is buried in the earth, contains 2 or 3 'nuts,' or seeds, which, when roasted, are favourite and wholesome articles for dessert, resembling somewhat an almond in flavour.

*ZORNIA*, *Gmelin*.

*Calyx-tube* short. *Pod* 2–6-jointed, mucicate. Herbs, the leaves digitately 2–4-foliolate.

*Z. DIPHYLLUM*, L.

Arakan and Pegu.

++ *Stamens united into 2 separate sheaths of 5 each.*

† *Pod twisted within the calyx.*

SMITHIA, Aiton.

*Calyx* 2-parted. Herbs with abruptly pinnate leaves, the rachis ending in a bristle.

\* *Fruiting calyx simply striate, not reticulate, the lobes more or less acute. Joints of pod more or less angular.*

*S. SENSITIVA*, Ait.

Chittagong to Tenasserim. Kamorta.

*S. Javanica*, Bth.

*Calyx*-lobes quite glabrous and nude. Flowers in slenderly peduncled naked heads or short racemes.

*S. CONFERTA*, Sm.

Tavoy.

*S. hispidissima*, Zoll.

*Calyx*-lobes more or less hairy-fringed on the keel beneath. Flowers in dense sessile heads, involucred by the uppermost leaves.

*S. CILIATA*, Royle.

Martaban between 3500 and 5000 feet.

*Calyx*-lobes minutely toothed, the teeth all excurrent into long stiff bristles. Flowers in dense slenderly peduncled naked heads.

\*\* *Fruiting calyx urceolate-bell-shaped, striate and net-veined, the lobes more or less truncate. Pod-joints (and also the seeds) much compressed.*

*S. DICHOTOMA*, Dalz.

Akyab.

Leaflets in 4 to 2 pairs. Upper part of stipule about 3 lines long. Pod-joints 10-12, about a line long, papillose.

*S. GRANDIS*, Bth.

Pegu.

Leaflets in 10-15 pairs. Upper part of stipule nearly an inch long. Pod-joints 20-25, 2 lines long or longer, veined.

++ *Pod straight.*

GEISSASPIS, Wight and Arnott.

*Calyx* deeply 2-lipped, the upper lip entire. Herbs, with abruptly pinnate leaves. Pods 1-2-jointed, indehiscent.

*G. CRISTATA*, W. A.

Arakan. Ava. Pegu and Tenasserim.

ÆSCHYNOMENE, Linnaeus.

*Calyx* 2-lipped. Herbs, rarely under shrubs, with unpaired-pinnate leaves. Pods many-jointed.

Æ. INDICA, L.

Swamps from Chittagong to Tenasserim.

Æ. Cachemiriana, Camb.

Æ. sensitiva, P. de B.

Hedysarum Neli-tali, Roxb.

Smithia aspera, Roxb.

'Kât-shola' of Bengal.

*Calyx* and corolla glabrous, the latter 1 lines long. Pod-joints only 2 lines long.

Æ. ASPERA, L.

Swamps in Arakan and Pegu.

Hedysarum lagenarium, Roxb.

Æ. trachyloba, Miq.

Pouk and Nya, *vide* Mason; but 'Pouk' in Pegu is Butea frondosa.

*Calyx* and outside of keel of corolla sparingly hairy, the corolla about an inch long. Pod-joints about  $\frac{1}{3}$  inch long.

This is the plant called in India *Shola*, of which 'Shola hats' are made. Mason says its bark yields a coarse hemp.

ORMOCARPUM, *Palisot de Beauvois*.

*Calyx* 5-toothed. *Pod-joints* longitudinally striate or ribbed. Shrubs with unpaired-pinnate leaves.

O. SENNOIDES, Willd.

Siam and probably Tenasserim.

O. ochroleucum, Zoll.

++ *Pods not jointed, very rarely 1-seeded.*

Sub-tribe VICIELE.

*Petiole terminating in a bristle or tendril. Leaves abruptly pinnate.*

\* *Stamens* 10, united into a single slit sheath with the tenth vexillary one free.

× *Leaflets toothed. Wings free from the staminal tube.*

CICER, *Linnaeus*.

*Style* not bearded at the apex. *Pod* inflated. *Funicle* filiform. Erect herbs.

\* C. ARIETINUM, L.

Ka-lā-peh. 'Gram.'

Extensively cultivated, especially in Upper Burma.

× × *Leaflets entire. Wings more or less adhering to the staminal tube.*

VICIA, *Linnaeus*.

*Staminal tube* oblique at the mouth. *Style* pubescent, or bearded at the apex. *Orules* usually numerous. Erect or twining herbs.

V. SATIVA, L.

Ava. Bhamo.

Flowers solitary, almost sessile, nearly  $\frac{1}{2}$  inch long. *Pods* glabrous, 6-18-seeded.

LENS, *Grenier and Godron*.

*Staminal tube* oblique at the mouth. *Style* filiform. *Orules* usually 2. Erect herbs.

\* L. ESCULENTA, Moench.

Cultivated in Chittagong.

*Errum lens*, L.

Lentils.

The flour of this pulse (the Masur ka dāl of India) is considered rather heating if liberally consumed. It is believed to be the basis of the popular *Revalenta Arabica*. *Errum lens* is by a slight change written *erevalenta*, which is then easily converted into *Revalenta*. It is strange that the sale of a really commendable article seems to be increased and stimulated by some paltry trick in advertising or by some audaciously unreal placard to catch the vulgar eye! I well remember years ago being struck with the ingenuity of the manufacturers of some bug-powder or other, who, being by the nature of the article precluded from declaring it to be patronized by the Queen and other members of the Royal Family, fell back on the next best recommendation to an idiotic public, that it was highly in vogue with Her Majesty's Army in Abyssinia! And so it is, in Trade as in Religion, "Populus vult decipi. Decipiatur."

LATHYRUS, *Linnaeus*.

*Staminal tube* truncate at the mouth. *Style* flat, or dilated at the apex. *Pods* more or less compressed. Erect herbs.

\* L. SATIVUS, L.

Cultivated in Chittagong.

Kesāri-dal, or Kasur in India. Tira in Bengal.

The seed is grey-coloured, with minute black specks, and surrounded by a thin black line. This 'dal' is considered indigestible, and Dr. Thomson attributed to its

use paralysis of the lower extremities in persons of all ages and sexes which came under his observation in a particular village in India.

PISUM, *Linnaeus*.

As preceding, but style triquetrous and dilated upwards. *Pods* turgid.

\* *P. SATIVUM*, L. var. *α* Cultivated in Ava, Prome, Pegu, etc.

Garden Pea. var. *β* Cultivated in Chittagong.

var. *α sativum*. Flowers larger, white. Seeds globular or nearly so, pale-coloured or green.

var. *β arvense*, L. Flowers white or pale-violet, the wings and keel purple. Seeds somewhat depressed angular, greyish, brown- or purple-mottled.

\*\* *Stamens* only 9, all united into a single slit sheath.

ABRUS, *Linnaeus*.

*Style* not bearded. *Pods* compressed, chambered within. Climbing under shrubs.

*A. PRECATORIUS*, L. In forests and hedges from Ava and Chittagong  
Yweh-ngē or Khyen-yweh. to Tenasserim, Car Nicobar, and Nankowry.

*Pods*  $\frac{1}{2}$ – $\frac{3}{4}$  as broad as long, somewhat crumpled. Seeds terete.

*A. LAEVIGATUS*, E. Mey. Pegu and Tenasserim.

*A. pulchellus*, Wall.

*A. melanosperma*, Hassk.

*Pods* flat and straight, 4 to 5 times as long as broad. Seeds compressed.

Of *A. precatorius*, Waring says the roots and leaves are demulcent, and an extract forms an excellent substitute for ordinary liquorice. The seeds are purgative and emetic. Dr. Mason also writes: "The jewellers use the seed of an *Abrus*, red with a black eye or black with a white eye, for small weights. It is a popular belief that they almost uniformly weigh exactly one grain troy, but I have weighed many and found them to vary from one to two grains. The Burmese use them within a fraction for two-grain weights, one hundred and twenty by one mode of reckoning, and one hundred and twenty-eight by another, make one tickal, which weighs, according to Capt. Low, 253.75 grains troy."

Sub-tribe PHASEOLIEÆ.

*Petiole* without tendril. *Leaves* pinnately 3-foliolate, very rarely unpaired pinnate.

\* *Leaflets* not resinous-dotted beneath.

× *Stamens* united into a slit sheath with the tenth vexillary one free.

+ *Nodes* of the inflorescence not tumid. *Stipules* and bracts conspicuous, persistent.

CLITORIA, *Linnaeus*.

*Petals* very unequal in length, the standard narrowed at the base, nude at the apex. *Calyx-tube* cylindrical, longer than the lobes. Herbs or under shrubs.

× *Corolla* quite glabrous.

*C. TERNATEA*, L. Chittagong, Tenasserim, the Nicobars.  
Leaflets in 2 or rarely in a single pair. Bractlets roundish.

× × *Standard* more or less pilose outside. *Leaves* pinnately 3-foliolate.

*C. GRAHAMII*, Steud. Tenasserim, Bithoko Range, at 3000 feet elevation.  
var. *β* Ava, Taong-doung, and Prome Hills.

*Calyx* puberulous, the teeth as long as the tube. Bractlets broader and larger, nearly  $\frac{1}{2}$  as long as the calyx. Flowers by 3–6, clustered in the leaf-axils.

var. *α Grahamii*, Steud. Elongate, twining, appressed pubescent. Bractlets broader and larger, nearly half as long as the calyx. Leaflets acuminate or sharply

acuminate. Calyx-lobes narrower, subulate-acuminate. Pedicels very short, the raceme almost reduced. Standard more pilose outside.

var. *β macrophylla*, Wall. More robust in all parts, the shoots and petioles spreadingly tawny pubescent, glabrescent. Leaves larger, acute or nearly so. Raceme short, often branched. The rest as in preceding.

*SHUTERIA*, *Wight and Arnott.*

*Style* filiform. *Calyx-teeth* distinct, the 2 upper ones connate. *Anthers* conform. *Bracts* persistent, striate.

*S. VESTITA*, W. A. Ava to Martaban between 3000 and 5000 feet.

More or less hairy. Racemes sessile, naked. Pods hairy.

*S. SUFFULTA*, Bth. Ava to Martaban up to 4000 feet.

All parts (also the pods) quite glabrous. Racemes filiform, furnished with 1 or 2 distant whorls of broad floral leaves.

*DUMASIA*, *De Candolle.*

*Style* dilated at the middle. *Calyx-tube* cylindrical, obliquely truncate at the mouth.

*D. LEOCARPA*, Bth. Martaban Hills, between 4000 and 5000 feet.

*D. villosa*, var. *leiorcarpa*, Baker.

All parts, also the ovary, glabrous.

+ + *Nodes of the inflorescence tumid.*

† *Stigma* terminal, capitate. *Style* beardless.

° *Anthers* all conform.

§ *Twining or creeping herbs. Petals usually long.*

*GALACTIA*, *R. Brown.*

*Calyx* 4-toothed (the 2 upper teeth united into one). *Pod* 2-valved.

*G. TENUIFLORA*, W. A. Hills opposite Loongyi Island in the Irrawaddy.

All parts scantily and minutely appressed-pubescent. Leaves glabrous above.

*G. VILLOSA*, W. A. Limestone Hills of Segain.

All parts, also the upper side of the leaves, softly but shortly pubescent.

*GRONA*, *Bentham (vix Loureiro).*

*Calyx* 5-toothed, the 2 upper teeth free. *Pod* linear, 2-valved. *Seeds* strophio-late.

*G. GRAMMII*, Bth. Prome Hills.

Leaves 3-nerved at the base, glabrous above. Flowers  $\frac{1}{2}$  inch long, in lax racemes.

*G. FILICATULIS*, Kz. Pegu.

Leaves palmately 5-nerved, sparingly hirsute on both sides. Flowers 2 lines long, yellow, solitary on filiform axillary peduncles.

§ § *Trees or woody climbers or shrubs.*

*BUTEA*, *Roxburgh.*

*Petals* equally long. The 2 upper calyx-teeth free. *Pod* indehiscent, 1-seeded at the apex, the sterile basal part much dilated and flat.

Sub-genus *BUTEA*, Roxb.

*Corolla* very large, orange-scarlet, appressed silk-hairy outside, the keel and standard more or less acute.

× *Pods stalked.*

*B. FRONDOSA*, Roxb.

All over Burma.

Pouk. (Palās or Prās in India.)

Tree. Pedicels  $\frac{1}{2}$ –1 inch long.

Dr. Mason remarks: "There is a species of *Butea* very abundant on the alluvial lands, which is a most magnificent tree. The Pwo Karens plant it in their sacred groves, where the deep rich orange blossoms, seen under a tropic sun in the dry season, enveloping their almost leafless trunks and branches, give the copse the appearance of a burning jungle. The Burman books describe the Himalaya forest as shining with the flowers of the *Butea*, like a flame of fire."

The tree yields a clear red gum with the astringent properties of Gum Kino. The leaves are used in India as plates, and the flowers yield a fugitive yellow or orange dye. Lac is also principally produced on this tree, and its brilliant saturnine or orange-red flowers seem to set the jungle ablaze and herald the commencement of the hot season. I measured one dwarfed tree near the Irrawaddy of 18 feet in girth, but have never seen another approaching this size (W. T.).

*B. SUPERBA*, Roxb. *W.C.*

All over Burma.

Pouk-nwch.

Woody climber. Pedicels 1–1 $\frac{1}{2}$  inch long.

× × *Pods sessile.*

Sub-genus *SPATHOLOBUS*, Hassk. (Woody climbers.)

*Corolla* small, white or purple, glabrous keel and standard more or less blunt.

*B. PARVIFLORA*, Roxb. *W.C.*

All over Burma.

*Spatholobus Roxburghii*, Bth.

Leaves large, beneath appressed silvery pubescent. Pods stalked. Flowers white.

*B. ACUMINATA*, Wall. *W.C.*

Tropical forests all over Burma.

Leaves small, glabrous to the naked eye. Pods sessile. Flowers white.

*ERYTHRINA*, *Linnaeus*.

*Petals* very unequal, the standard exceeding the keel.

\* *Wings of corolla much longer than the spathaceous calyx.*

× *Pod bearing the few seeds at or towards the narrowed end only, the lower sterile part greatly dilated, as in Butea.*

Sub-genus *HYFAPHORUS*, Hassk.

*Pods* dehiscing at both sutures, the pilose sterile part contracted into a stalk 1–2 inches long. *Seeds* 1–3, free. *Flowers* almost sessile.

*E. LITHOSPERMA*, Miq.

Pegu Range and Martaban.

*E. Sumatrana*, Miq.

Standard glabrous. Keel-petals wholly connate, obcordate and shortly acuminate in the sinus.

*E. HOLOSERICA*, Kz.

Tharawaddy district (Adamson).

Standard minutely velvety. Keel consisting of 2 obliquely oblong rather acute petals united at the middle only.

A curious species, the flowers of which much resemble those of *E. ovalifolia*, while the leaves (if they really belong to the flowers) are those of *E. lithosperma*.

× × *Pod many-seeded, seed-bearing from the base.*

Sub-genus *DECHASSANGIA*, Walp.

*Pods* flat, torulose, opening only along the sinuate outer suture, the dorsal suture prominent and straight. *Seeds* free, but usually separated by spurious spongy septa.

*E. OVALIFOLIA*, Roxb.

Lower Pegu, and often cultivated.

Glabrous, glaucous. Standard broad, notched. Pods minutely greyish-velvety.

Sub-genus *STENOTROPIS*, Hassk.

*Pods* torulose and almost moniliform, the valves opening at both sutures and exposing the continuous pithy-chartaceous indehiscent endocarp inclosing the seeds.

*E. INDICA*, Lamk.

The Nicobars.

*E. bisetosa*, Griff.

Ka-thyt.

Glabrous. Leaves membranous or chartaceous. *Pods* glabrous.

Frequent in the beach-forests all along the coasts of Burma and the adjacent islands; rears in the dry Prome District, but there very rare; often planted in villages.

\*\* *Wings of corolla minute, as long as, or shorter than the spathaceous calyx.*

Sub-genus *MICROPTERYX*, Walp.

*Pods* follicle-like, opening along the ventral suture, continuous. *Seeds* free.

*E. SUBEROSA*, Roxb.

Pegu Range.

Leaves rigidly chartaceous or almost coriaceous, more or less shortly tomentose or puberulous beneath. *Calyx* spathaceously 2-lobed.

*E. STRICTA*, Roxb.

Pegu Range and Martaban.

Leaves chartaceous, glabrous, acuminate. *Calyx* spathaceous.

The wood of *Erythrina* is very light, and of little use save for some of the purposes of cork. It is also selected for the manufacture of gunpowder, and an *Erythrina* tree, Dr. Mason says, is "famous in Buddhist mythology, as the tree round which the Devas dance till they are intoxicated in Indra's heaven." It is very questionable, however, if the Buddhist tradition favours the idea of dancing being associated with intoxication, as the Doctor's words would seem to imply! Or perhaps the intoxication meant is that produced not by strong drink, but by thrilling doctrine such is now-a-days distributed by your tub-thumpers and Revivalists.

°° *Authors dimorphous.*

*MUCUNA*, Adanson.

*Petals* very unequal, the keel exceeding the standard. Woody climbers or twining under shrubs.

\* *Pods winged along the sutures, or lamellate, or both.*

Sub-genus *CITTA*, Lour.

*Pods* transversely and obliquely lamellate on the valves, but not winged at the sutures. *Seeds* orbicular.

*M. MONOSPERMA*, DC.

All over Burma.

*M. anguina*, Wall.

Racemes corymb-like, short-peduncled. *Pods* 1-seeded.

Sub-genus *CARPOPOGON*, Roxb.

*Sutures* of pod dilated into broad wings, the valves smooth. *Seeds* orbicular.

*M. GIGANTEA*, DC.

Coasts of Tenasserim, the Andamans, and Nankowry.

Flowers yellowish or white. Pod 3-4 inches long, appressed tawny setose.

\*\* *Pods without sutural wings, the valves either quite plain, or longitudinally ribbed on the faces only.*

Sub-genus *STIZOLOBIUM*, Pers.

Characters as above. *Pods* often longitudinally ribbed on the sutures.

× *Pods stalked, glabrescent, torose. Seeds orbicular.*

*M. MACROCARPA*, Wall.

Hills of Ava and East of Toung-ngoo.

Arboreous climber. Flowers variegated dark-purple. Pod 1-3 feet long, plain.

× × *Pods sessile, plain or longitudinally ribbed. Seeds transversely oblong.*

+ *Pods densely setose, not glabrescent. Flowers purple.*

*M. PRURITA*, H. f.

Ava and Pegu.

*M. pruriens*, L. (in part).

*M. utilis*, Wall.

Khwe-leh.

Peduncle naked. Flowers arising from a knob. Pods with two longitudinal ribs along the upper suture. Leaves pubescent beneath.

The hairs which invest the pods cause intense itching, whence the name 'cowitch,' or perhaps more correctly 'cowage,' which some consider a corruption of 'kirach,' one of the native names of the plant. The hairs mixed with honey, by dipping the ripe pods therein, and scraping them, are sometimes given to children for round worms, whose expulsion they contribute to by sticking in these animals and causing uneasiness. The remedy is not, however, much used by European practitioners.

*M. prurita* is the East Indian plant, and *M. pruriens* that from the West Indies.

*M. (CARPOPOGON) BRACTEATA*, Roxb. Ava, Chittagong, and Pegu up to 4000 feet.

Peduncle bracted. Flowers from a secondary peduncle about 2 lines long. Pod without ribs. Leaves almost glabrous.

Another probably new species has been collected by Dr. Brandis somewhere in Pegu, which is very near to *M. atropurpurea*, DC., and, indeed, has the same flowers. It differs in the long cuspidate leaflets, slender and short racemes, the lower persistent bracts, which are concave-ovate, long-acuminate, and about an inch long; and the lanceolate, acuminate calyx-lobes (Kurz).

++ *Pods velvety, glabrescent. Flowers white.*

*M. NIVEA*, Roxb.

Ava.

Pods longitudinally ribbed,  $\frac{1}{2}$  foot long.

†† *Style bearded.*

*Stigma oblique.*

§ *Free part of filaments straight, alternately shorter. Twining herbs.*

*PACHYRHIZUS*, Rich.

*Keel* not spirally twisted. *Style* flat upwards, the stigma almost globose on the inner face. *Pod* transversely lined between the seeds.

\* *P. BULBOSUS*, L.

Cultivated all over Burma for its tuberous rhizomes.

*P. angulatus*, Rich.

*VIGNA*, Savi.

*Keel* not spirally twisted, blunt or arcuate-beaked. *Style* filiform.

\* *Stipules* not peltately attached. *Keel* prolonged into a distinct beak.

× *Ovary* and *Pods* (at least while young) more or less pubescent to tomentose. *Flowers* purple or blue.

× *Seeds velvety.*

*V. DOLICHODES*, Roxb.

Chittagong and Arakan.

Habit of the following. Pods 2-3 inches long by  $\frac{1}{2}$  broad, densely silky villous.

× *Seeds glabrous.*

*V. PILOSA*, Roxb.

Pegu.

Tor-peh.

Flowers about  $\frac{1}{2}$  inch long, forming short-peduncled many-flowered racemes. Pods densely brown hirsute,  $2\frac{1}{2}$ -3 lines broad by 4-5 inches long.

V. VEXILLATA, L.

Pegu Range, along streams.

*V. hirta*, Hook.*Phaseolus Pulniensis*, Wight.

Flowers about an inch long or longer, by 2-4 terminating the long peduncles.  
Pod glabrescent.

× × *Ovary and pods glabrous. Flowers yellow.*

° *Leaflets obovate, blunt or almost retuse.*

V. LUTEA, A. Gray.

Beaches of Tenasserim, the Andamans and Nicobars.

Quite glabrous. Corolla about  $\frac{1}{2}$  inch long. Pods 1-1 $\frac{1}{2}$  inch long.

° ° *Leaflets from ovate to ovate-lanceolate, acuminate to acute.*

V. REPENS, Baker.

Promc.

Flowers by 1-2 on very short paired peduncles.

V. LUTEOLA, Bth.

Ava. Bhamo.

*Dolichos Gangeticus*, Roxb.

Racemes many-flowered, long-peduncled. Stipules small, almost peltately falcate-ovate.

Baker refers my Burmese specimens to this species, but they differ greatly in the stipules, and are referred by me to the following species (Kurz).

\*\* *Stipules peltately attached, the lower end produced.*

× *Keel not prolonged into a beak. Flowers yellow.*

V. CALCARATA, Roxb.

Arakan and Pegu.

Pods 1-2 inches long by 1 $\frac{1}{2}$ -2 lines broad, minutely puberulous, soon glabrous.  
Seeds glossy. Stipules oblong, the produced basal part falcate-ovate.

V. BRACHYCARPA, Kz.

Arakan.

Pods rather blunt at both ends, up to an inch long by 2 $\frac{1}{2}$  lines broad, sparingly but long-hirsute. Seeds opaque. Stipules peltately linear-oblong, 3-4 lines long.

× × *Keel prolonged into a distinct beak. Flowers blue or white, or variegated in these colours.*

\* V. (DOLICHOS) SINENSIS, L.

Cultivated all over Burma and the islands.

*Dolichos Tranquebaricus*, Jacq.*D. catjang*, L.

Pods 2-3, or 4-12 inches long by 2-4 lines broad, glabrous. Stipules shortly peltate, lanceolate.

§ § *Free part of filaments once or rarely twice spirally twisted.*

PHASEOLUS, *Linnaeus*.

*Keel* spiral. *Style* filiform. The 2 upper calyx-teeth, or all, shorter than the tube. *Hilum* oblong or shortly orbicular. Twining or rarely almost erect herbs.

Sub-genus EU-PHASEOLUS.

*Stipules* small, basifixed and not or hardly produced downwards.

\* *Pods* dimidiate, oblong or linear, 2-many-seeded. *Flowers* purple to lilac and white.

\* P. LUNATUS, L.

Ava (cultivated?).

Country French beans.

Flowers small, greenish white, on filiform puberulous pedicels. Calyx shallow, 2 lines wide and barely a line deep. Pods falcate, 2-3 inches long by  $\frac{1}{2}$  broad, glabrous. An excellent vegetable, originally, it is said, introduced from Mauritius, easy to cultivate, and yields well.

*P. TENUICAILIS*, Grch.

Prome. Bhamo.

Flowers purplish, middling-sized, on slender glabrous pedicels. Calyx about 2 lines deep and nearly as wide, ribbed. Pods  $1\frac{1}{2}$ –2 inches long, by 3–4 lines broad.

\*\* *Pods neither dimidiate nor falcate, linear to narrow-linear, 4-many-seeded. Flowers purple to white.*

× *Bractlets oval, persistent, as long as, or longer than the calyx.*

\* *P. VULGARIS*, L.

Chittagong, cultivated.

*P. nanus*, L.

Racemes few-flowered. Pedicels longer than the calyx. Pods linear, 4–6-seeded.

× × *Bractlets deciduous, shorter than the calyx. Flowers shortly pedicelled.*

\* *P. ADENANTHUS*, E. Mey.

Ava. Prome. Tenasserim.

*P. rostratus*, Wall.

*P. alatus*, Roxb. (non. L.).

Corolla nearly an inch long. Calyx plain. Pods many-seeded,  $\frac{1}{3}$  inch broad.

Cultivated for its tuberous roots.

*P. SEMIERECTUS*, L.

Chittagong, in grass-land.

*P. psaraleoides*, W. A.

Corolla about  $\frac{1}{2}$  inch long. Calyx almost 5-ribbed. Pods many-seeded, 2 lines broad or narrower.

Sub-genus *SFROPHOSTYLES*, Ellis.

*Stipules* peltately attached and produced downwards. *Flowers* yellow or greenish yellow. *Bracts* very deciduous.

\* *Ovary and pods glabrous.*

*P. (GLYCINE) TRILOBUS*, L.

Burma (*fide* Mason).

Prostrate or half-twining. Stipules large and leafy, about  $\frac{1}{4}$  inch long. Leaflets more or less deeply-lobed.

\*\* *Ovary pubescent to hirsute.*

*P. TRINERVIUS*, Heyne.

Martaban and Tenasserim.

Twining, the stems spreadingly hirsute. Pedicels 1–1 $\frac{1}{2}$  lines long. Pods thinly and shortly hirsute.

\* *P. RADIATUS*, L.

var.  $\beta$  generally cultivated all over Burma.

Erect or nearly so, hirsute to almost glabrous. Flowers almost sessile. Pods sparingly but long-hirsute.

var.  $\alpha$  *radiatus*, *P. Mungo*, L. More or less spreading and twining. Pods shorter and more blunt.

var.  $\beta$  *P. Mungo*, L.; *P. Max*, Roxb. Dwarf and erect. Pods longer, narrower, and acuminate. Seeds green or black. Of this there is also an almost glabrous form.

It is a curious thing that some pulses should be unwholesome, and even poisonous, as *Ervum ervilia*, and some species of *Phaseolus* and *Lathyrus*. This unwholesomeness of some species is so well known, that they are avoided by well-to-do natives, but are consumed by the very poor with, it is believed, the result of inducing paralysis of the lower limbs.

— *Stigma terminal. Free part of filaments straight.*

*DOLICHOS*, Linnaus.

*Kel* not spirally twisted. *Style* filiform, minutely penicillate around the minute stigma. Twining or rarely sub-erect herbs.

D. BIFLORUS, L. Ava.

*Glycine uniflora*, Dalz.

Peh (generic).

Flowers by 1-3 clustered in the leaf-axils. Calyx-teeth about as long as the tube. Corolla yellow.

D. LANCEOLATUS, Grah. Prome Hills.

Flowers by 1 or 2 on a short axillary peduncle. Calyx-teeth shorter than the tube. Corolla reddish? Twining or sub-erect herbs.

D. LABLAB, L. Cultivated all over Burma.

*D. Bengalensis*, Jacq.

*D. lignosus*, Roxb.

As preceding, but style thickened upwards, bearded down the inner edge.

× × Stamens all united into a complete tube.  
+ Nodes of inflorescence tumid.

CANAVALIA, Adanson.

Upper-lip of calyx projecting. Style beardless or rarely bearded. Pod indehiscent or late-dehiscing, the upper suture thickened or narrowly 2-winged.

Sub-genus EC-CANAVALIA.

Pods more or less dimidiate, with 2 parallel wings along the upper suture, glabrous or glabrescent.

\* Seeds an inch long or slightly longer.

\* C. (DOLICHOS) ENSIFORMIS, L. Cultivated all over Burma.

*C. gladiata*, DC.

Peh-noung-ni. Sword Bean.

Pods  $\frac{1}{2}$ -2 feet long, linear-oblong. Seeds red or white.

var. *a erythrosperma*, Voigt. Seeds red. Flowers red or white.

var. *β leucosperma*, Voigt. Seeds and flowers white. Pods about 2 feet long.

\*\* Seeds only  $\frac{1}{2}$  inch long.

C. VIROSA, Roxb. Arakan. Kamorta. Katchall and Nankowry.

*C. ensiformis*, L., var. *virosa*, Bak. H. f.

Leaflets shortly acuminate or apiculate. Standard an inch long. Seeds light grey.

C. TURGIDA, Grah. Frequent in the leaf-shedding forests,

*C. ensiformis*, L., var. *turgida*, Bak. all over Burma, and the Andamans.

Leaflets apiculate. Standard  $\frac{2}{3}$  inch long or shorter. Seeds dark brown.

C. OBTUSIFOLIA, DC. Coast of Arakan and the Andamans.

*Dolichos rotundifolius*, Vhl.

Leaflets oboval, retuse or rounded. Standard an inch long. Seeds grey.

Sub-genus DYSOLOBITUM, Bth.

Pods terete, straight or slightly curved, obtusely 2-keeled along both sutures, but not winged, densely hirsute to velvety.

C. GRANDIS, Wall. All over Burma.

*Phuscolus velutinus*, Bak.

Shortly pubescent. Corolla an inch long. Style bearded. Pods velvety.

C. LUCENS, Wall. Forests from Chittagong to Tenasserim.

Glabrescent. Corolla hardly  $\frac{1}{2}$  inch long. Pod as in preceding, but more densely velvety, style villous round the stigma.

## PSOPHOCARPUS, Necker.

*Pod* 4 cornered, longitudinally 4-winged. *Stigma* almost globose, densely penicellate-villous.

\* *P. TETRAGONOLOBUS*, L. Prome and Martaban cultivated (*vide* Mason).

Bractlets shorter than the calyx. *Pods* up to a foot long, 12-16-seeded.

\* *P. PALUSTRIS*, Desv. Cultivated all over Burma.

*Diosingia scandens*, Endl.

*P. longipedunculatus*, Hassk.

*Dolichos tetragonolobus*, Roxb. non L.

Peh-myit or Peh-hmung-wā. Goa beans.

Bractlets as long or longer than the calyx. *Pods* 2-3 in. long, often 5-6-seeded.

The pods of this species are eaten as beans, and it also yields edible tubers. The pods have fringed or membranous edges, and the plant is said to be a native of Mauritius.

## DIOCLEA, Humboldt, Bonpland et Kunth.

Upper teeth of calyx not projecting. *Pods* oblong, turgid, indehiscent, the upper suture thickened or 2-winged. *Anthers* dimorphous.

*D. REFLEXA*, Hook.

Tenasserim.

*Dolichos hexandrus*, Roxb.

## PTERARIA, DeCandolle.

Upper teeth of calyx not projecting. *Pod* linear, flattish, readily dehiscing, many-seeded.

Sub-genus EU-PTERARIA. (Woody leaf-shedding climbers).

*Pods* constricted between the seeds. *Roots* large, tuberous. *Flowers* pale blue.

*P. RUBEROSA*, Roxb.

Chittagong.

Calyx densely silky. Bractlets minute. *Pods* tawny hirsute while young.

*P. CANDOLLEI*, Grah.

All over Burma.

Calyx minutely appressed pubescent. Bractlets as long as the buds. *Pods* minutely appressed pubescent, soon glabrous.

Stands in a similar relationship to the preceding species as *Millettia extensa* does to *M. macrophylla*, and is barely more than a glabrous variety of it (Kurz).

Sub-genus NEUSTANTHUS, Bth. (Under shrubs or shrubs, erect or twining).

*Pods* not constricted between the seeds.

\* *Erect shrubs or under shrubs, the branchlets terete or nearly so.*

× *Bracts deciduous.*

*P. WALLICHII*, DC.

All parts nearly glabrous. Calyx minutely velvety. *Pods* 1½-2 inches long. *Flowers* white.

*P. COMPOSITA*, Bth. Ava, Taong-doung and the drier hill-forests, especially the pine-forests of Martaban, 3500 to 5000 feet elevation.

Tomentum of young parts, inflorescence, and calyx tawny. *Pods* 2-3 inches long.

× × *Bracts persistent.*

*P. STRICTA*, Kz.

Pegu Hills between 1000 and 3000 feet.

Leaves sparingly appressed hirsute. Fruiting pedicels 2 lines long. *Pods* 1-1½ inch long, glabrous.

\*\* *Twining or prostrate herbs or under shrubs. Flowers purplish blue.*

× *Pods narrowly linear, 1½–3 inches long by 2 lines broad, many-seeded.*

° *Bracts deciduous. Branchlets terete or nearly so. Leaflets often lobed.*

*Extensive twiners (Schizophyllon, Baker).*

P. PHASEOLOIDES, Roxb.

Pegu.

Calyx about 2½ lines long, the lobes acuminate. Corolla about 5 lines long.

P. SUBSPICATA, Bth.

Arakan, Pegu, and Tenasserim.

Calyx about 4 lines long, the lobes subulate-acuminate. Corolla ¾ inch long.

°° *Bracts persistent. Branchlets somewhat angular.*

*Prostrate or twining perennial herbs.*

P. ANABAPTISTA, Kz.

Both varieties frequent in the upper mixed forests of the Pegu Range; also Khakyen Hills.

Pods long, but thinly hirsute.

var. *a genuina*. Branches, petioles, etc., spreading tawny hirsute. Pods similarly hirsute while unripe. Flowers purple.

var. *β glabrescens*. Branches, petioles, and also the pods thinly appressed hirsute, the last shorter and almost glabrescent. Flowers pale lilac, violet at the tips.

var. *β* may be distinct, and stands in a similar relation to the normal form as *P. Candollei* does to *P. tuberosa*. The species is also common in Sikkim (Kurz).

×× *Pods oblong to linear-oblong, ½–1 inch long by 2½–3½ lines broad, flat or torose. Branchlets sharply angular, retrorsely pubescent on the angles.*

P. HIRUTA, Kz.

Pegu Range up to 3000 feet.

Pods flat, sparingly but long and spreadingly hirsute, 2–4-seeded. Calyx small.

P. BRACHYCARPA, Kz.

Pegu Range.

Pods torose, shortly and sparingly appressed hirsute, 5–6-seeded. Calyx nearly a line long.

++ *Nodes of inflorescence not tumid. Stipules and bracts minute, deciduous.*

*TERAMNUS, Sprengel.*

*Calyx-teeth free. Alternate anthers abortive.*

\* *Pods more or less torose, tawny hirsute.*

T. MOLLIS, Bth.

Pegu Range.

*Glycine debilis, Roxb.*

Seeds opaque. Inflorescence and young branches spreadingly tawny pilose. Calyx-teeth as long as the tube.

\*\* *Pods glabrous to the naked eye.*

× *Flowers in racemes.*

T. (GLYCINE) LABIALIS, L.

Chittagong and Arakan.

Racemes appressed silk-hairy. Calyx-teeth as long as the tube. Seeds glossy. Leaflets up to 1½ inch long, not acuminate.

T. WALLICHII.

Prome Hills.

*Desmodium Rottleri, apud Baker.*

Racemes long-peduncled, almost glabrous. Leaflets obovate, retuse.

The few specimens seen by me are imperfect, but the terete stems, and more especially the large peculiar peltately adnate stipules at once remove it from *Desmodium Rottleri*, with which Baker identifies the plant (Kurz).

T. FLEXILIS, Bth.

All over Burma.

Racemes appressed silk-hairy. Calyx-teeth shorter than the calyx-tube. Seeds quite opaque. Leaves 2–4 inches long, acuminate.

× × *Flowers by 2-4, axillary.*

*T. OXYPHYLLA*, Bth.

Tenasserim.

Habit of *T. flexilis*. Corolla  $\frac{1}{2}$  in. long. Unripe pods  $1\frac{1}{2}$  in. long, flat, glabrous.

*GLYCINE*, *Linnaus*.

*Calyx-teeth* free, the 2 upper ones connate. *Anthers* all fertile and conform.

\* *G. soja*, L.

Ava, cultivated.

Erect. Flowers in small axillary clusters. Pods  $1-1\frac{1}{2}$  in. long, almost falcate. Seeds 3 lines long, slightly compressed, pale-coloured.

The word 'soja' is a variation of the Japanese 'soya,' whence our word 'Soy,' for a sauce prepared in China and Japan from the seeds of one or more species of *Dolichos* or allied genera.

\*\* *Leaflets more or less conspicuously resinose-dotted beneath.*

+ *Ovules 3 or more.*

*DUNBARIA*, *Wight et Arnott*.

*Pods* plain or slightly turgid, often falcate, not depressed between the obsoletely strophioled seeds.

\* *Ovary and pods sessile.*

*D. FUSCA*, Wall.

Prome Hills.

Leaflets large, acuminate, sparingly but distinctly resinous-dotted beneath. Flowers in racemes.

*D. CONSPERSA*, Bth.

Prome Hills.

*Dolichos? rhynchosoides*, Miq.

Leaflets small, bluntish. Flowers usually by pairs.

\*\* *Ovary and pods conspicuously stalked.*

*D. PODOCARPA*, Kz.

Maulmain.

Leaflets acuminate. Flowers usually by pairs or few, on a very short peduncle. Pods pubescent,  $1\frac{1}{2}-2$  inches long, 10-12-seeded, long-stalked.

*D. CIRCINALIS*, Bth.

Maulmain (*vide* Baker).

Leaflets acute. Flowers in racemes. Pods spreadingly viscose-hairy,  $1-1\frac{1}{2}$  inches long, 5-6-seeded, shortly stalked.

*ATYLOSIA*, *Wight et Arnott*.

*Pod* transversely depressed or lined between the seeds. *Arillus* large grooved.

\* *Twining under shrubs or herbs.*

× *Prostrate herbs with twining branches. Flowers 3-4 lines long, almost fascicled by 2-3.*

*A. (DOLICHOS) SCARABEOIDES*, L.

Bhamo.

*Dolichos medicaginus*, Roxb.

Puberulous. Pods  $\frac{1}{2}-1$  inch long, tawny puberulous and hirsute.

× × *Corolla  $\frac{1}{2}-\frac{3}{4}$  inch long. Extensive twiners. Flowers racemose.*

*A. BARRATA*, Bth.

All over Burma.

*Dunbaria calycine*, Miq.

Leaflets shortly pubescent on both sides. Racemes and pods long-pilose, the latter transversely torose, long-acuminate.

*A. MOLLIS*, Bth.

Ava. Martaban and the Andamans.

*Dunbaria Horsfieldii*, Miq.

Leaflets beneath softly (often yellowish) puberulous. Pods oblong, transversely impressed between the seeds, yellowish or tawny velvety.

\*\* *Erect shrubs or herbs.*

A. NIVEA, Bth.

Prome and Ava.

Stiff annual, little-branched. Leaflets beneath closely white or yellowish tomentose. Calyx slightly puberulous or almost glabrous. Corolla  $\frac{1}{2}$  inch long.

CAJANTS, *DeCandolle.*

*Pod* transversely depressed between the seeds. *Arillus* or *strophiole* none.

\* C. INDICUS, Spreng.

Cultivated all over Burma up to 3000 feet. Nicobars.

*Cytisus cajan*, L.

*Cytisus pseudo-cajan*, Jacq.

*C. flavus*, DC.

Peh-yen-khyung. Arhar in India.

An excellent vegetable, scarcely inferior to peas when young.

+ + *Ovules 1 or 2.*

× *Funicle arising from the centre of the hilum.*

CYLISTA, *Aiton.*

*Calyx* accrescent and leafy, scarious-membranous, the lowermost lobe largest.

C. SCARIOSA, Roxb.

Pegu and Martaban.

RHYNCHOSIA, *Loureiro.*

*Calyx* not accrescent in fruit. *Pods* compressed. *Leaves* pinnately 3-foliolate.

R. MINIMA, L.

Ava and Prome.

*Dolichos scarabæoides*, Roxb. non Willd.

Sub-genus ET-RHYNCHOSIA.

*Seeds* without arillus.

\* *Pods very much longer than the calyx.*

× *Twining herbs.*

Leaflets acute. Racemes elongate, longer than the leaves, almost glabrous.

R. PILOSA, Wall.

Banks of the Irrawaddy near Segain.

Leaflets obtuse or rounded. Racemes filiform, shorter than the leaves, pilose. *Calyx*-teeth filiform. The foliage resembles that of *Atylosia scarabæoides*, the flowers those of *Atylosia elongata*, Bth. (Kurz).

× × *Erect shrubs or under shrubs.*

R. BRACTEATA, Bth.

Ava and Prome.

Greyish velvety. Racemes longer than the leaves, paniced at the end of the branches, pod densely velvety.

\*\* *Calyx as long as the corolla, in fruit nearly as long as the pods. Twiners.*

R. DENSIFLORA, DC.

Limestone hills near Segain, Ava.

*Dolichos aurantiacus*, Wall.

Flowers in dense short axillary racemes. Pods long-pilose, short.

Sub-genus PHYLLOMATIA, W. A.

*Seeds* with a waxy arillus.

\* *Calyx-teeth broad, enlarging and leafy in fruit.*

R. RUFESCENS, DC.

Near Ka-thē on the Irrawaddy.

*Cyanospermum Javanicum*, Miq.

Half-twining, thinly pubescent. Flowers singly on the filiform viscid-pubescent racemes. Pods 1-seeded.

\*\* *Calyx-teeth lanceolate, acuminate, not enlarging.*

R. CAUDICANS, Wall. Ava, Taong-doung and Yē-nān-choung.  
R. *avensis*, Bth.

Stems, racemes, and under surface of leaflets white-tomentose. Pods 2-seeded.

FLEMINGIA, Roxburgh.

*Calyx* not accrescent in fruit. *Pod* turgid. *Leaves* digitately 3-foliolate.

Sub-genus EU-FLEMINGIA.

Erect shrubs or herbs. *Flowers* in racemes, panicles or head like spikes.

§ *Racemes one-sidedly-flowered, the upper ones collected into a terminal panicle. Floral bracts large, leafy, complicate, persistent. Leaves 1-foliolate. Pods 2-seeded. (Ostryodium, DC.).*

× *Floral bracts quite glabrous.*

F. CHAPPAR, Ham. Ava. Prome and Martaban.

Corolla yellowish,  $\frac{1}{3}$  inch long. *Leaves* cordate-ovate.

× × *Floral bracts puberulous or pubescent.*

F. (HEDYSARUM) STROBILIFERA, L. All over Burma and the Andamans.  
Kamorta and Nankowry.

*Stipules* not above 3 lines long, rather deciduous. *Bracts* rotundate and obsoletely pointed, not ciliate. *Corolla* about 3 lines long, white or yellowish.

F. BRACTEATA, Wight. All over Burma.

*Stipules* stiff-subulate, up to  $\frac{1}{2}$  inch long. *Bracts* more or less retuse, ciliate. *Corolla* purplish, about 2 lines long.

§ *Racemes spike-like, solitary or clustered in the leaf-axils, or in panicles, rarely reduced to axillary or terminal more or less involucre heads. (Flemingiastrum, DC. incl. Chalaria, W. A.).*

× *Flowers* in racemes or panicles. *Pods* usually few-seeded.

+ *Leaves* 1-3-foliolate. *Bracts* small, persistent or deciduous.

F. PANICULATA, Wall. Banks of the Attaran.

*Leaves* 1-foliolate. *Racemes* filiform, shorter than the leaves.

F. (HEDYSARUM) LINEATA, L. Ava. Pegu. Martaban.

*Leaves* 3-foliolate. *Racemes* slender, as long as or usually longer than the leaves.

+ + *Leaves* digitately 3-foliolate. *Spikes*, while young, densely imbricate-bracted, the bracts deciduous long before opening of the flowers, or rarely persistent.

° *Bracts* not scarious, shorter than, or about as long as the buds. *Low shrubs*, the branches more or less terete or angular.

† *Bracts* deciduous before opening of the flowers.

¶ *Low shrubs* with a woody subterranean trunk.

F. SERICANS, Kz. Prome and Hills East of Toung-ngoo.

*Racemes* small, silvery silk-hairy. *Calyx-teeth* falcately subulate, a line long, the lowermost one  $1\frac{1}{2}$  line long. *Corolla* 2 lines long. *Petiole* winged, about an inch long.

F. FERRUGINEA, Grah. Ava, Taong-doung. Prome.

*Racemes* rather slender and lax. *Flowers* almost sessile. *Corolla* 2 lines long or a little longer. *Calyx-teeth* falcate-lanceolate, the lowermost one barely longer than the rest. *Petiole* winged, 1-2 inches long.

• • *Well-developed under shrubs.*

F. CONGESTA, Roxb. Ava and all over Burma.

Petiole usually not winged. Racemes dense, usually clustered and shorter than the petiole, greyish silk-hairy. Bracts linear-lanceolate, subulate-acuminate, about 4 lines long. Calyx  $3\frac{1}{2}$  lines long, the lobes linear, subulate-acuminate, the lowermost much longer. Corolla  $3\frac{1}{2}$  lines long, purplish, with a flesh-coloured purplish-streaked standard.

F. PROSTRATA, Roxb. Hills East of Toung-ngoo between 4000 and 5000 feet.

As preceding. Racemes appressed tawny-pubescent, much shorter than the narrowly-winged petiole. Pods densely resinose-glandular and puberulous.

The Burmese variety differs from Khasi specimens chiefly in the long-acuminate not wrinkled leaflets and the black-glandular pods.

F. SEMIALATA, Roxb. var.  $\beta$  only all over Burma.

Petiole narrowly winged. Racemes rather lax, greyish silk-hairy. Calyx 3 lines long, the lobes subulate. Bracts ovate-lanceolate, cuspidate. Corolla 3 lines long, rose-coloured, with greenish keel. Pods puberulous.

var. *a genuina*. Racemes elongate, more robust.

var.  $\beta$  *viridis*. Racemes simple, more lax and slender, more silk-hairy, always clustered in the axils of the leaves, and much shorter than the petiole; leaves of a thinner texture or less pubescent; flowers and pods usually smaller.

F. LATIFOLIA, Bth. var.  $\beta$  in the hills East of Toung-ngoo between 2000 and 4000 feet.

Petiole narrowly winged. Bracts and calyx appressedly brown or golden silk-hairy, the latter  $\frac{1}{2}$  inch long, the lobes subulate with the lowermost one twice as long. Corolla  $\frac{1}{2}$  inch long, white, with rose-coloured wings.

var. *a genuina*. Racemes more lax and more slender, branched.

var.  $\beta$  *grandiflora*. Racemes simple, shorter and more dense. Flowers about  $\frac{1}{2}$  larger.

°° Bracts scarious and stiff, very much longer than the flower-buds. Branches and branchlets more or less triquetrous.

F. STRICTA, Roxb. All over Burma.

Tall under shrub. Petiole narrowly winged. Lower sheathing bracts up to 2 inches long. Calyx about 4 lines long, silvery silk-hairy, the lobes linear, acuminate, the lowermost one twice as long. Corolla nearly  $\frac{1}{2}$  inch long. Pods minutely appressed puberulous.

× × Spikes short and condensed into heads. Bracts all persistent, the outer ones large and involucre-like. Pod inclosed in the calyx, 1-seeded (*Lepidocoma*, Jungh.).

F. CAPITATA, Zoll. All over Pegu and Martaban.

*F. involucreata*, Bth.

*Lepidocoma trifoliatum*, Jungh.

Erect under shrub. Bracts silky-pilose. Calyx  $\frac{1}{2}$  inch long, the lobes subulate. Corolla  $\frac{1}{2}$  inch long, minutely appressed silk-hairy. Pods silky-pilose.

Sub-genus RHYNCHOSIODES, Bak.

Twining herbs or perennials. Flowers in long peduncled heads or dichotomous corymbs. Calyx-teeth almost equal. Pods 1- rarely 2-seeded, usually included in the calyx. Bracts minute, deciduous.

\* F. VESTITA, Grah.

Cultivated by the Karens of Martaban between 3000 and 5000 feet.

Flowers by 4-10 in long-peduncled heads. Calyx fulvous-pilose,  $\frac{1}{3}$  inch long. Corolla appressed pilose, nearly  $\frac{1}{2}$  inch long.

× × Funicle arising from the extremity of the linear hilum.

ERIOSEMA, DeCandolle.

Pod transversely depressed. Erect herbs, flowers axillary. Leaves simple.

E. TUBEROSUM, Ham.  
E. Chinense, Voq.

Pegu and Martaban up to 4000 feet.

Sub-tribe GENISTIEÆ.

*Stamens usually monadelphous, the filaments not dilated upwards. Anthers usually alternately longer and basifixed or nearly so, the others smaller and versatile. Leaves digitate. Pod often inflated.*

\* *Anthers dimorphous. Keel-petals firmly cohering.*

CROTALARIA, Linnaeus.

*Keel beaked. Pod turgid or inflated. Flowers in terminal or leaf-opposite racemes. Herbs or under shrubs with simple or digitately 3-7-foliate leaves.*

A. Leaves simple.

+ *Racemes lateral and leaf-opposed.*

× *Stipules none or small, not decurrent.*

° *Almost glabrous. Slender erect annuals.*

C. FILIFORMIS, Wall.

Pegu Range.

Stipules half-lunate, persistent.

C. STOCKSII, Bth.

Tenasserim or Andamans (*vide* Baker).

Stipules very minute, deciduous.

°° *Silk-hairy or pilose.*

† *Prostrate or ascending small herbs. Flowers not above 2½ lines long.*

C. PROSTRATA, Roxb.

Nāt-toung, East of Toung-ngoo (*vide* Mason).

Braets subulate, very minute. Stipules none. Pods 15-30-seeded.

C. ACICULARIS, Ham.

Chittagong. Pegu. Martaban.

Braets lanceolate, a line long. Stipules subulate, minute. Pods 12-15-seeded.

†† *Flowers ½-¾ inch long. Erect branched annuals.*

C. FERRUGINEA, Grah.

var. *α* frequent in the drier hill- and the pine-forests of Martaban and Ava, at 4000 to 5000 feet elevation.  
var. *β* frequent along rocky river-beds in the tropical forests, from Ava and Martaban down to Tenasserim.

Tawny pilose. Stipules lanceolate, spreading. Pod 20-30-seeded.

var. *α genuina*. More or less spreading. Leaves narrower and more or less acute. All parts more densely rusty pilose.

var. *β pilosissima*, Miq. Erect and often less pillose, leaves broader and rounded or blunt at the apex.

× × *Stipules decurrent, and forming leafy wings to the branches.*

C. ALATA, Roxb.

All over Burma.

C. bialata, Roxb.

Erect annual. Flowers middling-sized, yellow. Pods stalked.

++ *Racemes terminal or terminating axillary branchings. More or less hairy-hirsute or appressed silky-hairy, rarely glabrous.*

° *Calyx divided to the base into lobes, the 2 upper much enlarged in fruit.*

† *Pod exerted from the calyx.*

C. ALBIDA, Heyne.

All over Burma.

C. montana, Roxb.

Flowers ¼ inch long, pale yellow, racemose. Braets linear, very minute. Pods 1½-2 times longer than the calyx, ½-¾ inch long.

†† *Pod more or less included and shorter than the calyx (Calyceinae).*

¶ *Pod small, globular or ovoid-globose, sessile.*

*C. LINIFOLIA*, L.

Pegu and Martaban.

*C. caespitosa*, Roxb.

*C. melanocarpa*, Bth.

Erect annual of several feet. Racemes elongate.

*C. NANA*, Burm.

Small herb. Racemes shortened and head-like.

*C. patula*, Grah., is reduced by Baker to a variety of *C. nana*, Burm. I am unacquainted with the species (Kurz).

¶¶ *Pods linear-oblong to oblong.*

△ *Flowers yellow or pale yellow.*

*C. CALYCINA*, Schrank.

Ava, Taong-dong and Tagoung.

*C. stricta*, Roxb. non Roth.

Flowers few, in short lax racemes. Fruiting calyx covered with long coppery-brown soft hairs. Pods an inch long. Bracts and bractlets large, lanecolate.

*C. DUBIA*, Grah.

Chittagong, Pegu, and Martaban.

Flowers in dense heads. Calyx and pod  $\frac{1}{4}$  inch long. Bracts and bractlets large, ovate, acuminate.

*C. CHINENSIS*, L. non Roxb.

Pegu and Tenasserim.

*C. barbata*, Miq. non Grah.

Flowers? yellow, capitate. Calyx and pods  $\frac{1}{4}$ – $\frac{1}{2}$  in. long. Bracts and bractlets linear.

△△ *Flowers blue.*

*C. SESSILIFLORA*, L.

All over Burma.

Flowers in long racemes. Bracts and bractlets long, setaceous. Calyx  $\frac{1}{4}$ – $\frac{1}{2}$  inch long. Pods  $\frac{1}{2}$  inch long.

°° *Pods very much exerted from the calyx. Calyx-tube obliquely bell-shaped, the teeth rather short, barely enlarging in fruit.*

¶ *Bracts subulate, very minute. Flowers yellow.*

△ *Branches and branchlets woody, with medullary pith, terete.*

*C. KURZII*, Bak.

Pegu Range and Martaban, var.  $\beta$  ranges up to 5000 feet.

Almost glabrous. Leaves acute. Racemes terminating axillary branchlets or reduced to axillary flower-clusters.

var. *a genuina*. Leaves longer and of a thinner texture. Flowers usually axillary and gradually passing into terminal or axillary racemes with all intermediate conditions on the same plant. Pods an inch long. Low-level form.

var.  $\beta$  *montana*. Leaves of a firmer texture and half the size. Flowers in true leafless elongate axillary and terminal racemes. Pods only  $\frac{1}{2}$  an inch long. High-level form.

△△ *Branches herbaceous, fistulose, stout.*

*C. ASSAMICA*, Bth.

Khakyen Hills. Ava.

Calyx and underside of the blunt or acute leaves densely appressed silky. Racemes all terminal. In Ava specimens the flowers sometimes grow indifferently in the place of the leaves from the leaf-branches, so that the flowers are either mixed up with the leaves (reduced flowering branchlets) or form incomplete racemes below the leafy summit. The species itself, however, may be nothing but a more pubescent hill-form of *C. retusa*.

*C. MACROPHYLLA*, Kz.

Southern Pegu.

*C. Kurzii*, var. *luxurians*, Kz.

I have referred this form erroneously to *C. Kurzii*, but the stout hollow stems bring it nearer to *C. Assamica*, from which it differs not only in its much larger petioled leaves and in the calyx, but also in the pods, which are sessile and  $1\frac{1}{2}$ -2 inches long. In habit it may be called a very luxuriant terminal-racemed form of *C. Kurzii* (Kurz).

*C. RETUSA*, L. Chiefly near the sea in Arakan and Pegu, but also found along the Irrawaddy in Prome. It has become a weed on Ross Island and the Andamans, but there very likely only introduced.

Thinly appressed silky-hairy. Leaves retuse to blunt. Racemes all terminal.

♂ ♀ Bracts ovate to ovate-lanceolate, up to 4 lines long, reflexed.

*C. SERICEA*, Retz.

Arakan and the Pegu Range.

Glabrous. Leaves blunt to acute, almost sessile, glaucous-green. Pods stalked. Branches stout, fistulose.

\*\* Ovary variously clothed, from villose to tomentose and appressed silk-hairy. Pods similarly clothed, rarely minutely pubescent or glabrous. Flowers racemose.

+ Stipules none, or small and subulate. Flowers yellow.

× Pods minutely appressed-pubescent, appearing glabrous to the naked eye. Calyx glabrous. Leaves narrow.

*C. NERIIFOLIA*, Wall.

Ava and hills East of Toung-ngoo.

Glabrous. Bracts linear, very minute. Leaves narrow-linear.

× × Pods and calyx brown or dark brown tomentose or pubescent, leaves narrow.

*C. JUNCEA*, L.

All over Burma.

*C. fenestrata*, Sims.

*C. tenuifolia*, Roxb.

Pān. Paik-hsan. Sun hemp.

Stems sulcate, but not angular. Pods sessile,  $1-1\frac{1}{4}$  inch long.

This plant is commonly planted for its fibre, which makes twine, rope and paper. The seed is sown very thickly, and in good soil the plants run up to 8 or 10 feet. The fibre is prepared in the usual way by soaking the plant and stripping the bark, and it is probable that more care and attention than is usually bestowed on this process would result in a greatly improved fibre as regards strength and appearance.

*C. TETRAGONA*, Roxb.

Along rocky streams in Arakan and

*C. grandiflora*, Zoll.

Pegu up to 3000 feet.

Stems sharply 4-angular. Pods shortly stalked,  $1\frac{1}{2}$ -2 inches long.

+ + Stipules large, leafy, half-lunate. Flowers blue or rarely greenish-white.

*C. VERRUCOSA*, L.

Ava. Prome and Martaban.

*C. angulosa*, Lam.

*C. carulea*, Jacq.

Stems angular, puberulous to glabrous. Leaves rhomboid. Pods pubescent.

B. Leaves digitately 3-7-foliolate.

*C. QUINQUEFOLIA*, L.

In wet lands from Arakan to Tenasserim.

Leaves 5-foliolate. Flowers rather large, yellow, racemose. Bracts 3-4 lines long, linear, acuminate, reflexed. Pods glabrous, stalked,  $1\frac{1}{4}$ - $1\frac{1}{2}$  inch long.

× Pods inflated.

+ Pods short, globular or obliquely ovoid, 1-2-4-seeded.

*C. MEDICAGINEA*, Lamk.

*C. procumbens*, Roxb.

Leaves 3-foliolate. Stipules and bracts minute, subulate. Flowers small, by 1-2 (rarely 3-4) terminating slender leaf-opposed peduncles. Pods acuminate, minutely appressed pubescent, 1-2-seeded.

++ *Pods oblong to linear-oblong, many-seeded.*

*C. STRIATA*, DC.

All over Arakan and Pegu.

*C. Brownei*, Rehb.

*C. Saltiana*, And.

Pods indistinctly appressed-pubescent, linear-oblong, 1-1½ inch long.

*C. BRACTEATA*, Roxb.

All over Burma.

Pods densely tawny-villous, boat-shaped-oblong, somewhat curved, ¾-¾ inch long.

× × *Pods much compressed (Priotapis, W. A.).*

*C. CYTISOIDES*, Roxb.

Ava. Khakyen Hills and Tenasserim.

Habit of *C. striata*. Flowers yellow, racemose. Pods 1 inch long by ½ broad, acuminate at both ends, on a filiform stalk, glabrous.

Sub-tribe LOTIEÆ.

*Stamens usually diadelphous (9+1), the filaments dilated upwards. Leaves digitately or pinnately compound.*

\* *Leaflets quite entire.*

*PAROCHETUS*, Hamilton.

*Petals* deciduous, free from the staminal tube, the keel rather acute. *Pod* 2-valved. *Flowers* solitary or in poor umbels. *Leaves* digitately 3-foliolate.

*P. COMMUNIS*, Ham.

Ava and Tenasserim.

*P. maculatus*, R. Br.

*Cosmusa repens*, Alef.

\*\* *Veins of leaflets usually produced into marginal toothlets. Leaves pinnately 3-foliolate. Keel-petal blunt.*

× *Pod straight or nearly so.*

*MELILOTUS*, Jussieu.

*Pod* small, rotundate or oblong, more or less indehiscent.

*M. ALBA*, Desv.

Prome. A weed in the Irrawaddy valley.

*M. leucantha*, Koch.

*Trifolium Indicum*, Willd.

Sub-tribe GALEGIEÆ.

*Stamens* 10, variously connate, the filaments filiform upwards. *Anthers* usually versatile. *Pods* dehiscent or indehiscent. *Leaves* unpaired pinnate, rarely simple.

\* *Pods* dehiscent (very rarely indehiscent and small and 1-seeded) (*Eu-galegiæ*).

× *Pods* distinctly transversely chambered within, dehiscent, or 1-seeded and indehiscent.

† *Pods* 1-seeded and indehiscent. *Hairs* basifixed.

*PSORALEA*, Linnæus.

*Anthers* blunt. *Leaves* simple or 3-foliolate, the leaflets gland-dotted. *Seed* adhering to the pericarp.

*P. CORYLIFOLIA*, L.

Ava and Prome.

†† *Pods* several-seeded and dehiscent.

° *Anthers* apiculate. *Hairs* fixed by the centre.

*CYAMOPSIS*, De Candolle.

*Stamens* monadelphously united into a tube. *Leaflets* entire or toothed.

\* *C. PSORALIOIDES*, DC.

Burma, cultivated (*vide* Mason).

*Dolichos fabaformis*, L'Her.

*Lupinus trifolius*, Cab.

Pch-pa-swōn.

The pods are esteemed a good vegetable.

INDIGOFERA, *Linnaeus*.

*Stamens* diadelphous (9+1). *Leaves* pinnately many-1-foliolate.

Sub-genus SPHERIDIOPHORA, Desv.

*Ovary* 1-ovuled. *Pods* very short, 1-seeded.

*I. LINIFOLIA*, Retz.

Arakan and Pegu.

All parts appressed silk-hairy. Leaves simple, small. Pods almost globular.

Sub-genus ET-INDIGOFERA, Bth.

*Ovary* 2-more-ovuled. *Pods* usually elongate, rarely short.

\* *Calyx* deeply cleft, the lobes subulate-acuminate. *Corolla* about twice as long as the *calyx*. *Annuals* or *perennials*.

+ *Pods* short, 2- rarely 3-seeded.

*I. ENNEAPHYLLA*, L.

Limestone hills of Segain and about Prome.

Appressed pubescent. Leaves pinnate. Pods almost 4-angular, shortly hairy. Seeds cubical.

++ *Pods* many- or several-seeded, elongate.

° *Seeds* cylindrical.

\* *I. TINCTORIA*, L.

var. *α* cultivated in Prome and Pegu, and most probably elsewhere; var. *β* frequent in the open forests, and along river-banks, all over Burma.

Mai.

Leaflets usually in 4 to 5 pairs. Racemes shorter than the leaves.

var. *α genuina*. Pods about an inch long and more slender, usually straight or only slightly curved, 7-10-seeded, the seeds about a line long, pale-coloured.

var. *β anil*, L.; *I. caerulea*, Roxb. *I. argentea*, var. *caerulea*, Bak. Pods more curved and reflexed, shorter, about  $\frac{1}{2}$  inch, long but sometimes longer, 3-4, but as often 1-6, and even up to 7-seeded, the seeds smaller, olive-coloured.

I cannot find any sufficient grounds for specifically separating the above two forms. The pod differs greatly on the same plant (Kurz).

*I. ENDECAPHYLLA*, Jacq.

Ava.

*I. debilis*, Grah.

Leaflets in 1 or 2 pairs. Racemes very slender, much longer than the leaves.

In Burma the pods are more slender and more persistently pubescent (Kurz).

*I. TRIFOLIATA*, L.

Tenasserim.

Leaves 3-foliolate. Racemes very short or reduced to clusters.

Seeds cubical or 4-angular-oblong.

*I. VISCOSA*, Lamk.

Ava.

All parts (also the pods) viscid-pubescent. Leaflets in 4-7 pairs.

*I. TRITA*, L.

Ava.

*I. cinerea*, Willd.

All parts appressed greyish or silvery pubescent. Leaves 3-foliolate. Pods thinly appressed pubescent.

*I. HIRSA*, L.

Ava. Tenasserim.

All parts hirsute-pubescent. Leaflets in 3 or 4 pairs. Pods hirsute.

\*\* *Calyx toothed, the teeth short, more or less acute. Corolla at least 3 times as long as the calyx and usually much longer. More or less woody shrubs.*

× *Leaves simple or 3-foliate (often on the same plant).*

I. BRUNONIANA, Grah.

Pegu.

Whole plant greyish from minute appressed stiff hairs. Leaves 1-3-foliate on the same plant. Stipules very minute.

I. CALONEURA, Kurz.

Pegu.

Softly tawny pubescent. Leaves 1-foliate. Stipules about 2 lines long.

× × *Leaves unpaired pinnate.*

° *Pods 1½-2 inches long, more or less 4-gonous. Seeds cubical or 4-cornered.*

I. GALLEGOIDES, DC.

Pegu and Tenasserim up to 4000 feet.

*I. uncinata*, Roxb.

*I. Zollingeriana*, Miq.

Stipules 2-3 lines long. Pods minutely appressed pubescent.

I. PULCHELLA, Roxb.

Ava and Pegu.

*I. arborea*, Roxb.

Stipules minute. Pods glabrous.

° ° *Pods about an inch long, terete. Seeds cylindrical.*

I. VIOLACEA, Roxb.

Pegu and Tenasserim.

Differs from the above in the pod and the cylindrically oblong pale-coloured seeds. It is in my eyes nearer akin to *I. elliptica*, from which it deviates only in the size and colour of the seeds.

I. ELLIPTICA, Roxb.

Pods glabrous. Stipules minute.

Indigo is produced by various species of *Indigofera*, but mainly by *I. tinctoria*.<sup>1</sup>

° ° *Anthers blunt. Hairs basifixed.*

SESBANIA, Persoon.

*Style not bearded, the stigma minute. Flowers in axillary racemes. Leaves pinnate. Herbs or under shrubs, rarely trees.*

Sub-genus AGATI, Desv.

*Flowers 2-3 inches long, falcately recurved in bud, the standard acute or bluntish.*

\* S. GRANDIFLORA, Roxb.

Cultivated all over Burma.

Pouk-hpyu.

Small glabrous tree. Flowers showy, white or scarlet.

Sub-genus EU-SESBANIA, Bth.

*Flowers less than an inch long, straight in bud, yellow or brown-purple, the standard broad, more or less notched.*

\* *Racemes drooping from the base. Small trees.*

\* S. SESBAN, L.

Cultivated all over Burma.

*S. Aegyptiaca*, Pers.

*S. picta*, Pers.

Yc-thu-gyi.

Glabrous. Pods 1½-2 lines broad, somewhat angular from the prominent sutures.

\*\* *Racemes erect from the base, but often overhanging. Shrubby annuals.*

S. POLYPHYLLA, Miq.

Grassy pastures along the Koladyne River.

<sup>1</sup> For a full history of the development of the Indigo trade, consult Balfour's Cyclopaedia of India.

*Æschynomene canabina* and *spinulosa*, Roxb.

*S. aculeata*, Pers.

Pods rather convex on both sides,  $1\frac{1}{2}$ –2 lines broad; standard  $\frac{1}{2}$  inch long. Seeds cylindrical.

*S. COCHIN-CHINENSIS*, DC.

Swamps in Arakan and Pegu.

*Æschynomene paludosa*, Roxb.

*S. canabina*, Pers.

Dunchi, or Dhanehi hemp, of Bengal.

Pods rather flat, 2–3 lines broad, narrowly bordered; standard  $\frac{3}{8}$  inch long, seeds more or less compressed-rhomboid.

*Sesbania* is a genus of no great utility save as yielding a coarse fibre, an excellent charcoal for the manufacture of gunpowder, and a hedge or trellis plant in gardens and betel plantations, as near Maulmain (Parish). The hemp is coarse, but durable, and resists wet better than many others.

× × Pods not chambered within, many-seeded.

TEPHROSIA, Persoon.

*Vexillary stamen* only at the middle adnate to the staminal tube. Pods thin coriaceous. Herbs, under shrubs, or rarely shrubs. Leaves pinnately many-1-foliate.

\* Flowers in axillary or leaf-opposed racemes, rarely reduced to 2 or a few only. Leaves unpaired pinnate, rarely simple.

× Calyx-teeth short, deltoid (*Brissonia*, Neck.).

*T. CANDIDA*, DC.

Chittagong and Tenasserim.

*Kiesera sericea*, Rwdt.

Shrub, silky pubescent. Corolla  $\frac{3}{4}$ –1 inch long, white. Racemes terminal and lateral. Pod appressed silk-hairy.

× × Calyx-teeth narrow, cuspidate, as long as the calyx-tube (*Reinera*, Manch.).

+ Flowers in racemes.

° Racemes peduncled, leaf-opposed, and terminal.

*T. (GALEGA) PURPUREA*, L.

All over Burma.

*G. lanceifolia*, Roxb.

Almost glabrous or very thinly appressed silk-hairy. Pods glabrous or nearly so.

° ° Racemes axillary and terminal, sometimes reduced.

*T. PAUCIFLORA*, Grah.

Paghlā-myo.

Similar to the preceding, but racemes short or reduced to a few (2) flowers only.

*T. (GALEGA) TINCTORIA*, L.

var.  $\beta$  only near Ava.

*G. Hayneana*, Roxb.

Racemes long-peduncled, many-flowered. Leaves pinnate, leaflets in 3–6 pairs, appressed silvery silk-hairy. Pods glabrescent.

var. *a genuina*. The indument more or less tawny. Leaflets oblong.

var.  $\beta$  *coccinea*, Wall. The indument silvery-white. Leaflets short and more or less obovate, the base usually cuneate. This plant yields a blue dye like indigo.

*T. HOOKERIANA*, Kurz.

Racemes long-peduncled, many-flowered. Leaves pinnate, leaflets in 6–9 pairs, thinly appressed silk-hairy. Pods densely brownish silk-hairy.

*T. GRAHAMII*, Wall.

Prome.

Racemes long-peduncled, few-flowered at the apex. Leaves simple, or with a pair of diminutive basal leaflets. Rest as in *T. tinctoria*.

+ + *Flowers solitary or by pairs in the leaf-axils.*

T. (GALEGA) SENTICOSA, L. Ava, Yē-nān-choung.  
*G. pentaphylla*, Roxb.

Silvery silk-hairy. Leaflets in 2-3 pairs. Pods appressed silvery pubescent.

\*\* *Flowers solitary or paired in the leaf-axils, very small. Leaves simple*

T. TENUIS, Wall. Ava, Segain.

All parts thinly silk-hairy. Leaves linear. Peduncle capillary.

#### MILLETTIA, *White et Arnott.*

*Filaments* diadelphous (9+1), filiform. *Pod* woody or coriaceous. Trees or woody climbers. *Leaves* pinnate.

Sub-genus NOTHO-MILLETTIA, Miq.

*Stamens* diadelphous (9+1 and 7+1). *Seeds* usually not compressed. Trees.

M. ATROPURPUREA, Wall. *E.T.* T. forests of Pegu and Tenasserim.

Kwē-tanyeng or Tanyeng-ngu (Kurz).

Glabrous. Corolla purple, glabrous. Stamens 9+1. Pods coriaceous, the valves very convex and smooth.

*M. paniculata*, Miq., differs only in its larger and more flattened pods. Miquel ascribes to this species a very abnormal diadelphism, viz. 7+1. *Pongamia glandulosa*, Griff., from Mergui, remains doubtful, as Griffith says nothing of the stamens, while he describes 10 hypogynous glands surrounding the ovary; he compares the tree to *M. atropurpurea* (Kurz).

Sub-genus EU-MILLETTIA, Bak.

*Stamens* monadelphous, the tenth vexillary stamen more or less free at the base only. *Seeds* much compressed.

\* *Standard not auricled at the base.*

+ *Trees.*

× *Valves of pod without prominent ledges or wings on the margins, flat or slightly convex, glabrous or nearly so.*

° *Pod-valves not rough from warts or lenticels.*

M. (MUNDULEA) PULCHRA, Bth. Ava Hills.

Thyt-pagān (Kurz).

Young parts and leaves beneath slightly pubescent. Corolla glabrous, lilac. Pods appressed puberulous.

M. BRANDISIANA, Kz. Pegu Range.

Thyt-pagān (Kurz).

Young parts slightly pubescent. Corolla pubescent, lilac. Pods glabrous.

M. (PONGAMIA) CANA, Grah. *C.* Ava. Yē-nān-choung.

Leaves beneath sparingly appressed grey-hairy. Corolla glabrous. Pod obscurely "grey-canescent."

°° *Pod-valves rough from warts or lenticels, glabrous.*

M. (PONGAMIA) PENDULA, Grah. Pegu Range up to 2000 feet.

*M. leucantha*, Kz.

Thi-wyn.

Young shoots silky pubescent. Corolla glabrous, white. Pods thick, lenticellate. Heartwood very dark purplish brown, hard, tough and durable. When perfectly

seasoned, barely to be distinguished from Yendaik. Selected planks would form a handsome 'rosewood.' For strength and toughness it is surpassed by few woods. Weight 63 lbs. Highly deserving attention. The wood is yellowish when freshly cut, soon turning to purple, and then darkening still more (W. T.).

*M. ovalifolia*, Kz. *T.*

Prome.

Glabrous. Corolla glabrous, blue. Pod thick, warted.

× × *Valves of pod extended into prominent ledges or wings.*

*M. glaucescens*, Kz.

Pegu Range and Martaban.

Young shoots slightly pubescent. Leaflets bluntish acuminate. Racemes almost glabrous. Corolla steel-blue, glabrous. Pods sharply edged.

*M. rubinervis*, Kz.

Toukya-gat Valley.

As preceding, but racemes pubescent. Corolla white, glabrous. Pods unknown.

*M. tetraptera*, Kz.

Prome and Ava.

Shortly tomentose, especially while young. Leaflets rounded at the apex. Corolla pale blue, glabrous. Pods with 4 waved marginal wings.

+ + *Woody climbers.*

× *Corolla glabrous. Ovary more or less pubescent. Pod glabrous.*

*M. pachycarpa*, Bth.

Khakyen Hills.

Young shoots and leaves beneath pubescent. Calyx broader than deep. Corolla white. Pods fleshy coriaceous, torose.

*M. monticola*, Kz.

Martaban Hills over 6500 feet.

As preceding, but glabrescent. Flowers much smaller, lilae. Calyx longer than wide. Pod unknown.

× × *Corolla, at least the standard, velvety or silky pubescent outside.*

*M. (Robinia) paniculata*, Roxb.

Chittagong. Ava.

*M. cinerea*, Bth.

*Pongamia heterocarpa*, Wall.

Leaves glabrous. Flowers racemose, in terminal panicles. Pods torose, tawny.

*M. (Pongamia) sericea*, DC. *S.S.*

Tropical forests East of Young-ngoo.

Leaves appressed silvery or coppery silk-hairy beneath. Flowers in lateral racemes. Pods flat, not torose, brown velvety.

*M. cœrulea*, Baker.

Upper Tenasserim.

Leaves glabrous. Flowers in axillary short peduncled racemes. Pods brown.

\*\* *Standard auricled at the base on both sides of the claw.*

× *Corolla glabrous.*

*M. leiogyne*, Kz. *S.S.*

Nakawā-choung, Toukya-gat.

Young shoots rusty tomentose. Corolla violet. Ovary quite glabrous.

× × *Corolla, at least the standard, velvety or silky pubescent outside.*

*Leaflets blunt or apiculate, rarely shortly acuminate. Branches brown.*

*M. extensa*, Bth. *S.S.*

Ava to Tenasserim.

*Da-ma-nā-nweh-nyeh* (Kurz).

Flowers purple. Racemes elongate, longer than the petiole. Pods glabrous when fully ripe.

*M. macrophylla*, Roxb.

Flowers white. Racemes elongate, much longer than the petiole. Pods tawny or brown tomentose even when fully ripe.

M. FRUTICOSA, Roxb. S.S.

Pegu.

Flowers rose-coloured. Racemes much shorter than the petiole. Leaflets obtuse. Pods tawny or brown tomentose.

° ° *Leaflets glaucous beneath, long- and caudate-acuminate. Branches grey.*

M. CAUDATA, Bth. S.S.

*Tephrosia urophylla*, Wall.

Low scandent shrub, almost glabrous.

\*\* *Pods indehiscant, usually many or several-seeded (Dalbergiæ).*

× *Pods wingless.*

PONGAMIA, Ventenat.

*Filaments long. Pod flattish, firmly fleshy coriaceous. Leaflets opposite.*

P. (ROBINIA) MITIS, L.

Coasts of Arakan, Tenasserim, the Andamans, and Nicobars.

*P. glabra*, Vent.

*Galedupa Indica*, Lamk.

Theng-weng or Thi-wyn (Kurz).

Kurz describes the timber as white, turning yellowish, and fibrous. It must not be confounded with the true *Thyt-wyn* (*Millettia pendula*), to which it bears no resemblance either in look or qualities. It is, however, a graceful tree, with glabrous green leaves. The seeds are bean-shaped, and yield an oil, used in lamps and for some industrial purposes, but bitter and acrid, and used externally only as a cure for itch. A maund of seeds will yield thirteen pounds and a half of oil, at a net cost of a little over two rupees. It would make a good road-side or avenue tree.

DREPANOCARPUS, E. Meyer.

*Filaments alternately shorter. Pods reniform or crescent-shaped, coriaceous or drupaceous, 1-3-seeded. Flowers white or purple. Leaflets alternate.*

Sub-genus EU-DREPANOCARPUS. (Trees or woody climbers.)

*Stamens* united into a single sheath.

× *Corolla glabrous. Pods usually 1-seeded (Selenolobium, Bth.).*

D. SPINOSUS, Roxb. S.S.

Chittagong to Tenasserim.

Yē-ehin-yē (Kurz).

Leaflets  $\frac{1}{2}$  inch long. Calyx a line long.

This and the following are referred by Bentham to *Dalbergia*, but the pods are not winged and the cell-cavity extends from suture to suture. Strictly speaking, the pods of *Dalbergia* cannot be called winged, for the broad thin margins of the pod are simply consolidated so as to leave (as in *Pterocarpus*) only a central cavity for the seed (Kurz). Kurz too says the powdered root absorbs alcohol, and consequently, if administered in water, destroys the effects of alcoholic intoxication!!

D. MONOSPERMA, Dalz.

Tidal forests of Upper Tenasserim.

Leaflets about an inch long. Calyx  $1\frac{1}{2}$  lines deep.

Sub-genus PONGAMIOPSIS.

*Stamens* united into 2 separate sheaths. *Corolla* glabrous. *Pods* 1-3-seeded, moniliform-constricted between the seeds.

D. (DALBERGIA) RENIFORMIS, Roxb.

Pegu and Tenasserim.

Htoug-mā (Kurz).

Curious on account of the joints being dimorphous on the same or on different pods. They are either normally thick-coriaceous and as flat as those of the following species, and have the seeds much compressed; or they are firmly fleshy and up to

half an inch thick, in which case the seeds are larger and scarcely compressed. This latter state is not attributable to the agency of insects, but seems to be normal development. The full-grown foliage so much resembles that of *Dep. inundatus*, Mart., that I should experience some difficulty in distinguishing between the two species when out of flower or fruit (Kurz).

D. (DALBERGIA) CUMINGII, Bth. W.C. Tenasserim.

Panicles almost glabrous. Pod-joints flat and thick-coriaceous, wrinkled-veined. A dyewood, and yields the 'Kaya lakka' of commerce (Kurz).

× × Pods winged along one or both sutures.

DALBERGIA, *Linnaeus*.

*Filaments* alternately shorter. *Pods* oblong to linear, all round extended into a chartaceous or coriaceous wing. Trees or woody climbers. *Flowers* from white to rose and purple. *Leaflets* alternate.

Sub-genus DALBERGARIA, Bth.

*Stamens* united into 2 separate sheaths of 5 each.

\* *Erect trees*.

× *Pods velvety*.

D. CANA, Grah.

Pegu and Tenasserim.

Leaves bluntish acuminate. Panicles lax, puberulous. Flowers purple.

× × *Pods quite glabrous*.

+ *Leaflets rather large, apiculate, acute or acuminate*.

D. PURPUREA, Wall.

Martaban and Tenasserim.

Thyt-pök.

Leaflets retuse-apiculate. Panicles lax, puberulous. Flowers white or purplish.

D. GLOMERIFLORA, Kz.

Prome Hills, above 1000 feet.

Leaflets acute or shortly acuminate. Panicles short and compact. Calyx glabrous. Flowers white.

+ + *Leaflets blunt or retuse, rather small*.

D. NIGRESCENS, Kz.

Ava and Prome.

Thyt-seh-nweng (Kurz).

Panicle rather compact. Pedicels short or very short. Leaves nigrescent.

D. PANICULATA, Roxb.

Ava and Prome.

Ta-pouk-pou (Kurz).

Panicle lax. Pedicels slender. Flowers white or purplish. Leaves not nigrescent.

\*\* *Woody climbers. (Leaflets blunt or retuse.)*

D. VOLUMBIS, Roxb.

Ava, Chittagong, and Tenasserim.

Leaflets 11-13. Panicles densely pubescent. Bractlets minute.

D. STIPULACEA, Roxb.

Ava, Chittagong, Pegu, and Tenasserim,

*D. ferruginea*, Roxb. (*vide* Baker). up to 3500 feet.

Douk-ta-lōng-nweh (Kurz).

Leaflets 17-21. Panicles glabrous. Bractlets small, but conspicuous.

Sub-genus SISSEA, Bth.

*Stamens* united into a single slit sheath.

\* *Erect trees. Flowers white*.

× *Bractlets fallen long before expansion of the flowers*.

D. LATIFOLIA, Roxb.

The Andamans.

*D. emarginata*, Roxb.

*D. Javanica*, Miq.

Leaflets 3-7, almost orbicular to obovate, notched or blunt. All parts glabrous.

*D. CULTRATA*, Grah.

Ava, Pegu and Upper Tenasserim.

Yen-daik.

Young shoots appressed silky puberulous. Leaflets 7-11, more or less oblong, notched or blunt.

× × *Bractlets black, short and broad, deciduous but still present at flowering time.*

*D. GLAUCA*, Wall.

Ava. Pegu and Upper Tenasserim.

*D. orata*, var. *obtusifolia*, Baker.

Ma-da-mā (Kurz).

Leaflets blunt, more or less notched and mucronate.

*D. OVATA*, Wall.

Pegu and Upper Tenasserim.

Ma-da-mā (Kurz).

Leaflets acuminate, smaller or more coriaceous.

\* \* *Woody climbers.*

× *Leaflets in 5-7 pairs. Inflorescence, etc., glabrous.*

*D. FOLIACEA*, Wall.

Ava. Pegu and Upper Tenasserim.

Flowers blue. Panicle ample, terminal. Leaflets more or less oblong.

*D. THOMSONI*, Bth.

Kambala Toung in the Pegu Range.

Flowers white. Panicles small, axillary. Leaflets more or less obovate.

× × *Leaflets in 11-41 pairs. Inflorescence and young branchlets rusty pubescent.*

*D. TAMARINDIFOLIA*, Roxb.

Andamans and Tenasserim.

*Derris pinnata*, Lour.

Leaflets  $\frac{1}{2}$ - $\frac{1}{2}$  inch long. Panicles or cymes very short.

The pods of the Burmese species (= *D. rufa* and *multijuga*, Grah.) differ a good deal from those figured by Roxburgh, and they are much narrower. The pods of the Assam plant are unknown to me, but Mr. Simons calls it "a large tree 30 to 40 feet high." The matter requires further inquiry (Kurz).

*D. VELUTINA*, Bth.

Pegu and Tenasserim up to 4000 feet.

Leaflets 1-2 inches long. Panicle ample.

The heartwood of some species of *Dalbergia* is excellent, being tough and durable, and dark and handsome when polished, such as *D. latifolia* and *D. cultrata* ('Yendaik'). Weight of well seasoned wood, 58 lbs. *D. paniculata* yields a good pale-coloured timber, and *D. cana* a worthless one according to Kurz.

PTEROCARPUS, *Linnaeus.*

*Filaments* equally long. *Pods* almost orbicular or broadly oblong, seed-bearing in the centre and surrounded by a broad complete wing. *Trees.* *Flowers* yellow. *Leaflets* alternate.

*P. INDICUS*, Willd.

Tropical forests of the Pegu Range, Tenasserim, and the Andamans.

*P. flavus*, Lour.

*P. Dalbergioides*, Roxb.

Pa-douk.

Pods about an inch across, almost glabrous (even while young), the stylose point far above the base. Calyx more glabrous. Leafless in hot season.

A splendid timber is the Pa-douk (*P. Indicus*), resembling a coarse mahogany,

though paler. Weight, when thoroughly seasoned, 61 lbs. With that insatiable peculiarity peculiar to 'Departments,' the Pa-douk is largely chosen for planting as a 'roadside' or 'avenue' tree, for which purpose it is singularly ill fitted, as it affords little shade when shade is most required, smells atrociously when in blossom, and is nowise comparable, for the end in view, to the different species of *Ficus* and *Eugenia*. As a timber tree it is surpassed by none—if matched by any,—and the freshly sawn wood is most fragrant. Dr. Mason thus writes of it: "The gum kino tree is a majestic evergreen, whose yellow papilionaceous flowers, clustering amid the bright drooping foliage, scent the air, like the large magnolias, for several hundred yards around. It is propagated by simply planting large branches in the ground at the commencement of the rain. There are, however two species, the red and the white, as distinguished by the Burmese, the red producing the finest timber, but the white padouk is by far the finest ornamental tree." Kurz describes both species as shedding their leaves in the hot season, and such is their undoubted habit when planted along roads, but it is not improbable the above luckless and inaccurate passage may have let the 'Department' into selecting so inappropriate a tree for roadside planting. The gum exuded by *Pterocarpus* constitutes the true gum kino of the Pharmacopœia (Pulv. Kino. Co.). According to Dr. Pemberton it possesses the singular property of not acting as an astringent unless diarrhœa is present.

*P. MACROCARPUS*, Kz.

Rare in Prome, common in Tenasserim.

Pods almost  $1\frac{1}{2}$ –2 inches in diameter, when young densely velvety-pubescent, the stylose point at the basal corner. Calyx rusty pubescent.

DERRIS, *Loureiro*.

*Filaments* alternately shorter. *Pod* flat, thin or coriaceous, winged along one or both sutures. Trees or woody climbers. Leaflets opposite.

Sub-genus BRACHYTERUM, W. A. (ET-DERRIS, Bth.).

*Standard* equally tapering at the base, with or without 2 basal callosities. *Stamens* monadelphous. *Pods* narrowly winged along the vexillary suture only.

\* *Standard without basal callosities.*

× *Flowers in simple or almost simple racemes.*

+ *Pods lanceolate, acuminate or acute at both ends.*

D. (DALBERGIA) ROBUSTA, Wall. T. Pegu. Ava. The Andamans.

*D. Kroyee*, Roxb.

Erect tree. Leaflets almost acute, mucronate.

D. SCANDENS, Roxb. E.S.S.

Tropical forests all over Burma and the Andamans. Kamorta.

Mi-joung-nweh (Kurz).

Scandent shrub. Leaflets notched.

+ + *Pods oblong or orbicular, with rounded ends. Scandent shrubs.*

D. (PONGAMIA) ULIGINOSA, DC. E.S.S. Same localities as the last. Nicobars.

*Galedupa uliginosa*, Roxb.

All parts, also the pods, glabrous.

D. ELEGANS, Bth. S.S.

Swamp forests of Pegu and Tenasserim.

Rusty pubescent. Pods pubescent.

× × *Flowers racemose, collected into panicles.*

D. SINUATA, Thw. S.S.

Tropical forests of Pegu and Tenasserim.

*D. polyarthra*, Miq.

Myouk-gông-nyin (Kurz).

Glabrous. Pods sinuately constricted between the seeds. Corolla  $\frac{1}{2}$  inch long.

\*\* *Standard with 2 basal callosities (Paraderris, Miq.).*

D. (PONGAMIA) ELLIPTICA, Wall. S.S. Upper Tenasserim.

*Pongamia colubilis*, Zoll. and Mor.

*Pongamia Horsfieldii*, Miq.

Young shoots densely silk-hairy. Flowers 10 lines long. Ovary villous.

Sub-genus AGAXOTE, Miq. (DIPTERODERRIS, Bth.).

*Standard* equally narrowed at the base, and without callosities. *Stamens* monadelphous, or the vexillary one free. *Pods* distinctly winged at both sutures.

D. AMENA, Bth. S.S. Tenasserim.

Glabrous. Lateral nerves beneath very faint, immersed.

Kurz adds from the Nicobars:

D. THYRSIFLORA, Bth. Tropical forests of Kamorta.

*D. polythyrsa*, Miq.

#### CÆSALPINIÆ.

*The uppermost one of the imbricate or valvate petals (standard) innermost in bud. Stamens free or connate.*

\* *Anthers erect and basifixcd, rarely almost versatile, usually opening by 2 apical pores, rarely opening by longitudinal slits.*

Sub-tribe CASSIÆ.

*Leaves unpairedly or abruptly pinnate. Sepals free to the disk, usully imbricate. Ovary or ovary-stalk free.*

\* *Petals all developed.*

CASSIA, *Linneus*.

*Sepals* imbricate. *Stamens* 5—10. *Leaves* abruptly pinnate. Trees, shrubs or herbs.

Sub-genus FISTULA, DC.

*Filaments* of the 3 lower stamens very long and arcuate, the others short or imperfect. *Pod* terete, elongate, indehiscent. *Seeds* horizontal.

\* *Racemes slender and elongate, drooping, destitute of bracts. Flowers yellow.*

C. FISTULA, L.

All over Burma.

*C. rhombifolia*, Roxb.

Ngugyi (Kurz).

All adult parts glabrous. Calyx very deciduous, velvety. Petals an inch long.

\*\* *Racemes often corymb-like, more or less erect, with persistent bracts. Flowers pale or intensely pink-coloured. Longer filaments thickened node-like at middle.*

C. NODOSA, Roxb.

Tropical forests of Chittagong and Upper Tenasserim.

Nguthein (Kurz).

Leaflets shortly acuminate, on petiolules 1—2 lines long. Bracts narrowly lanceolate.

C. RENIGERA, Wall.

Ava and Prome.

Ngushwē (Kurz).

Leaflets retuse or blunt, pubescent, almost sessile. Bracts cordate-ovate.

Sub-genus SENNA.

*Perfect anthers* 7 or 10, opening by terminal pores or short slits. *Pods* opening along one or both sutures. *Seeds* transverse or oblique.

\* *Pods usually not elastically opening. Funicle of seed filiform (Senna genuina).*

× *Pods compressed and often flat, sometimes winged (Chamæsenna).*

‡ *Perfect stamens 10 (Psilorhegma).*

C. GLAUCA, Lamk. S. var. *a* in the dry forests of Ava and Prome.  
var. *β* only cultivated in Pegu.

*Senna arborescens* and *speciosa*, Roxb.

*C. suffruticosa*, Koen.

Leaflets bluntish or rounded, more or less glaucous beneath. Flowers yellow, in corymb-like racemes. Bracts small, persistent. Pods black, very flat, shortly stalked.

var. *a genuina*. All parts more glabrous; leaflets larger, bluntish or acute, more glaucous beneath.

var. *β Kanigii* (*C. fruticosa*, Koen.; *C. speciosa*, Roxb.). The young parts more pubescent. Leaflets  $\frac{1}{2}$ –1 inch only, refuse, or rounded, less glaucous beneath.

‡ ‡ *Perfect stamens 7. Pods much compressed. Flowers yellow.*

° *Pods not winged.*

† *Pods straight and acute. Trees or shrubs.*

△ *Stipules none or very deciduous. Petals  $\frac{1}{2}$  inch long.*

C. STAMEA, Lamk. T. var. *a* all over Burma. var. *β* Ava and Prome only.  
*C. florida*, Vhl.

*C. Sumatrana*, Roxb.

Mai-zali or Meh-zali (Kurz).

Adult parts glabrous. Bracts small, persistent, obovate with a subulate point longer than the blade. Leaflets in 6–10 pairs,  $1\frac{1}{2}$ –2 inches long. Pods velvety.

var. *a genuina*. Leaves glabrous, the leaflets more glaucous beneath.

var. *β puberula*. Rachis of leaves puberulous, leaflets puberulous (especially while young), but less glaucescent beneath. A low rather stunted tree.

Brandis, in his list of woods in 1862, describes this tree as "Cultivated, heart-wood almost black, used for helvies, walking sticks, mallets, etc.," and in Gamble's manual the wood is described as "dark brown, nearly black, very hard," with the same statement as above reproduced of its serving for mallets, helvies and walking sticks. Now there is some mistake here; and whatever tree Dr. Brandis had before him when he penned his description, it was not, in my opinion, that commonly known in Pegu as Mai-zali. *Mai-zali*, or *Meh-zali*, is a common tree, and its heartwood is a very peculiar dark or blackish brown, with a silky sheen; but as weak as rotten wood almost, and this is so well understood that the natives ascend the tree with great caution. It is indeed the weakest wood I know, and possesses none of the properties attributed to it (W.T.).

C. TIMORIENSIS, DC. E.T. All over Burma.

Toung-mai-zali (Kurz).

All parts pubescent. Bracts leafy, broad-ovate, about  $\frac{1}{3}$  inch long. Leaflets in 10–20 pairs,  $1-1\frac{1}{2}$  inch long. Pods glabrous.

△ △ *Stipules large, cordate-semilunate, persistent.*

C. AURICULATA, L. S. Common about Ava.

More or less pubescent. Leaflets in 8–10 pairs,  $\frac{1}{2}$ – $\frac{3}{4}$  inch long. Bracts ovate to obovate-lanceolate, 3–4 lines long. Petals nearly an inch long. Pods shortly and rather thinly pubescent.

† † *Pods lunate.*

C. OBOVATA, Collad. S. Ava. Yē-nān-choung.

*Senna obtusa*, Roxb.

Calyx glabrous. Petals 3–4 lines long. Pods shortly stalked, glabrous.

°° *Pods broadly 4-winged. Flowers large, orange-yellow.*

*C. ALATA*, L. S.

All over Burma.

Shrubby herb, almost glabrous. Leaves abruptly pinnate, the rachis almost winged-angular. Braets yellow, obovate-oblong, about an inch long, deciduous. Pods glabrous. The bruised leaves and simple cerate, in equal parts, are an excellent application for 'ringworm.' The leaves are also supposed to possess tonic properties (Waring, Manual of Therapeutics).

× × *Pods more or less terete to 4-gonous. Seeds transverse, oblique, or rarely parallel with the valves. Herbs, flowers yellow.*

+ *Seeds transverse or oblique.*

*C. OCCIDENTALIS*, L.

Common all over Burma. Kamorta.

*C. sophora*, L.

Leaves abruptly 4-pinnate, glabrous, leaflets in 4-12 pairs, acuminate. Calyx glabrous. Petals about  $\frac{1}{2}$  inch long. Ovary glabrous.

+ + *Seeds parallel with the valves.*

*C. TORA*, L.

All over Burma.

*Senna toroides*, Roxb.

Leaves abruptly pinnate, leaflets in 3-2 pairs, blunt. Petals nearly  $\frac{1}{2}$  inch long. Ovary shortly pubescent.

\*\* *Pods opening elastically at both sutures. Funicle very short. Perfect anthers 10, or fewer by abortion, opening by slits. Flowers yellow, small. Herbs (Lasiorhegma).*

*C. PUMILA*, Lamk.

Prome.

*Senna prostrata*, Roxb.

More or less prostrate. Leaflets in 8-15 pairs,  $2\frac{1}{2}$ - $3\frac{1}{2}$  lines long. Basal gland of rachis long-stalked. Pedicels 1-2 lines long.

*C. MIMUSOIDES*, L.

var.  $\alpha$  common all over Burma. var.  $\beta$  a shade-loving form in Tenasserim.

Erect, branched. Leaflets in 15-30 pairs, 1-3 lines long. Basal glands of rachis sessile. Pedicels up to  $\frac{1}{2}$ - $\frac{3}{4}$  inch long.

var.  $\alpha$  *angustissima*, Lamk.; *Telfairiana*, Hook.; *sensitiva* and *tenella*, Roxb.

Leaves almost sessile, the rachis often marginate. Leaflets only about a line long, very narrow. Pods nearly glabrous. All parts more or less glabrous.

var.  $\beta$  *C. myriophylla*, Wall.; *C. mimosoides*,  $\beta$  *myriophylla* and *auricoma*, Bth.; *Senna dimidiata*, Roxb. Leaves on a short pubescent petiole. Leaflets 2-3 lines long, oblong to linear, the rachis marginate or not. Pods more copiously appressed pubescent, while young usually pilose from yellow soft spreading hairs.

The timber of *C. fistula* and *C. renigera* is strong and hard, but of small scantling. The leaves of *C. oborata* and some other species constitute 'senna' of the Pharmacopœia, and the seeds of *C. fistula* are surrounded by a black sweetish laxative pulp, used in electuaries. As an ornamental tree *C. fistula* somewhat resembles the laburnum when in flower.

\*\* *Anthers versatile, opening by longitudinal slits.*

Sub-tribe BAUHINIEÆ.

*Leaves simple, 2-foliate or simply pinnate. Calyx gamosepalous, or the sepals free to the disk, imbricate or valvate. Ovary-stalk adnate to the calyx-tube or rarely free.*

\* *Leaves simple and more or less 2-lobed, or 2-foliate (Eu-bauhinia).*

BAUHINIA, Linnaeus.

*Petals unequal. Calyx gamosepalous or valvate. Pods dehiscent. Leaves palmately 5-many-nerved.*

\* *Trees or erect shrubs, without tendrils.*

Sub-genus *PILEOSTIGMA*, Hochst.

*Stamens* 10, all fertile. *Style* short or wanting, the stigma peltate. *Flowers* small.

*B. MALABARICA*, Roxb. *E.T.* Mixed forests of Pegu.

Bwē-zyn.

Calyx valvate, the segments all free. Glabrous trees.

The leaves are boiled and eaten as 'greens.'

*B. RACEMOSA*, Lamk. *T.* Deciduous forests of Prome.

*B. parviflora*, Vhl.

Hpa-lān.

Calyx spathaceous. Young shoots and under side of leaves pubescent.

Sub-genus *EU-BAUHINIA*.

*Stamens* 10, 5-9 sterile or reduced to staminodes, very rarely all 10 fertile.

× *Calyx* spathaceous.

+ *Pods* sessile or acuminate and barely stalked.

*B. BRACHYCARPA*, Wall. Ava, Taong-doung.

*Pods* minutely tomentose.

*B. POLYCARPA*, Wall. Pegu and Upper Tenasserim.

*Pods* glabrous.

++ *Pods* long-stalked.

*B. MONANDRA*, Kz. Upper Tenasserim.

Swē-tan (Kurz).

Fertile stamen one only. Leaves shortly pubescent beneath.

*B. VARIEGATA*, L. *T.* var.  $\beta$  in Ava, Prome and the Yoonzaleen Valley (*vide* Parish).

Fertile stamens 5. Young shoots puberulous. Leaves glabrous.

var.  $\alpha$  *purpurascens*, Voigt. The 4 narrower petals purple, the fifth broader one tinged with cream and red.

var.  $\beta$  *candida*, Voigt. non Ait. The 4 narrower petals white or very pale purple, the fifth lower one somewhat sulphur-coloured in the centre, or purple towards the borders and yellow in the centre.

× × *Calyx*-lobes valvate, reflexed and free to the base, or only slightly cohering. *Pods* long-stalked.

+ *Pods* glabrous. *Petals* white or purple.

*B. ACUMINATA*, L. *S.* All over Burma.

*B. isopetala*, Griff.

Ma-hā-hlai-gā-hpyoo (Kurz).

A shrub, the leaves minutely puberulous beneath. Calyx in bud terete.

*B. PURPUREA*, L. *T.* Irrawaddy Valley.

Ma-hā-hlay-gā-ni (Kurz).

A tree, the leaves glabrous. Calyx angular in bud, irregularly bursting.

var.  $\alpha$  *genuina*. Flowers purple.

var.  $\beta$  *triandra*, Roxb. Flowers white, often with a yellowish blotch on the lower petal.

++ *Pods brown-pubescent. Flowers yellow, turning orange-coloured.*

B. ELONGATA, Korth. *E.T.* Tropical forests in Pegu and Tenasserim.

*B. mollissima*, Wall.

*Phanera velutina*, Bth.

Leaves velvety. A small evergreen tree.

\*\* *Scandent shrubs, with hook-tendrils.*

Sub-genus PHANERA, Lour.

*Calyx-tube* more or less elongate. *Calyx-lobes* valvate, all expanding or becoming reflected, rarely the one or other cohering. *Style* more or less elongate.

× *Ovary and pod glabrous.*

° *Pods stalked. Flowers racemose, large.*

B. DIPHYLLA, Symes. *S.S.* Ava and Prome.

Leaves 2-foliolate, the leaflets free to the base. Bracts or bractlets none.

B. INVOLUCELLATA, Kz. *S.S.* Martaban.

Leaves united into a 2-cleft leaf. Bractlets very large, almost leafy.

°° *Pod sessile. Flowers rather small, corymbose.*

B. GLAUCA, Wall. *E.S.* Tropical forests of Pegu and Tenasserim.

Lobes of the leaves rounded. Pedicels and calyx glabrous.

B. PIPERIFOLIA, Roxb. Tenasserim.

*Phanera glabrifolia*, Bth.

Lobes of the leaves acuminate. Pedicels and calyx appressed silk-hairy.

×× *Ovary, and usually also the pod, villous-pubescent or puberulous.*

° *Pod and ovary sessile.*

† *Adult leaves glabrous, the lobes acuminate to acute, and bluntish.*

B. MACROSTACHYA, Wall. Khakyen Hills.

*B. scandens*, Roxb. non L.

Racemes elongate, appressed silk-hairy. Pedicels stout.

B. ORNATA, Kz. Eastern Slopes of Pegu Range.

Myouk-hlō-gā.

Racemes corymb-like, contracted, sparingly puberulous. Pedicels slender.

†† *Leaves tomentose or pubescent, the lobes rounded.*

B. VAHLII, W.A. *S.S.* Tenasserim.

*B. racemosa*, Vhl. non Lamk.

All parts brown-tomentose or pubescent. Petals an inch long. Racemes elongate.

°° *Pod and ovary stalked.*

B. ROSEA, Kz. Martaban, Kāma-hpyu-choung.

Flowers rose-coloured, in corymb-like racemes; style shorter than the ovary, villous, thick.

“A *B. VahlII* inter alia differt stylo et floribus minoribus” (Kurz).

B. FERRUGINEA, Roxb. *E.S.S.* Tropical Forests East of Toung-ngoo over 2000 feet. Great Nicobar.

*P. albolutea*, Miq.

*P. Griffithiana*, Bth.

Flowers yellowish-white to yellow, in short racemes. Style elongate, slender.

Sub-genus LASIOBEMA, Korth.

*Calyx-tube* almost none, the lobes tooth-like. *Style* very short. *Pods* 1-2-seeded.

B. ANGUINA, Roxb. E.S.S.

Tropical Forests of Chittagong and

*Lasiobema Horsfieldii*, Miq.

Hills East of Young-ngoo.

Glabrous or nearly so. Ovary and pods glabrous.

The wood of *Bauhinia* is of little value and no beauty, but the elegant creepers of the genus are some of the most striking objects in a tropical forest. The leaves and flowers of some species are eaten, as are the seeds, which in some of the scandent species are of very large size.

\*\* *Leaves abruptly pinnate (Anaherstieæ).*

× *Calyx-tube short, the disk basal or nearly so (Cynometrieæ).*

+ *Petals 5 or fewer.*

CYNOMETRA, *Linnaeus.*

*Sepals* 4-5. *Petals* 5, imbricate. *Stamens* 10 or many. *Pod* fleshy, indehiscent or tardily dehiscent. *Leaflets* in 1 to many pairs.

× *Racemes short and umbel-like, puberulous.*

\* C. RAMIFLORA, L.

Cultivated in Tenasserim. Nicobars.

Myeng-ka-pen (Kurz).

Leaves and rachis glabrous. Leaflets larger, usually in a single pair;  $1\frac{1}{2}$ -2 inches long, edible.

C. BIJUGA, Spanoghe. E.T.

Tropical forests of Arakan, Tenasserim, the Andamans, and Nicobars.

Rachis of leaves puberulous, slenderer. Leaflets smaller, usually in 2, very rarely in 3 pairs. Pods about  $\frac{1}{2}$  inch long, insipid.

× × *Racemes longer or shorter, bracted.*

\* C. CAULIFLORA, L. E.T.

Cultivated (*fide* Mason).

Pedicels glabrous or puberulous. Leaflets in a single pair.

× × *Disk at the top of a prolonged calyx-tube (Eu-anherstieæ).*

+ *Petals* 1-5. *Trees.*

° *Calyx-tube elongate.*

† *Petal* one.

AFZELIA, *Smith.*

*Calyx-segments* 4, much imbricated. *Petal* clawed. *Stamens* 3-8, free, with or without a few minute staminodes. *Pod* large, woody or coriaceous. *Seeds* not arillate. *Leaves* abruptly pinnate.

A. BIJUGA, Colebr.

Coast forests of the Andamans. Kamorta and Katchall.

*Jonesia triandra*, Roxb.

Inflorescence and calyx puberulous. Pods  $\frac{1}{2}$ -1 foot long, woody. Leaflets usually bluntish.

A. RETUSA, Kz.

Tidal forests of the Andamans.

Inflorescence and calyx glabrous. Pods 3-4 inches long, thin coriaceous. Leaflets notched.

†† *Petals* 3-5.

TAMARINDUS, *Linnaeus.*

*Petals* 3, with the rudiments of 2 others. *Staminodes* teeth-like. *Stamens* monadelphous, only 3 of them developed. *Pod* turgid, indehiscent, the acid mesocarp pulpy.

\* T. INDICA, L. *E.T.*

Cultivated all over Burma. Nicobars.

Maji.

Kurz describes the heartwood as "dark-coloured and resembling ebony, sometimes beautifully dark-reddish veined." This is hardly correct, as the wood is not black, but a reddish-purple when fresh, seasoning to a brownish-purple. The fully-seasoned heartwood weighs 86 lbs., and it is the heaviest, hardest and handsomest wood I know. Its hardness is so great as to chip or spoil any but the most seasoned tools, and it is a matchless wood for ornamental turnery. A very large tree would, however, only yield a plank a foot broad. Small logs of the heartwood would be valued in England for turning (W.T.).

AMHERSTIA, *Wallich.*

*Petals* 5, 3 of them nearly equally long, and like the lowermost one, very broad, the 2 others minute or rudimentary. *Stamens* diadelphous (9+1).

A. NOBILIS, Wall.

Planted around kyouns, chiefly in the southern parts of Burma. Wild along streams in Martaban (Parish).

Thaw-kah.

Dr. Mason was uncertain as to the precise locality of the wild tree, but Mr. Parish, a most competent authority, declares it exists wild in Martaban. Dr. Mason describes this rare tree as of "low stature, with slender pendulous branches clustered under its tufted summit of lively green, and draped with large pea-blossom-shaped flowers of brilliant red and yellow, which hang down from its graceful arches in tassels, more than a yard long." Dr. Wallich also writes: "There can be no doubt that this tree when in full foliage and blossom is the most strikingly superb object which can possibly be imagined. It is unequalled in the flora of the East, and I presume not surpassed in magnificence and elegance in any part of the world." The following poetical picture is from the pen of Mrs. Ellen H. B. Mason, the helpmate and fellow-labourer for many years of my deceased friend. Trochla is a village on the Salween, where Wallich discovered the tree.

"Ho, Trochla! thy tide  
Hath a beautiful bride,  
The child of an iris-wreathed shower;  
With veils flowing down  
From her emerald crown,  
Whose fringes unfold,  
In scarlet and gold,  
A glorious sight,  
Ever graceful and bright—  
The queen of proud Ava's wild bower.

Tall sweet-blossomed trees  
Are wooing the breeze  
O'er highland, and dingle, and glade;  
But, though they allure  
With their fragrance so pure,  
The Amherstia is fairest,  
The noblest, the rarest;  
Nor all the rich flowers  
Of Albion's bowers  
Can vie with its purpling shade."

Mr. Parish's remarks on this tree, which completely establish its claim to be considered as indigenous to Burma, are contained in the *Journal of the Asiatic Society of Bengal* for 1865, p. 135 and p. 145, and are worth reproducing here:—

"While at Beling on the way, I rode out in company with Col. Fyche and Capt. Harrison to a place called *Kothanaiong*, about 7 miles off, to see the Amherstia trees there. This place had often been mentioned as one where the Amherstia was

to be seen in great perfection, and where indeed it might perhaps be wild. I was well rewarded, for a prettier little spot I never visited. The Amherstias, growing in a well-shaded place and watered by a perennial stream, which tumbles down a steep granite hill, and is ingeniously directed hither and thither, in large bamboo troughs, were indeed to be seen in the wildest luxuriance of growth. But Kothanaiong is a sacred spot. Here are Pagodas, Pongyee-houses, Zayats all around. A flight of steps leads from the bottom to the top of the overhanging hill, which is about 600 feet high, and on which are more sacred buildings. The Amherstias, seen only round the principal Pagoda, were undoubtedly planted, although they are now left to take care of themselves and have a wild appearance. Evidently, this is not a native habitat of the tree."

Dropping down the Yunzaleen, however, by boat from Pahpoon, on the second day, Mr. Parish found a fine Amherstia in full flower, which he regarded without hesitation as a wild tree. Mr. Parish cogently remarks: "Now my reasons for saying that this was a *bona fide* wild tree are these: in all this district, the Valley of the Yunzaleen, there are no Pagodas or Pongyee-houses, or spots sacred to the Burmese, where they have erected buildings. The inhabitants of this district, in fact, are Karens, and not Burmese, and these Karens are exceedingly few and scattered. After leaving Pahpoon, we did not see a single village on the banks all the way until we came to the junction of the Yunzaleen with the Salween. There are indeed, no doubt, a few villages a little way from the bank, here and there hidden among the trees; but these generally consist of but two or three houses; neither are they settled villages, for the custom of the Karens is to change the site of their houses continually. Besides, the regular Karens, not being Buddhists, do not build Pagodas, nor do they ever trouble themselves to plant ornamental trees, as the Burmese always do, in their sacred places. Again, the spot where this Amherstia was seen was not at all a likely spot for an Amherstia to have been planted by any one; but one of the wildest places imaginable. Had it been on a rising ground, or on a high bank alone, or on any prominent point on the river, I should have suspected that a hand had placed it, but it was on a low and sloping part of the bank, struggling for life with *Calamus*, *Bauhinia*, and tall grasses and such other tangled stuff as forms the common vegetation of our river banks in the wildest places, and behind again was dense jungle of the tallest trees. However, notwithstanding all this, had it been seen in a fairly peopled district, I should have doubted, but in such a wild uninhabited country as the Yunzaleen is, I see no reason for suspecting that it was not a genuine native. Had Wallich's first tree been here, I am satisfied that the idea of its *not* being wild would never for a moment have occurred to him. I am perfectly satisfied that the tree seen by me was a wild one. That the Amherstia in a wild state may be very scarce is not improbable; but that it should not exist any longer in that state, though possible, is to say the least, very unlikely."

+ + *Petals none.*

SARACA, *Linnaeus.*

*Sepals* 4. *Stamens* 3-9. *Pods* coriaceous, 2-valved. Trees.

\*S. INDICA, L. *E.T.* Wild in the tropical forests of Arakan (Boronga Island, *Jonesia Ahsoca*, Roxb. at 1000 feet elevation); also Tenasserim; much *J. Zollingeriana*, Miq. planted around monasteries all over the country.

A-thor-kā-bō.

One of the loveliest trees when in full blossom that the East produces. When they first open, the blossoms are a fine orange colour, which gradually changes to red, and at night they exhale a delicious perfume. It is a pity it is not more extensively cultivated in the gardens of Europeans.

Sub-tribe EUCESALPINIÆ.

*Leaves usually abruptly bipinnate. Sepals free to the disk, valvate or imbricate. Ovary or ovary-stalk free.*

× *Sepals valvate or nearly so.*

POINCIANA, *Linnaeus*.

*Pod* 2-valved, flat, coriaceous. *Leaves* bipinnate, the leaflets all developed. Unarmed.

\* P. REGIA, Boj.

Cultivated as an ornamental shrub.

Calyx quite glabrous. Petals very large, waved, usually crimson.

PARKINSONIA, *Linnaeus*.

*Pod* turgid-moniliform, indehiscent. *Petiole* very short, spine-like, with 2-4 much elongate pinnæ of minute and often quite reduced leaflets. Armed.

\* P. ACULEATA, L.

Cultivated in Ava and Prome.

A good tree to form hedges.

× × *Sepals imbricate. Trees or woody climbers.*  
+ *Climbers, usually armed.*

CÆSALPINIA, *Linnaeus*.

*Pods* not winged, indehiscent or 2-valved, several-seeded. *Stigma* small.

Sub-genus CÆSALPINARIA.

*Albumen* none. *Pods* coriaceous, 2-valved. *Filaments* very long and slender, quite glabrous. Erect shrubs or trees, unarmed.

\* C. (POINCIANA) PULCHERRIMA, L.

Cultivated all over the country.

Doung-sök.

Sub-genus EU-CÆSALPINIA.

*Seeds* albuminous. *Pods* various. *Filaments* as long as, or somewhat longer than, the petals. Usually scandent shrubs, more or less armed with prickles.

**A.** Valves of pod dry, coriaceous or almost chartaceous.

Sub-genus NUGARIA, DC.

Scandent thorny shrubs, rarely trees. *Pods* rigidly or thinly coriaceous, 2-valved or indehiscent, smooth. *Seeds* compressed or not. *Stamens* as long as, or a little longer than the petals.

\* *Seeds flat and compressed. Pods 2-valved. Leaflets large.*

C. NUGA, Miq.

Arakan, Tenasserim, the Andamans,  
Kamorta, and Katchall.

*C. paniculata*, Roxb.

*C. Chinensis*, Roxb.

All parts quite glabrous.

\*\* *Seeds hardly compressed. Pods 2-valved or indehiscent, or nearly so, the sutures usually thickened. Leaflets small.*

C. SAPPAN, L.

Pegu and Tenasserim.

Small tree. Leaflets unequally oblong, retuse. Pods tardily dehiscing.

Dr. Mason remarks:

"In the valley of the Tenasserim, between the latitudes of Tavoy city and the mouth of the Tavoy river, the hills that border the valley on the eastern side abound in sapan wood, which is used extensively as a red dye. Considerable quantities are exported every year from Mergui, and that province is usually supposed to contain the tree, though it is really within the Province of Tavoy; but the facility of water communication from the interior to Mergui makes that the only port to which the wood is conveyed. It is rather singular that this narrow locality is the only one in the Provinces, so far as I am aware, in which the tree is found. The tree has a much wider range, the Karens inform me, on the Meinam side of the mountains in Siam. More than five hundred thousand pounds have been exported from Mergui during

some years between 1830 and 1840; but latterly the forests have not been so productive." Dr. McClelland writes: "It is found in the immediate vicinity of Prome, growing in the small hills of that place. It is also seen near Thoungzai, in the northern part of the Rangoon district;" but Dr. Brandis says: "Not wild in Pegu."

*C. SEPIARIA*, Roxb. S.S. Burma (*vide* Mason).

Su-kyin-bō (Kurz).

Scandent shrub. Leaflets ovate, acute. Pods 2-valved.

Sub-genus *GUILLANDINA*, L.

Scandent thorny shrubs. *Pods* coriaceous or thin coriaceous, 2-valved, the valves echinate or glandular-hirsute. *Seeds* not compressed. *Stamens* as long as, or somewhat longer than, the petals.

\* *Pods echinate. Seeds almost globose.*

*B. BONDU*, L. S.S. All over Burma and the Andamans.

Kalein (Kurz). Kamorta and Katchall.

Branchlets, etc., more or less brown or tawny-pubescent. Stipules none. Bracts straight and erect.

\*\* *Pods glandular-hirsute when fully ripe. Seeds oblong.*

*C. MIMOSOIDES*, Lamk. S.S. Toung-ngoo.

*C. simora*, Ham.

All parts more or less glandular-puberulous and prickly.

#### B. Pods fleshy-coriaceous, torose.

Sub-genus *CYLINDOCARPUS*, Zoll.

Thorny scandent shrubs. *Pods* indehiscent, the sutures thickened. *Seeds* not compressed. *Stamens* as long as, or somewhat longer than, the petals.

*C. TORTUOSA*, Roxb. Tenasserim.

Panicle shortly tomentose and prickly.

*C. DIGYNA*, Roth. All over Burma.

*C. oleosperma*, Roxb.

*C. gracilis*, Miq.

Panicle glabrous and unarmed.

#### *PTEROLOBIUM*, E. Browne.

*Pods* samaroid, indehiscent, the upper end produced into a conspicuous wing-like appendage, 1-seeded. *Ovary* 1-ovuled.

*P. MACROPTERUM*, Kz. S.S. Pegu and Tenasserim.

Kyoung-gyet-nweh (Kurz).

#### *MEZONEURUM*, Desfontaines.

*Pod* flat, several-seeded, indehiscent, the upper suture extended into a wing. *Stigma* small.

*M. GLABRUM*, Desf. var.  $\beta$  frequent in the Irrawaddy zone of Pegu. var.  $\gamma$  not unfrequent in the dry forests of Prome.

Leaflets in 10 to 8 pairs,  $\frac{1}{2}$  inch long, blunt or retuse.

var. *a* *genuinum*. Glabrous or nearly so. Leaflets usually alternate.

var. *\beta* *enneaphyllum*, W. A. Glabrous or the secondary rachises and young shoots slightly puberulous. Leaflets glabrous or nearly so, usually opposite.

var. *\gamma* *pubescens*, Desf. The young parts more or less velvety pubescent or puberulous. Leaflets opposite or nearly so, beneath shortly pubescent.

M. (CESALPINIA) CUCULLATUM, Roxb. All over Burma.  
*M. macrophyllum*, Bl.

Kyoung-shyt.

Leaflets in 3-4 pairs,  $1\frac{1}{2}$ -2 inches long, bluntish acuminate.

+ + *Erect trees, not armed.*

PELTOPHORUM, Vogel.

*Pods* flat, several-seeded, indehiscent, both sutures extended into a wing.  
*Stigma* peltate. *Stamens* 10, free.

P. (CESALPINIA) FERRUGINEUM, Dene. Beach forests of the Andamans.  
*Pedicels* only 2-3 lines long. *Pods* with coriaceous wings.

ACROCARPUS, Wight.

*Pods* as in preceding, but indehiscent and winged along the upper suture only.  
*Stigma* minute. *Petals* narrow, almost equal. *Stamens* 5, free.

A. FRAXINIFOLIUS, Wight. Pegu Range.

Mai-a-nhen (Kurz).

Flowers green. *Petals* 3 lines long or longer. *Pods* 17-18-seeded.

#### Sub-order MIMOSEÆ.

*Flowers* regular, the petals valvate in bud, free or more usually united into a shorter or longer tube. *Stamens* definite or indefinite, free or connate.

#### MIMOSIEÆ.

*Stamens* definite, usually 10 or 5, or twice as many as the petals.

#### Sub-tribe MIMOSIEÆ VERÆ.

*Anthers* gland-tipped or not. *Stamens* free. *Calyx* valvate in bud.

\* *Anthers* gland-tipped.

× *Flowers* in spikes or racemes.

#### ADENANTHERA, Linnæus.

*Pods* 2-valved, often falcate or circinate, transversely chambered between the seeds. *Flowers* in spikes or racemes. *Erect trees*. *Leaves* bipinnate.

A. PAVONINA, L. var.  $\beta$  in Tropical forests all over Burma and the adjacent  
*Entada arborea*, Griff. islands up to 3000 feet. Great Nicobar.

*A. Gersenii*, Scheff.

var. *a genuina*. Seeds about  $\frac{1}{8}$  inch in diameter.

var.  $\beta$  *microsperma*, T. and B. Seeds half the size.

A handsome tree, heartwood red and durable.

#### ENTADA, Adams.

*Pods* large, the indehiscent joints separating from the persistent thickened sutures. *Flowers* in spikes. *Tendrils*-bearing woody climbers. *Leaves* bipinnate.

E. (MIMOSA) SCANDENS, L.

All over Burma, Kamorta and Nankowry.

*E. pursathæ*, DC.

*E. Rumphii*, Scheff.

This gigantic creeper, with pods more than a yard long and four inches broad, is one of the most striking of its class. The seeds are roasted and eaten, and are eagerly sought in the tree tops by both Burmans and Karens at the risk of their necks.

× × *Flowers in oblong or globose heads.*

NEPTUNIA, *Lourcero*.

*Pods* flat, 2-valved, thin coriaceous. *Flowers* in dense heads. Erect herbs. *Leaves* bipinnate.

N. (DESMANTHUS) NATANS, Willd. In stagnant waters in Pegu and Tenasserim.

N. oleracea, Lour.

Mimosa natans, Roxb.

N. plena, Ldl. non Bth.

\*\* *Anthers not gland-tipped.*

× *Pods more or less jointed, the joints receding from the persistent sutures.*

MIMOSA, *Linnaus*.

*Flowers* in dense spikes or heads. Shrubs or herbs, with bipinnate leaves.

\* M. RUBICA, L. A weed, introduced and now common from Ava to Pegu.

The sensitive plant.

+ + *Valves of pod thick and woody, falcate.*

XYLIA, *Bentham*.

*Pods* woody, tardily dehiscent. *Flowers* in globose heads. *Leaves* bipinnate.

X. (MIMOSA) XYLOCARPA, Roxb.

All over Burma up to 3000 feet.

X. dolabriformis, Bth.

Pyn-ga-do. Pegu Ironwood.

The ironwood of Pegu is hard, strong and durable. The seasoned wood weighs 68 lbs. Kurz says: "recommended for spars"; but surely no "Tar" in his senses would select such a heavy wood for the purpose! and I take the above as a specimen of the glib rubbish which gets copied and re-copied *ad nauseam* by heedless compilers. An excellent wood for all purposes demanding strength and durability, and where weight is no objection.

Sub-tribe PARKIEÆ.

*Calyx imbricate in bud. Stamens monadelphous.*

PARKIA, *R. Brown*.

*Stamens* 10, in neuters reduced to long filaments. *Flowers* in large long-peduncled heads, the lower ones neuter, the upper ones fertile. Trees with bipinnate leaves.

\* *Calyx-lobes obovate-cuneate.*

P. insignis, Kz.

Tropical forests East of Toung-ngoo.

Myonk-tanyet (Kurz).

Leaflets an inch long, pubescent beneath, penninerved. Receptacle regular.

\*\* *Calyx-lobes short, rotundate (not cuneate-narrowed).*

P. LEIOPHYLLA, Kz.

Tropical forests of Pegu Range.

Leaflets  $\frac{1}{2}$  inch long, quite glabrous, 1-nerved, with a lateral basal nerve. Receptacle irregular.

ACACIÆÆ.

*Stamens indefinite, free or connate.*

Sub-tribe ACACIÆÆ VERÆ.

*Stamens free.*

ACACIA, *Willdenow*.

*Pods* various, dehiscent or not. *Flowers* in heads or dense spikes. Trees or shrubs, sometimes climbing, with bipinnate leaves or the leaves reduced to phyllodes, armed or unarmed.

\* *Trees or erect shrubs, the branchlets armed only with paired diverging stipulary or infra-stipulary prickles.*

× *Flowers in spikes.*

+ *Pod-valves chartaceous, transversely reticulate-veined, the sutures nerve-like or almost keeled.*

A. FERRUGINEA, DC.

Burma.

Glaucous-green, glabrous. Leaflets oblong-linear, blunt, 3-5 lines long. Flowers yellow.

+ + *Pod-valves coriaceous, the margins not or hardly prominent.*

A. (MIMOSA) CATECHU, L.

var. *a* Ava and Pegu. var. *β* Ava.

Shā.

Spikes glabrous or pubescent, yellow. Leaves glabrous or slightly pubescent. Bark much cracked and rough, dark brown.

var. *a genuina*. *Mimosa catechuoides*, Roxb. Young parts all slightly appressed pubescent but soon glabrescent. Full-grown leaves glabrous or the leaflets ciliate, the rachis slightly pubescent. Spikes shorter and thicker, like the calyces more or less appressed pubescent. Corolla about twice the length of the calyx.

var. *β Sandra*, DC. All parts glabrous or the very young shoots slightly pubescent. Full-grown leaves and rachis quite glabrous. Spikes elongate and slender, quite glabrous. Corolla glabrous, about  $\frac{2}{3}$  longer than the glabrous calyx.

*Terra japonica*, *Catch*, or *Xath*, is the inspissated extract obtained by boiling chips of the wood. The wood is dark red, very hard, and handsome, but easily dressed and free from knots, and in aspect is equal to mahogany. Weight of selected pieces when seasoned 69 lbs., but runs lighter in ordinary samples.

A. (MIMOSA) SUMA, Roxb.

Ava.

*A. catechu*, Bth. and Bedd.

Spikes tomentose, white. Leaves while young greyish pubescent. Bark rather even and smooth, white.

× × *Flowers in globular heads, yellow.*

+ *Pods dry-coriaceous, flat, dehiscent.*

A. LEUCOPHLEA, Willd.

var. *a* along the Irrawaddy. var. *β* Prome  
up to 1000 feet.

Bark whitish. Flower-heads arranged in ample terminal panicles.

var. *a genuina*. Flower-heads the size of a pea, the stout peduncles, and also the pods, shortly tomentose. Leaves slightly, the rachis more or less, pubescent.

var. *β A. microcephala*, Grah. Flower-heads half the size, the slender peduncles and the inflorescence puberulous. Pods when ripe, leaves and rachis glabrous.

+ + *Pod thick, torose, fleshy-coriaceous, indehiscent.*

\* A. FARNESIANA, Willd.

Cultivated all over Burma.

Nan-lon-kyaing (Mason).

Glabrous or nearly so. Leaves  $1\frac{1}{2}$ -3 inches long, leaflets 2-3 lines long.

\*\* *Woody climbers, without stipulary spines, but the branchlets armed along their whole length with sharp recurved prickles. Flower-heads globular.*

× *Pods fleshy-coriaceous, often somewhat constricted between the seeds.*

A. (MIMOSA) RUGATA, Lamk.

var. *β* all over Burma and the Andamans.

Leaflets in 10-20 pairs, up to  $\frac{1}{2}$  inch long. Flower-heads small, yellowish.

var. *a genuina*. Ovary villous. Softer parts more pubescent.

var. *β A. concinna*, DC. Ovary glabrous. All softer parts more glabrous.

× × *Pods dry, chartaceous or thin coriaceous, flat.*

° *Ovary and pods pubescent.*

A. (MIMOSA) CÆSIA, L. S.S. var. β in Tropical forests of Pegu Range.  
*Mimosa torta*, Roxb.

Leaflets in 15-40 pairs, 3-6 lines long. Flower-heads small, white, in panicles.

var. *a genuina*. Leaflets only about 3 lines long, more rigid, bluntish, with or without a mucro. Branches terete.

var. β *elegans*. Leaflets about ½ inch long, bristly acute, less rigid. Branches 5-angular, retrorsely prickly along the corners.

° ° *Ovary and pods glabrous.*

A. (MIMOSA) INTSIA, L. S.S. Chittagong and Khakyen Hills.

*A. oxyphylla*, Grah.

*Mimosa cæsia*, Roxb.

Leaflets in 8-20 pairs, ½ inch long. Peduncles tawny tomentose.

A. (MIMOSA) PENNATA, L. S.S. var. *a* all over Burma. var. β Ava.

*A. prensans*, Lowe.

Su-yit (Kurz).

Leaflets in 30-40 pairs, 2-3 lines long. Flower-heads the size of a large pea. Panicles and young branchlets puberulous or tomentose, not pruinous.

var. *a genuina*. Panicles puberulous. Flower-heads the size of a large pea. Young branchlets shortly puberulous. Leaflets glabrous. Rachis glabrous or slightly pubescent. Pods linear-lanceolate, acuminate at both ends.

var. β *A. canescens*, Grah. Panicles and young branchlets tomentose. Leaflets ciliate. Rachis tomentose. Pods linear-oblong, rounded at both ends, smooth. coloured.

A. PRINESCENS, Kz. W. C. Southern Pegu. Also the Khakyen Hills.

As preceding, but branchlets and panicles pruinous. Leaflets up to ½ inch long. Flower-heads twice the size. This species has flower-heads twice the size of those of the preceding; and the branchlets, inflorescence, and peduncles are more or less pruinous, with or without an admixture of tomentum. It is a powerful climber, with somewhat compressed dark-coloured stems up to 3 feet girth. The tough reddish bark and fibre are used for poisoning fish.

Sub-tribe INGIEÆ.

*Stamens connate. Flowers in heads or dense spikes.*

\* *Seeds without an arillus, but on longer or shorter funicles.*

ALBIZZIA, Durazzo.

*Pods straight. Trees with bipinnate leaves.*

Sub-genus EU-ALBIZZIA.

*Pods straight, very flat, the sutures slightly thickened. Flowers white.*

\* *Pinne numerous (10-18). Leaflets linear, 1-6 lines long, in very numerous pairs.*

× *Leaflets bluntish, the nerve central or nearly so.*

A. MYRIOPHYLLA, Bth. E.T. Tenasserim.

*Mimosa microphylla*, Roxb.

Leaflets very narrow, glabrous. Flower-heads small, in terminal panicles.

× × *Leaflets more or less acute, the nerves marginal or nearly so.*

A. (MIMOSA) STIPULATA, Roxb. E.T. Chittagong, Tenasserim, and the Andamans  
*M. Smithiana*, Roxb. up to 4000 feet. Kamorta.

Bō-mē-zā or Bōn-meh-zā.

Stipules very large, obliquely ovate, acuminate. All parts more or less shortly pubescent. Corolla nearly 4 times as long as the calyx.

A. ELEGANS, Kz. *E.T.*

Pegu Range.

Stipules none or obsolete. Full-grown parts glabrous or nearly so.

Very similar to the preceding, but a much more elegant tree. Flowers and fruits unknown. I have the very same plant from the island of Banka (Sumatra) (Kurz).

\*\* *Pinnæ in 2-6 pairs. Leaflets ovate to oblong,  $\frac{1}{2}$ -1 $\frac{1}{2}$  inch long, in several pairs.*

× *Leaflets sessile.*

A. (MIMOSA) ODORATISSIMA, Roxb. *T.* Pegu and Tenasserim.

*A. micrantha*, Boiv.

Flowers small. Calyx minute. Corolla  $1\frac{1}{2}$  line long. Pods blackish.

Thyt-ma-gyi (Kurz) or Thym-maji.

A. LEBBEK, L. *T.*

Pegu. Tenasserim and the Andamans.

*Mimosa sirissa*, Roxb.

Kō-kō.

Flowers conspicuous. Calyx  $1\frac{1}{2}$  line long. Corolla 4 lines long. Pods yellowish.

× × *Leaflets shortly petioluled. Pinnæ in 4-3 pairs.*

A. (MIMOSA) PROCERA, Roxb. *T.*

Pegu and Tenasserim.

*M. elata*, Roxb.

Syt.

Leaflets blunt or somewhat acute,  $\frac{1}{2}$ -1 inch long, glaucescent beneath. Pods tapering at the base, linear, smooth, brown.

\*\*\* *Pinnæ in a single pair. Leaflets few only, large, acuminate.*

A. (MIMOSA) LUCIDA, Roxb.

Ava and Prome.

Tor-that-hpyu (Kurz).

Glabrous. Pods broad, very flat.

Sub-genus PITHECOLOBIUM, Mart.

*Pods twisted circinate or screw-like or curved. Flowers white.*

\* *Flowers pedicelled, or head-like umbels or racemes. Trees.*

+ *Branchlets terete.*

A. JIRINGA, Jack.

Pegu and Tenasserim.

*Mimosa Djiringa* and *Kœringa*, Roxb.

*Pithecolobium lobatum*, Bth.

Leaves with a single pair of pinnæ. Leaflets in 2-3 pairs, smooth and glossy. Seed-bearing lobes of pod about an inch long and broad.

+ + *Branchlets sharply angular.*

A. (MIMOSA) HETEROPHYLLA, Roxb.

Tenasserim from 4000 to 6000 feet.

*Pithecolobium angulatum*, Bth.

*P. acutangulum*, Miq.

Leaves with about 12 pairs of pinnæ. Leaflets in 4-8 pairs, while young shortly and softly pubescent like all younger parts, acuminate.

\*\* *Flowers sessile, in small heads.*

A. GLOMERIFLORA, Kz.

Hills East of Toung-ngoo from 4000 to 7000 feet.

Erect shrub. Leaves with a single pair of pinnæ. Leaflets in 4-8 pairs, almost glabrous, glaucous beneath.

The following species are added by Kurz from the Nicobars:

A. LITTORALIS, T. et B.	Nankowry. Great Nicobar.
A. (PITHECOLOBIUM) BUBALINA, Bth.	Kamorta. Nankowry.
<i>P. oppositum</i> , Miq.	
A. (PITHECOLOBIUM) CLYPEARIA, Bth.	Katchall.
A. (PITHECOLOBIUM) FASCICULATA, Bth.	Tropical forests of Kamorta.

Kurz adds: "I follow v. Mueller and Scheffer in throwing together *Albizzia* and *Pithecolobium*, the differences pointed out by Bentham appearing to me not to be of generic value.

This genus yields excellent timber for furniture and fittings, the wood being light, lasting (when not exposed to the weather), easily planed and dressed, and handsome in appearance. *A. stipulata* (Bôn-meh-zā) is a light brown wood, somewhat like walnut, and when seasoned weighs 28 lbs., though Kurz (so frequently inaccurate when misled through following Brandis in the matter of timbers) states it to be "heavy," Brandis giving 66 lbs., which is undoubtedly wrong for the seasoned wood. *A. odoratissima* (Thyt-maji) is a similar wood, but closer-grained, and runs up to 54 lbs., and is highly to be commended for ornamental furniture. *A. lebbek* (Kō kō) is a handsome brown wood of open grain, 47 lbs. weight. *A. procera* (Syt) give a light brown wood of 34 lbs. only. All these are admirable light woods, not so heavy as Kurz's remarks would lead one to suppose, but I allude, of course, always to the thoroughly seasoned timber.

\* \* \* *Seeds conspicuously arillate.*

INGA, Willdenow.

*Pods* circinnate or cochleate. Trees or shrubs with simply pinnate leaves.

\* I. (MIMOSA) DULCIS, Roxb. Cultivated.

#### Order CONNARACEÆ.

*Flowers* usually hermaphrodite, regular or nearly so. *Calyx* 5-cleft, often persistent, imbricate or valvate. *Petals* 5, free, or sometimes slightly coherent at the middle, imbricate, rarely valvate. *Stamens* perigynous or hypogynous, sometimes distinctly declinate, 5 or 10, very often alternately shorter, and sometimes imperfect. *Filaments* usually united in a ring at the base. *Anthers* usually opening inwards, didymous. *Disk* none, thin or incomplete. *Ovary* of 5 distinct 1-celled carpels, either all perfect, or 1 fertile and the rest abortive, rarely reduced to 2, or 1 carpel, with 2 erect or ascending ovules in each. *Styles* subulate or filiform. *Ripe carpels* usually solitary, sessile, or stalked, follicle-like, usually dehiscing along the inner, rarely along the outer suture, 1- or very rarely 2-seeded. *Seed* with or without arillus, the testa thick, often fleshy below the middle and arillus-like. *Albumen* fleshy or none. Trees or shrubs, often scandent, with alternate 1-3-foliolate or pinnate leaves. *Leaves* usually small, in racemes or panicles.

#### CONNARIEÆ.

*Calyx* imbricate. *Seeds* without albumen.

RODREA, Aublet.

*Sepals* enlarged in fruit, imbricately-connate. *Follicle* sessile. *Seeds* arillate.

\* All parts quite glabrous. *Leaflets* in few (not above 6) pairs, acuminate.

R. PULCHELLA, Planch. S. Mergui.

Leaflets  $1\frac{1}{2}$ -2 inches long, the rachis and petiolules very slender.

R. COMMUNATA, Planch. E.S. Tropical forests of Chittagong, Tenasserim, and the Andamans.

Leaflets 5-3 inches long, the rachis and petiolules stout.

\* \* *Inflorescence, leaf-rachis, and often the leaflets beneath puberulous or shortly pilose. Leaflets in numerous pairs, small, usually retuse or rounded.*

× *Sepals erect and cupular-closing.*

R. VILLOSA, Planch. S.S. Tenasserim.

Leaflets pubescent or pilose beneath.

R. WALLICHIANA, Planch. Tenasserim. Nicobars.

Leaves glabrous on both sides.

× × *Sepals spreading.*

R. STENOPETALA, H. f. (non Griff. ?) S.S. Mergui.

Leaflets obliquely ovate or obovate, 2-lobed at the summit.

Kurz adds :

R. FLORIBUNDA, Miq. Tropical forests of Katchall and Nankowry.

CONNARUS, *Linnaeus.*

*Sepals not enlarging or deciduous. Follicle stalked. Seeds arillate.*

\* *Follicles perfectly glabrous and smooth on the walls inside.*

C. STICTOPHYLLUS, Kz. Tenasserim and Siamese province of Radbooree.

Rachis of leaves and midrib beneath pubescent, or almost glabrous, the nervation thin, much net-veined, especially while young, conspicuously bullate-dotted on the areoles. Follicles sessile,  $\frac{1}{2}$  inch long.

\* \* *Follicles more or less pubescent or velvety within.*

× *Petioles and leaflets beneath, or the nerves only, pubescent.*

C. SEMIDECANDRUS, Jack. Mergui.

Leaflets pubescent on the midrib beneath, nerves very slender, in 5 pairs, follicles tomentose.

C. GRIFFITHII, H. f. Mergui.

Leaflets finely rusty pubescent beneath, the nerves very indistinct.

× × *Leaflets perfectly glabrous. Follicles stalked.*

+ *Follicles chartaceous or thin coriaceous, deeply striate.*

C. PANICULATUS, Roxb. Chittagong.

A large tree. Follicles about an inch long or somewhat longer.

This tree is said to yield a useful timber. A species is said to occur near Rangoon (*C. speciosa*, MacClelland, Gwē-douk), which has a bright scarlet pod, whose seeds yield abundance of oil.

C. GIBBOSUS, Wall. From Chittagong to Tenasserim up to 2000 feet.

Climber. Follicles about an inch long or somewhat longer.

C. LATIFOLIUS, Wall. Tenasserim. South of Maulmain.

Apparently as preceding, but the follicles nearly cylindrical.

++ *Follicles woody.*

C. GRANDIS, Jack. Tenasserim or the Andamans.

Leaflets thick coriaceous, large. Follicles about 2 inches long.

Kurz adds from the Nicobars :

C. MAINGAYI, H. f. From Great Nicobar.

CNESTIDIEÆ.

*Calyx calvate, 5-parted. Seeds with or without albumen.*

× *Seeds with albumen.*

CNÉSTIS, *Jussieu.*

*Carpels* 5-7, sessile, pilose or hispid within. *Leaves* unpaired pinnate.

*C. PLATANTHA*, Griff. Pegu and Tenasserim up to 3000 feet.

*C. fluminea*, Griff.

Tor-kyet-louk or Kyet-mouk-ni.

A scandent shrub. *Sepals* a line long. *Leaflets* usually opposite.

*C. RAMIFLORA*, Griff. *S.* or *T.* Tropical forests of the Andamans.

*Rourea dasyphylla*, Miq.

*C. ignea*, Planch.

*Sepals* 2 lines long. *Flowers* long, pedicelled. *Leaflets* often alternate.

× × *Seeds without albumen.*

ELLIPANTHUS, *Hooker, f.*

*Sepals* erect. *Carpels* solitary, tomentose or velvety within. *Leaves* 1-foliolate.

\*\* *Leaves* glabrous or nearly so. *Follicles* glabrous within.

*E. CALOPHYLLUS*, Kz. Tropical forests of the Andamans.

*Leaves* and petiole glabrous, the former 4-6 inches long, nerves beneath very slender.

*E. HELFERI*, H. f. Tenasserim or the Andamans.

Petiole and midrib beneath puberulous. *Leaves* 2-3 inches long, nerves strong beneath.

\*\* *Leaves* pubescent or tomentose beneath. *Follicles* glabrous within.

*E. TOMENTOSUS*, Kz. Southern end of Pegu Range and Tenasserim

Nerves beneath very slender. *Follicles* 1½-2 inches long.

This Order is of small importance economically, consisting of small trees and scandent shrubs. The handsome Zebra wood of Demerara is said, however, to be produced by a species of this Order, *Omphalobium Lambertii*.

#### Series II. DISCIFLORE.

*Torus* usually thickened or expanded into a disk, either free or adnate to the ovary, or to the calyx, or to both, rarely reduced to glands or wanting. *Ovary* superior, or partially immersed in the disk, divided into cells, with axile placentas, or the carpels distinct.

#### SAPINDALES.

*Flowers* often irregular and unisexual. *Disk* tumid, adnate to the base of the *Calyx* or lining its tube. *Stamens* perigynous, or inserted upon the disk, or between it and the ovary, usually definite. *Ovary* entire, lobed, or apocarpous. *Ovules* one or two in each cell, usually ascending with a ventral raphe, or reversed, or pendulous from a basal funicle, rarely many, horizontal. *Seed* usually exalbuminous. *Embryo* often curved or crumpled. *Leaves* usually compound.

#### Order ANACARDIACEÆ.

*Flowers* hermaphrodite or unisexual, usually regular. *Calyx* 3-7-cleft or parted, rarely spathaceous, or irregularly slit, the sepals sometimes wing-like, enlarging, or the tube or base of tube thickened and turning fleshy. *Petals* 3-7, rarely none, free, or very rarely united with the torus, sometimes enlarging into wings. *Disk* usually annular, rarely the torus raised and stalk-like. *Stamens* usually twice as many as petals, usually inserted at the base of the disk, all perfect or variously imperfect. *Anthers* dehiscent inwards. *Ovary* superior, usually 1-celled,

with 1-3 styles, or 2-5-celled, or very rarely of 2 to 5 distinct carpels, with a solitary ovule in each cell, in male flowers reduced to 4 or 5 style-shaped rudiments. *Fruit* superior or very rarely half-inferior, free or adnate to the engrossed calyx-tube or disk, 1- or rarely several-celled, usually drupaceous and indehiscent. *Seed* erect, horizontal or pendulous. *Albumen* none or scanty. *Radicle* inferior or superior, Trees or shrubs, rarely climbing, with alternate or rarely opposite, often crowded simple or compound leaves. *Stipules* none. *Flowers* small, variously arranged.

## ANACARDIÆÆ.

*Ovary* 1-, very rarely 2-celled.

\* *Leaves* (in Burmese species) ternately or pinnately compound.

× *Calyx* in no way enlarging after flowering.

+ *Ovule* suspended from near the summit of the cell.

ODINA, Roxburgh.

*Petals* 4-5, imbricate in bud. *Stamens* 8-10. *Styles* 3-4 in the male flowers, the ovary 4-5-partite.

O. WODIER, Roxb.

All over Burma and the Andamans and Nicobars.

Nab-hē or Na-bch.

Kurz describes the heartwood as of a reddish-brown colour and a good wood for cabinet work. For some reason or other trees from east of the Bay of Bengal seem to yield a heavier wood than that grown in India. The average weight from seven samples given by Gamble (*Manual of Indian Timbers*, p. 111) from India is 43 lbs., whilst four samples from east of this bay give an average of 57 lbs. I consider 40 lbs. about the weight of the fully-seasoned wood. It is a good wood. Kurz says the tree yields a yellowish gum, and that the bark is good for tanning.

+ + *Ovule* suspended from a free erect basilar funicle.

RHUS, Linnæus.

*Petals* 4-6, imbricate in bud. *Stamens* 4-10. *Styles* 3. *Leaves* compound, very rarely simple. Trees or shrubs.

\* *Leaves* 3-foliolate.

R. PANICULATA, Wall.

Ava and Prome.

Glabrous, the leaflets entire.

\*\* *Leaves* unpaired-pinnate.

R. JAVANICA, L.

Ava and Hills East of Toung-ngoo.

*R. semialata*, Murr.

*R. Bucki-amela*, Roxb.

Tomentose, the leaflets serrate-toothed, in 4-6 pairs. Endocarp smooth and bony.

R. KHASIANA, H. f.

Chittagong (*fide* Hooker).

Petiole very slender and glabrous, the leaflets in 8-12 pairs, incised-serrate. Endocarp fibrous.

TAPIRIA, Jussieu.

*Petals* 5, imbricate in bud. *Stamens* 10. *Styles* in female flowers single and short, in the males 4-5. *Climbers*.

T. HIRSETA, Roxb.

Chittagong. Ava. Khakyen Hills.

× × *Calyx-lobes* much enlarging and becoming leafy and wing-like.

PARISHIA, Hooker, f.

*Flowers* 4-, rarely 3-merous. *Stamens* 4, rarely 3. *Style* 3-cleft at the summit.

P. INSIGNIS, H. f. E.T.

Tenasserim and the Andamans.

\*\* *Leaves simple.*

× *Petals variously enlarged under the fruit.*

SWINTONIA, *Griffith.*

*Sepals* 5. *Stamens* 5. *Drupe* sessile and subtended by the wing-like petals.

× *Leaves opaque and glaucous beneath.*

S. SCHWENCKII, Teysm. and Binn. Tropical forests of Chittagong, Pegu Range, and Tenasserim.

Pedicels  $\frac{1}{2}$ –1 line long. Petals hardly a line long. Drupes oblong.

× × *Leaves one-coloured and glossy.*

S. GRIFFITHII, Kz.

Mergui.

Leaves greyish green, the nerves and net-venation conspicuous. Pedicels 3–5 lines long. Petals 2 lines long.

S. HELPERI, H. f.

Tenasserim.

As the above, but leaves dark-brown, the net-venation obsolete. Drupes obovoid.

MELANORRHOEA, *Wallich.*

*Calyx* spathaceous, 5-parted. *Stamens* numerous. *Drupe* stalked and subtended by the wing-like spreading petals.

Thyt-si (*generic*).

M. GLABRA, Wall.

Tenasserim South of Tavoy.

Leaves glabrous. Panicles usually minutely puberulous. Fruit-stalk nearly  $1\frac{1}{2}$  inch long, slender.

M. USITATA, Wall.

Ava. Pegu Range. Tenasserim up to 3000 feet.

Leaves beneath and panicles pubescent or villous. Fruit-stalk short and thick.

Mason writes: "The celebrated black-varnish tree is cultivated in the Tenasserim Provinces, but I never saw it growing there spontaneously. In Tonng-ngoo, however, it is so abundant in the forests, that in some of the Christian villages, the posts of the chapels are exclusively of this tree, and it makes very fine timber, the *lignum vite* of Pegu. The varnish, says Major Berdmore, mixed with the ashes of bones, is used as a paste for sticking glass on boxes and images. Native doctors also use it as a vermifuge for children, the dose being a quarter of a tickal of varnish to half a tickal of jaggery" (coarse sugar).

The term *lignum vite* is not a happy one, as it is of no extraordinary hardness, and in appearance the wood, when polished, closely resembles Mahogany. Its weight is 54 lbs. The 'varnish,' or sappy exudation, is a thick yellowish clay-coloured fluid, which flows from incisions in the bark, and turns a brilliant black on drying. Natives dread cutting the live tree, owing to the irritating quality of the sap which spurts out under the axe. The timber would, I think, become a favourite one in Europe if introduced into the market, and the tree deserves propagation in localities suited to it. It abounds in Martaban.

× × *Petals not enlarging after flowering.*

+ *Calyx-tube much enlarging and becoming fleshy, either bearing the superior nut or more or less inclosing the same and forming an inferior drupe.*

† *Nut more or less inclosed in the fleshy calyx. Ovary inferior.*

DRIMYCARPUS, *Hooker, f.*

*Petals* imbricate in bud. *Stamens* 5. *Style* 1, with a capitate stigma.

D. RACEMOSUS, Roxb.

Chittagong and Eastern Slopes of Pegu Range.

The genus hardly differs from *Nothopegia*, except in the free ovary and in the attachment of the ovules, and stands much in the same relationship to it as *Holigarna albicans* does to *Semecarpus* (Kurz).

HOLIGARNA, *Hamilton*.

*Petals* valvate in bud. *Stamens* 5. *Styles* 3. *Disk* annular or obsolete. *Petiole* furnished with 2-4 tubercles or barb-like excrescences.

H. HELFERI, Hook. *E.T.*

Pegu Range and Tenasserim.

*H. longifolia*, H. f. non Roxb.

*Semecarpus Grahamii*, Wight (apud Kz.).

Leaves glabrous or rarely pubescent beneath. Nut entirely inclosed in the obliquely ellipsoid or elliptical perfectly glabrous calyx of an inch length.

Wood heavy, brown, but perishable and apt to be 'wormed.' The tree yields a black varnish.

H. (*SEMECARPUS*) *LONGIFOLIA*, Roxb., is quoted by Mason (probably for the last species), but not mentioned by Kurz.

SEMECARPUS, *Linnaeus*.

*Petals* imbricate or valvate in the bud. *Stamens* 5. *Styles* 3. *Disk* rather broadly annular. *Petiole* without excrescences.

A. Nut adnate to the endocarp, barely exserted. Ovary superior.

S. ALBESCENS, Kz. *E.T.*

Tropical forests of Pegu and Tenasserim.

*Holigarna albicans*, H. f.

Leaves glabrous or pubescent and whitish beneath. Nut velvety, the hypocarp sappy, veined, and puberulous. Exudes a black varnish.

B. Nut seated on the endocarp.

\* Ovary tomentose or pubescent.

× *Hypocarp* (enlarged base of the calyx) as large or nearly as large as the nut.

S. ANACARDIUM, L.

Chittagong.

*S. cuneifolia*, Roxb.

Leaves coriaceous, blunt, densely pubescent or tomentose, and strongly net-veined beneath. Nut not or scarcely oblique. Yields a bright gum.

S. PANDURATUS, Kz.

Chittagong, Pegu, and Martaban up to 2000 feet.

*S. cuneifolia*, Kz. (non Roxb.).

Chē-ben.

Leaves (full-grown) chartaceous, sharply acuminate, softly pubescent beneath, the net-venation faint. Nut very oblique.

The nuts of this and the last, and perhaps other species, yield an indelible marking ink, hence called 'Dhobie' nuts in India.

"I formerly identified this species with Roxburgh's *S. cuneifolia*, but Hooker reduces this to *S. anacardium*, and, I think, correctly so, as it is a tree of Hindustan" (Kurz).

× × *Hypocarp* very small.

S. HETEROPHYLLUS, Bl. *E.T.*

Beach forests of the Andamans, Katchall and Car Nicobar.

Leaves coriaceous, acuminate, quite glabrous or pubescent, and very glaucous beneath, the net-venation strong. Nut very oblique,  $1\frac{1}{2}$ -1 inch across.

Like *S. albescens*, but has flowers more than twice as large, and very stout panicles (Kurz).

\*\* Ovary quite glabrous.

S. SUBPANDURIFORMIS, Wall.

Chittagong and Arakan.

Leaves chartaceous, acuminate, glabrous. Panicles quite glabrous. Nut an inch broad.

S. SUBRACEMOSUS, Viz.

Prome.

A simple-stemmed shrub with a large subterranean trunk. Leaves chartaceous, minutely pubescent beneath and glabrescent. Panicles densely puberulous. Nut only 3-4 lines long.

The timber of this genus is worthless, being white and perishable, but the nuts are used for marking clothes by washermen, the colour being fixed by lime water. The nuts are also used as mordants. The acrid juice of the nut and an oil prepared from it are used externally by natives to alleviate rheumatic pains, by rubbing in over the part affected.

## ANACARDIUM, Roxburgh.

*Petals* imbricate in bud. *Stamens* 8 to 10, all or few of them anther-bearing. *Style* filiform. *Torus* stalk-like.

A. OCCIDENTALE, L. E.T.

Beach forests of Chittagong, Tenasserim  
and the Andamans.

Thi-hō-thayet. Cashew nut-tree.

Nut kidney-shaped, seated on a fleshy glabrous orange-coloured edible *hypocarp* of the size of a small pear. The bark exudes an astringent pellucid gum, and by incision, a juice which forms an indelible ink. The *pericarp* of the nuts yields an acrid, vesicating oil, and the nuts themselves by expression a bland edible one. When roasted, the nuts are excellent.

++ *Calyx* unchanged in fruit. *Ovules* pendulous from a basal funicle.

## BUCHANANIA, Roxburgh.

*Calyx* 3-5-toothed. *Stamens* 10. *Carpels* 5 or 6, of which one only fertile. *Styles* as many, short.

\* *Leaves* and *panicles* tomentose or pubescent.

2 *Leaves* tomentose or pubescent on both sides, large.

B. LATIFOLIA, Roxb.

All over Burma.

Lên-lwôn. Lôn-bo (Kurz).

Panicles stout and stiff. Flowers 2 lines across, sessile and crowded. The seeds are good eating, especially when roasted, also the fresh fruit.

B. LAXIFLORA, Kz.

Martaban and Pegu.

Panicles slender, grey pubescent. Flowers barely a line in diameter, pedicelled.

\*\* *Leaves* glabrous and more or less glossy, usually fuscous in drying.

× *Panicles* rusty puberulous.

B. GLABRA, Wall.

Maulmain.

Petiole  $\frac{1}{2}$  inch long. Flowers a line across. Flowers shortly pedicelled, crowded.

×× *Panicles* quite glabrous. *Flowers* pedicelled.

B. ARBORESCENS, Bl. E.T.

Tenasserim.

*B. lucida*, Bl.*B. petiolaris* and *B. Bancana*, Miq.*B. subobovata*, Griff.*B. laxiflora*, Kz. J.A.S.B. ii. 1872. p. 30 f.

Leaves equally decurrent at the base. Pedicels very slender. Petals a line long, reflexed. Panicles longer than the leaves.

B. ACUMINATA, Wall. E.T.

Andamans and Tenasserim.

Leaves equally decurrent at the base. Pedicels short and stout. Petals 2-3 lines long, erect. Panicles as long as or longer than the leaves.

*B. LANCEFOLIA*, Roxb. *E.T.*

Chittagong. Andamans.

Leaves very unequally decurrent at the base, large. Pedicels very slender. Petals a line long, reflexed. Panicles crowded, shorter than the leaves.

Kurz adds from the Nicobars:

*B. PLATYNEURA*, Kz.

Kamorta.

*GLUTA*, *Linnaeus*.

*Calyx* spathaceous. *Stamens* inserted on the stalk-like torus. *Style* filiform.

*G. TAVOYANA*, Wall. *E.T.*

Tenasserim, south of Tavoy.

*Syndesmis Tavojana*, Wall.

Thayet-thytsi (Kurz). Chē (Mason).

Leaves coriaceous, the petiole not above 6 lines long, stout and marginate. Panicles and calyx puberulous.

I fear nothing but a variety of Linné's *G. Renghas* (Kurz).

*G. ELEGANS*, Kz. *E.T.*

Coasts of Tenasserim.

Leaves chartaceous, the petiole long and slender, not or only at the apex marginate. Panicles and flowers perfectly glabrous.

*G. LONGIPETIOLATA*, Kz.

Andamans.

A tree common on the shores of the Andamans, with large green long-petioled leaves unlike those of any other species. Flowers and fruits unknown.

*Gluta* (*Syndesmis*) yields good timber, equalling mahogany in appearance. Dr. Mason remarks: "Tavoy red-wood makes handsome furniture, and is used in Tavoy for the same purposes to which guano-wood<sup>1</sup> is applied at Maulmain. When the wood is steeped in ferruginous mud, it turns jet-black, and looks like ebony. The large cylinder knobs, one or two inches in diameter, so often noticed in the ears of Karen women at Tavoy, are made of this wood after the colour has been changed." It seems strange if the word 'chē,' which in Pegu undoubtedly applies to a white wood (*Semecarpus*), is in Tavoy applied to a red wood like *Gluta*; if so, it is a striking example of the confusion that may result by trusting to vernacular names. The timber (*Gluta Tavojana*) is of a fine red colour, works easily, and looks like a coarse mahogany. Its weight when fully seasoned is 52 lbs.

*BOUEA*, *Meisner*.

*Calyx* 3-5-parted, valvate in bud. *Stamens* 3-8, all anther-bearing. *Style* short. *Leaves* opposite.

\* *B. OPPOSITIFOLIA*, Roxb. *E.T.*

Tenasserim and the Andamans, and cultivated all over Burma.

May-an.

Panicles small, sessile or nearly so, quite glabrous. Petals  $\frac{1}{2}$  line long. Drupes orange or orange yellow. Dr. Mason says: "There are two varieties, one bearing an intensely sour fruit, and the other one as insipidly sweet."

*B. BURMANICA*, Griff. *E.T.*

Thoungyeen Valley.

*B. Brandisiana*, Kz.

Panicles large, long-peduncled, puberulous. Petals a line long or longer. Drupes bluish-black.

*MANGIFERA*, *Linnaeus*.

*Calyx* 4-5-parted. *Petals* 4-5, the nerve usually thickened. *Anther-bearing stamens* 1-5. *Style* filiform. *Leaves* alternate.

\* *Petals* and *stamens* free, the former inserted at the base of the cushion-like or cupular disk.

× *Panicles* and *calyx* more or less puberulous or pubescent, rarely almost glabrous. *Fertile stamen* 1.

<sup>1</sup> Pterocarpus.

*M. LONGIPES*, Griff. *E.T.*

Swamp forests in Pegu and Tenasserim.

Thayet-thyt-ni (Kurz).

Panicles and the 3-6 lines long pedicels very slender, glabrescent or almost glabrous. Petals linear-subulate. The lateral nerves very thin.

\* *M. INDICA*, L. *E.T.*

All over Burma and the Andamans,  
also cultivated.

Thayet.

Panicles stout. Pedicels short and thick. Petals yellow, streaked red, hardly 2 lines long. Disk fleshy, 5-lobed. Drupes obtuse, 3-4 inches long.

Wood coarse, pale-coloured, and said to decay under exposure to wet, but strong and very useful for common purposes. It is said to hold a nail more firmly than any other. The darker heartwood of old trees sometimes yields selected planks of some excellence. The fruit of the mango is, all over the East Indies, what the apple is in Europe.

*M. CALONEURA*, Kz. *E.T.*

Pegu Range.

Panicles stout. Petals hardly 2 lines long. Disk 5-lobed. Drupes 1-2 inches long, blunt. Net venation minute and strongly prominent on both sides.

× × *Panicles and calyx perfectly glabrous.*

*M. SYLVATICA*, Roxb. *E.T.*

T. forests of Martaban, where rare.

Hseng-neng-thayet (Kurz).

Panicles stout. Pedicels 3-4 lines long, thick. Petals white, about 3 lines long. Disk cup-shaped. Drupes acuminate.

\*\* *Petals and stamens connate with the base of the stalk-like torus, rarely the latter wanting altogether.*

*M. FETIDA*, Lour. *E.T.*

Southern Tenasserim, cultivated (*vide* Mason).

La-môt (Kurz). Horse Mango (Mason).

Leaves coriaceous and shining, almost polished beneath. Flesh of drupe soapy.

Dr. Mason says, "This is a large mango cultivated at Mergui, and is quite a favourite with the natives. It has an odour resembling the 'dorian,' and, like that, has been introduced from the Straits."

#### SPONDIEÆ.

*Ovary 2-5-cell-d. Ovules pendulous. Leaves pinnate.*

*SPONDIAS*, *Linnaeus.*

*Flowers* polygamous. *Stamens* 8 or 10. *Styles* 4 or 5, free at the summit.

*S. MANGIFERA*, Willd.

All over Burma up to 3000 feet.

*S. pinnata*, Kz.

Gwē (Kurz).

There are two varieties of this, the one with leaflets and drupes as big as a duck's egg, the other with these parts only half the size, but differing in no other respects. Wood worthless (Kurz).

*DRACONTOMELUM*, *Blume.*

*Flowers* hermaphrodite. *Stamens* 10. *Styles* 5, thick, connate at their summits, and resembling ovaries.

*D. MANGIFERUM*, Bl.

T. forests of the Andamans.

*D. sylvestre*, Bl.

*D. pulcrum*, Miq.

This Order yields some useful timbers, fruits, fragrant gums and varnishes. Foremost among the fruits stands the Mango, *Mangifera Indica*, which in the East takes the part of the apple in Europe, as a fruit in universal use and esteem. The

Pistachio-nut, *Pistachio vera*, is another fruit widely cultivated, but the native country of which is unknown, and the Cashew-nut, *Anacardium occidentale*. Mastic, a resin much used to sweeten the breath, is produced by several trees of the Order, and others yield astringent barks used in tanning. A fine black varnish is yielded by *Melanorrhwa* and *Holigurna longifolia*.

#### Order SABIACEÆ.

*Flowers* hermaphrodite or polygamously diœcious. *Calyx* 4-5-parted, imbricate. *Petals* 4-5, equal or unequal, alternating with or opposite to the sepals, imbricate. *Stamens* 4-5, opposite the petals, inserted at the base of the small disk, or on the torus, free or cohering with the petals, usually 2 only perfect, the others reduced to scales, rarely all fertile. *Anthers* didymous, the cells opening by a transverse slit or deciduous hood. *Ovary* 2-3-celled, with 1-2 horizontal or suspended ovules in each cell. *Styles* cohering, or the stigmas sessile. *Ripe carpels* 1-2, drupaceous or dry, indehiscent, compressed-kidney-shaped or almost globular, the endocarp crustaceous or bony, 1-seeded. *Albumen* none or scanty. *Cotyledons* much folded. *Radicls* inferior. *Stipules* none. Shrubs or trees, rarely climbers, with alternate, simple or pinnate leaves. *Flowers* usually minute.

#### SABIA, Colebrooke.

*Stamens* 4-5, all perfect. *Ovary* 2-3-lobed. *Drapes* usually compressed.

\* *Glabrous*. *Flowers* panicle.

S. LIMONIACEA, Wall. S.S.

Chittagong.

Flowers about a line across, the pedicels short and thick. Leaves coriaceous.

S. VIRIDISSIMA, Kz.

Tropical forests of South Andaman.

Flowers nearly 4 lines in diameter, the pedicels capillary and long. Leaves membranous.

Maout and Decaisne observe: "*Sabia* is very remarkable for the opposition of its bracts, sepals, petals, stamens, and ovarian carpels, which is perhaps unique in the vegetable kingdom." The snake-nut (*Ophiocaryon*) belongs to this Order, and is so-called from the coiled embryo, resembling a snake coiled up in the nut.

#### MELIOSMA, Blume.

*Stamens* 5, very unequal. *Ovary* 2-3-celled. *Drapes* more or less globose.

M. SIMPLICIFOLIA, Bl. E.T.

Chittagong, Ava Hills, Tenasserim.

Sir J. Hooker says the wood is of excellent quality.

#### Order SAPINDACEÆ.

*Flowers* usually polygamous. *Sepals* 4-5, free or united, imbricate, or rarely valvate. *Petals* 4-5, rarely fewer, sometimes minute, or wanting, frequently bearing a basal scale inside. *Disk* various, sometimes unilateral, rarely wanting. *Stamens* 8, rarely fewer, or more, inserted round the ovary, within the disk or sometimes unilateral. *Anthers* erect, or versatile. *Ovary* entire, or lobed, 1-4- (usually 3-) celled, with 1-2, rarely more, ascending, or rarely almost horizontal ovules in each cell. *Style* simple, or more or less divided. *Fruit* dry, or succulent, dehiscent, or indehiscent, entire, or separating into lobes, or cocci. *Seeds* with or without an arillus.

The majority of *Sapindaceæ* are readily recognized by having the disk outside, not inside the stamens, and by the 8 stamens in a 5-merous flower with a 3-merous ovary.

A. Seeds with albumen. Stipules present.

#### STAPHYLIEÆ.

*Flowers* regular. *Stamens* inserted outside the disk. *Leaves* opposite.

#### TURPINIA, Ventenat.

*Ovary* 3-celled. *Fruit* entire, indehiscent. *Leaves* pinnate, or rarely simple.

*T. POMIFERA*, DC. *E.T.*  
*T. sphaerocarpa*, Hassk.

Tropical forests of Chittagong, Pegu,  
 and Martaban.

Htonk-shā-mā (Kurz).

Leaves apiculate to abruptly acuminate. Flowers about 2 lines across. Fruits the size of a cherry, fleshy. Wood heavy, close-grained, but soon wormed (Kurz).

*T. NEPALENSIS*, Wall. *E.T.* var.  $\beta$  frequent in the drier hill-forests and the  
*Xanthoxylon montanum*, Bl. pine-forests of Martaban, at 3000 to 7200  
 feet elevation.

Donk-ya-mā (Kurz).

var. *a genuina*. Panicles very slender and lax, as long as or longer than the leaves, the ultimate branchings almost filiform.

var.  $\beta$  *Nepalensis*, Wall. Panicles shorter and more compact, stiff.

**B.** Seeds without albumen. Stipules none.

*a. Stamens inserted outside or on the disk. Flowers regular.*

#### DODONIEÆ.

*Stamens inserted outside the disk. Capsule septicidally dehiscent. Leaves alternate.*

DODONÆA, *Linnaeus*.

*Sepals* valvate. *Petals* none. *Ovules* by pairs. *Leaves* usually simple.

*D. VISCOSA*, L. *S.*

Sandy beaches of Tenasserim, from  
 Amherst to Mergui; also Anda-  
 mans, Narcondam Island.

*D. angustifolia*, L.

*D. dioica*, Roxb.

*D. Burmanniana*, DC.

*D. pentandra*, Griff.

The younger shoots and leaves sticky. Leaves almost entire, with the margins often revolute, coriaceous.

#### ACERINIEÆ.

*Stamens inserted on the disk. Samaras indehiscent. Leaves opposite.*

ACER, *Linnaeus*.

*Disk* annular. *Samaras* 2. *Leaves* simple or palmately lobed.

× *Leaves* simple, not lobed, with 3 basal nerves.

*A. NIVEUM*, Bl. *E.T.*

Ava, Hookhoom Valley, and Nāt-toung  
 in Martaban 4000 to 7000 feet.

*A. laurinum*, Hassk.

Leaves usually whitish beneath, the petiole 1-2 inches long. Cymes glabrous, branchlets blackish.

*A. LEVIGATUM*, Wall. *T.*

Upper Tenasserim.

Leaves one-coloured, the petiole 3-6 lines long. Cymes paniced, glabrous. Branchlets pale brown.

× × *Leaves* 3-lobed and 3-nerved.

*A. ISOLOBUM*, Kz.

Martaban 5000 to 7000 feet.

Leaves 5-6 inches long and broad, rounded at the base, and long-petioled, 3-lobed, lobes spreading, pointed, smooth on both sides, 3-nerved and reticulate. A large and smooth tree. Flowers and fruit unknown.

*b. Stamens inserted inside the disk, sometimes unilateral.*

#### SAPINDIEÆ.

*Leaves* alternate, or rarely (in *Æsculus*) opposite. *Flowers* regular or irregular.

\* *Fruit indehiscent, drupaceous, fleshy or rarely corticate or crustaceous.*

× *Fruit entire, 1-4-celled.*

° *No petals. Flowers polygamously dioecious.*

SCHLEICHERA, Willdenow.

*Calyx* small, valvate or nearly so. *Disk* unilateral. *Seeds* arillate. *Leaves* abruptly pinnate.

S. TRIJUGA, Willd.

Common in leaf-shedding forests from Ava to  
Tenasserim.

Jio.

Dr. Mason remarks: "The fruit of this tree resembles the wild 'rambutan' (*Nephelium lappaceum*) in everything except that is covered with prickles half an inch long. It is rarely seen in the market, but would be a valuable addition to the dessert. The tree grows among the hills of Tavoy."

The wood is a pale lively brown, very handsome, hard, close-grained and tough, weighing 68 lbs., and is a most valuable one, being both useful for strength, and commendable when polished for beauty (W.T.).

°° *Petals present, furnished with scales. Flowers polygamously monocious.*

LEPISANTHES, Blume.

*Flowers* regular. *Disk* regularly annular. *Leaves* pinnate.

L. MONTANA, Bl.

Tavoy.

L. *Browniana*, Hiern.

Leaves quite glabrous, not stiff. Racemes short and dense, clustered to almost solitary, axillary. Pedicels robust,  $\frac{1}{2}$  line long. Petals inside and scale glabrous.

L. BURMANICA, Kz.

Tenasserim.

L. *montana*, Hiern. non Bl.

A small palm-like tree. Leaves large and stiff. Leaflets slightly puberulous on the midrib beneath, rigid. Racemes in larger or smaller axillary panicles. Pedicels capillary,  $1\frac{1}{2}$ -2 lines long.

"Leaves very similar to those of *L. sessiliflora*, Bl. I fear that I am to a certain degree to blame for Hiern's misidentification of the plant, in having referred Brandis' specimens, as also my own, to Blume's *L. montana*, under which name I also put it down in my preliminary Report on the Pegu forests. It was hardly possible to avoid such mismatchings in a Report which was drawn up in less than fifteen months, in which period more than 1000 species had to be named, and keys furnished for the discrimination of the species" (Kurz).

HEMIGYROSA, Blume.

*Flowers* irregular. *Disk* unilateral, cushion-like. *Leaves* pinnate.

H. CANESCENS, Roxb.

Tenasserim.

Fruit fleshy, 3-gonously ovoid, the size of a bullet, densely greyish velvety.

× × *Fruit divided deeply or to the base into 3-2 lobes, the lobes often solitary by abortion.*

° *Flowers irregular. Arillus none.*

† *Leaves pinnate. Trees.*

DITTELASMA, Hooker, f.

*Fruit* deeply 1-3-lobed, the lobes drupaceous, globose. *Testa* bony. *Embryo* curved. *Disk* half crescent-shaped.

D. KARAK, DC. *E.T.*

Pegu Range and Tenasserim.

*Sapindus polyphyllus*, Roxb.

## PANCOVIA, Willdenow (ERIOGLOSSUM, Bl.).

*Fruit* to the base 1-3-lobed, the lobes oblong. *Testa* membranous. *Embryo* straight. *Disk* unilateral.

P. RUBIGINOSA, Roxb. E.T.

Tropical forests of Pegu, Tenasserim,  
and the Andamans.

*E. edule*, Bl.

Tseik-chē. 'Goats' dung.'

Wood white, with pinkish-brown heartwood. Strong and durable. It receives its native name from the wood presenting, when sawn into planks, small round black spots like segments of currants or goats' dung. These seem to be sections of imbedded woody thorns.

†† *Leaves* 3-1-foliate. *Shrubs* or *small trees*.

ALLOPHYLLUS,<sup>1</sup> Linnaus.

*Flowers* irregular with the place of the 5th petal empty. *Sepals* orbicular. *Petals* with scales. *Fruit-lobes* fleshy or sappy. *Racemes* simple or compound.

× *Rachis* of *racemes* more or less pubescent or villous.

A. SERRATUS, DC.

Coast forests from Chittagong to Tenasserim.

*Schmidelia villosa*, Wight.

All softer parts and leaves pubescent or villous-pubescent. Bractlets minute. Berries the size of a pepper-corn.

A. APORETICUS, Roxb.

Arakan up to 1200 feet.

Rather glabrous, the nerves of the leaves villous above. Racemes recurved, the bractlets linear-subulate, as long as or longer than the pedicels. Berries the size of a pea.

A. LITTORALIS, Bl.

Chittagong, Tenasserim, the Andamans and Nicobars.

This species is placed first by Kurz in his enumeration of the species, though in his initial conspectus or key that position is occupied by *A. racemosus*, which species is not again alluded to. Are we to understand that the two are identical?

Hiern makes 2 species of Indian *Allophylli*, viz., those with 1- and those with 3-foliate leaves, but this character falls to the ground, inasmuch as his *A. Zeylanicus*, var. *grandifolia* (= *Schmidelia chartacea*, Kurz, in Journ. As. Soc. Beng. 1871, 183), has sometimes 1- and 3-foliate leaves on the same branch. I have not been able as yet to study this genus; but I have little doubt but that Hiern's eminently practical conclusions will not stand a scientific test (Kurz).

♂♀ *Flowers* regular.

† *Seeds* without arillus.

## SAPINDUS, Plumier.

*Fruit-lobes* deeply or to the base separated, by 2-3 or often solitary by abortion, the pericarp crustaceous or coriaceous, smooth. *Testa* crustaceous or membranous.

× *Leaves* pubescent. *Leaves* unpaired-pinnate.

S. TOMENTOSUS, Kz.

Khakyen Hills.

All softer parts pubescent. Leaflets in 3-4 pairs with an odd one.

×× *All parts* glabrous.

× *Leaves* simple.

S. DANURA, Roxb.

Tidal forests of Pegu, Tenasserim, the  
Andamans and Kondul.

*Euphoria verticillata*, Lindl. non Roxb.

<sup>1</sup> The probable etymology of this word would seem to point to its being spelt *allo-phyllus*, from *φύλλον*, rather than *allophytus*.

Leaves cordate at the narrowed base, the petiole very short and thick. Anthers yellow. Petals emarginate. The scale double, woolly. Fruit-lobes the size of a pea.

In this species abnormal leaves are often observed of a semipinnate and even perfectly pinnate shape. Roxburgh's *Scytalia verticillata* is in my opinion a different plant (Kurz).

*S. RUBER*, Roxb. *E.S.*

Chittagong.

*S. attenuatus*, Wall.

Leaves abruptly pinnate, glabrous.

° ° *Leaves 2-foliolate.*

*S. MICROCARPUS*, Kz.

Siamese Province of Kanboree and probably Upper Tenasserim.

Petiole only about 2 lines long. Leaflets oblong, about 2 inches long, sessile. Panicles very slender. Fruit-lobes didymous,  $1\frac{1}{2}$ –2 lines long.

Kurz also records from the Nicobars:

*S. MONTANUS*, Bl.

Kamorta and Nankowry.

#### *XEROSPERUM*, Blume.

*Fruit-lobes* separated to the base, by pairs or solitary, the pericarp crustaceous, tubercled. *Testa* fleshy and pilose within, resembling an arillus.

*X. NORONHIANUM*, Bl.

Tenasserim.

Mr. Hiern confounds two generically different plants, viz., the true Malayan plant and *Sapindus glabratus*, Wall., from Sylhet and the Khasi hills (Kurz).

† † *Seeds truly arillate.*

#### *NEPHELIUM*, Linnæus.

*Fruit-lobes* 1–3, separated to the base, the pericarp coriaceous to crustaceous, smooth or tubercled, muricate, and echinate. *Seeds* enveloped by the arillus.

\* *Petals none. Calyx toothed.*

° *Fruits covered with soft fleshy subulate or angular-conical prickles.*

*N. GRIFFITHIANUM*, Kz.

Khakyen Hills.

Kyet-mouk (generie).

Glabrous. Leaflets glaucous or whitish beneath. Prickles of the fruit fleshy, long, conically angular, truncate, glabrous.

Hiern identifies the above species with *N. mutabile*, Bl., a species which is distinguished at once by its irregularly tubercled fruit-lobes (hence Blume formerly confounded it with *Euphoria longana*). His description seems to have been drawn up from specimens belonging to two or three different species, but chiefly to *N. chrysseum*, Bl. (Kurz).

*N. LAPPACEUM*, L.

Upper Tenasserim.

*Scytalia rampoutan*, Roxb.

Leaflets more coriaceous, pale-coloured beneath or almost 1-coloured. Fruits and prickles as in preceding, but quite glabrous.

° ° *Fruits tubercled.*

\* *N. (SCYTALIA) LITCHI*, Roxb.

Chittagong (cultivated).

Leaflets very coriaceous, small, the net-venation quite obsolete, the nerves thin and faint. Fruit-lobes ellipsoid-oblong, the size of a prune; tessellate.

A favourite fruit with Europeans, the fleshy layer enveloping the seeds being very refreshing and juicy. Mason says the tree will not thrive in Burma.

\*\* *Petals present. Calyx cleft to  $\frac{1}{2}$  or to near the base.*

N. RUBESCENS, Hiern.

Tenasserim.

Leaflets firmly coriaceous, glaucescent beneath, in drying fuscous, the lateral nerves thin and slightly prominent. Fruit-lobes oblong, shortly mucronate, the mucron about a line long, sharp.

\* N. HYPOLEUCUM, Kz.

Tropical forests on Eastern Slopes of Pegu Range and cultivated.

Leaflets thin coriaceous, more or less glaucescent beneath, the numerous (14-20) lateral nerves strongly prominent beneath. Fruit-lobes ovoid-oblong, the size of a plum, perfectly glabrous, strongly tubercled, as in *N. litchi*, but not tessellate.

\* N. (EUPHORIA) LONGANA, Lamk.

Tropical forests on Eastern Slopes of Pegu Range, and cultivated.

As preceding, but leaflets usually smaller. Fruit-lobes globose, the size of a small cherry, obsolete tubercled or almost smooth, minutely tawny-velvety all over.

#### POMETIA, Forster.

Fruit-lobes 1-3, separated to the base, the pericarp corticate, smooth. Seeds arillate at the lower end. Hardly different from *Nephelium*.

P. TOMENTOSA, Bth. and H. f. Tropical forests of the Andamans and Katchall. *Eccremanthus eximius*, Thw.

Distinguishable at once from *P. pinnata*, Forst., by its small and very differently shaped fruits (Kurz).

\*\* *Fruit a dry dehiscent capsule, the valves from woody to coriaceous and membranous.*

○ *Ovules solitary in each cell.*

× *Trees or shrubs. Leaves pinnate. Capsule coriaceous or woody. Flowers regular.*

† *Petals cucullate, or the blade shorter than the cucullate scale.*

#### PARANEPHELIUM, Miquel.

*Petals* broadly trigonous, smaller than the cucullate scales. *Style* long. *Capsule* 3-valved, woody, tubercled or mucronate. *Leaves* pinnate, the end-leaflets ternate.

P. XESTOPHYLLUM, Miquel.

Tenasserim (Maulmain district).

In HBC. are some leaves from the Khakyen Hills which apparently represent a second Burmese species of this genus, if they should not be identical with Hiern's *Scyphopetalum*, the description of which is too imperfect to enable one to recognize the plant intended. They have the 3 end-leaflets similarly ternate, and in texture and nervature are almost the same as above (Kurz).

#### SCYPHOPETALUM, Hiern.

*Style* obsolete. *Petals* cucullate, without scale.

S. RAMIFLORUM, Hiern.

Ava, Hill-forests of Hookhoom Valley (Griff.).

I have not seen this plant, and place it near *Paranephelium* simply by guess. The petals are differently described and the style is said to be obsolete,—characters which would keep it distinct from Miquel's genus.

†† *Petals flat or nearly so, longer than the scale if present, or the petals minute or wanting altogether.*

#### CITANIA, Linnaeus.

*Calyx* cup-shaped or the sepals distinct. *Capsule* 3-quetrous or didymous.

Sub-genus EU-CITANIA.

*Capsules* clavate-pyriform, conspicuously 3-lobed or angular, coriaceous.

\* *Petals present, furnished with a double scale.*

× *Leaves and panicles glabrous.*

*C. GRIFFITHIANA*, Kz.

Tenasserim.

*C. pleuropteris*, Hiern.

Leaflets opaque, glaucescent beneath, nerves thin. Rachis narrowly winged upwards.

Hiern's *C. pallidula* (Maingay, 442; Griff. 982) is *C. pleuropteris*, Bl. (Kurz).

*C. GLABRATUS*, Wall.

Tropical forests of Eastern Slopes of  
Pegu Range and Martaban.

Leaflets glossy, 1-coloured, strongly nerved and net-veined. Rachis terete.

I do not know what Hiern describes under the above name, but generally, I think, he has my plant under view. *Sapindus squamosus*, Roxb., is *Cupania regularis*, Bl., differing from it (*Sapinduca* 4. Java, Horsfield Coll. is the typical form) in having the petiolules not incrassate (Kurz).

× × *Leaflets beneath and panicle shortly tawny pubescent.*

*C. FUSCICULA*, Kz.

Tenasserim.

Leaflets chartaceous, fuscous in drying, opaque.

\*\* *Petals none or minute, without scales.*

*C. LESSERTIANA*, Camb.

Tropical forests of Mergui and the Andamans.

Net-venation minute and obsolete. Filaments glabrous. Leaflets in 2 pairs.

*C. SUMATRANA*, Miq.

Tenasserim; rare in Pegu Range.

Net-venation strong and prominent on both sides. Filaments exerted, pubescent.

Leaflets not fuscous.

*C. HELPERI*, Hiern.

Tenasserim (or Andamans).

Net-venation thin but prominent. Filaments short, pubescent. Leaflets fuscous.

Sub-genus *ARYTERA*, Bl.

*Capsule* divided to nearly the base into 2 divergent lobes, coriaceous.

*C. ADENOPHYLLA*, Planch.

Tenasserim. Nankowry.

Leaflets chartaceous, reddish fuscous beneath, glabrous. Panicles tawny puberulous.

× × *Twining tendril-bearing under shrubs. Leaves twice ternately foliolate. Capsule bladderly-membranous, inflated. Flowers irregular.*

*CARDIOSPERMUM*, *Linnaeus*.

*Sepals* 4, the 2 outer ones small. *Petals* 4, with basal scales. *Disk* almost reduced to 2 round or linear glands opposite the lower smaller petals.

*C. HALICACABUM*, L.

All over Burma and the Nicobars.

Pubescent or glabrous. Leaflets often acuminate produced. Flowers 1-1½ line.

*C. CANESCENS*, Wall.

Ava.

Softly pubescent. Leaflets usually short and broad. Flowers 2-3 lines.

Kurz adds from the Nicobars:

*C. JACKIANA*, Hiern.

Katchall and Car Nicobar.

◊ ◊ *Ovules by 2 or more in each cell. Trees.*

× *Capsule membranous or chartaceous. Flowers regular, the sepals free. Leaves pinnate, alternate.*

*HARTFLIA*, *Roxburgh*.

*Petals* without scales, but sometimes with inflexed lobes at the base of the blade.

*Stigma* linear, often twisted. *Capsule* didymously 2-lobed, chartaceous, not winged. *Seeds* arillate.

*H. cyparioides*, Roxb.

Tropical forests of Chittagong and the Andamans.

*Streptostigma viridiflorum*, Thw.

*H. imbricata*, Thw.

ZOLLINGERIA, Kurz.

*Petals* with a woolly scale. *Stigma* 3-toothed. *Capsule* by thinning of the cell-walls often 1-celled, 3- or rarely 2-winged, chartaceous. *Seeds* without arillus.

*Z. macrocarpa*, Kz.

Prome District.

The genus is named in honour of the late H. Zollinger, the author of so many valuable botanical papers, which, owing to their being written in the Dutch language, remain almost unknown to the majority of botanists.

× × *Capsule* thick or fleshy-coriaceous. *Flowers* irregular, the calyx tubular or bell-shaped. *Leaves* digitate, opposite.

ÆSCULUS, Linnaeus.

*Flowers* rather showy. *Stigma* simple.

Æ. ASSAMICA, Griff.

Upper Tenasserim.

The Order *Sapindaceæ*, or Soap-worts, is so named from the fruit of *Sapindus* frothing with warm water, and being considered a stronger detergent than a similar quantity of soap. Foremost among its useful products may be reckoned the Litchi (*Nephelium litchi*), the Longan (*N. longanum*), and the Rambutan (*N. lappaceum*), all delicious and wholesome fruits of China and the Malay countries. Other edible fruits also are yielded by this Order, of less note. A few species yield valuable timber, as the South African *Pterocylon utile* and *Hippodromus alata*, and the Jio of Burma (*Schleichera trijuga*); while coarse strong timber is afforded by *Poncovia rubiginosa* and several other species. Narcotic and poisonous qualities prevail in some species, and *Serjania lethalis* is said to afford the Lechenquana bee a poisonous honey which causes madness, and even death, while *Paullinia curaru* yields the arrow poison *curaru*, used by the natives of Guiana. *P. pinnata* too is used to stupify fish. Another species, however (*P. sorbilis*), contains in its seeds a valuable bitter principle named *Guarana*, and the powdered seeds are used by the Brazilians to make a refreshing and febrifuge drink.

## CELASTRALES.

*Flowers* hermaphrodite, regular. *Corolla* hypogynous or perigynous. *Disk* tumid, adnate to the base of the calyx-tube or lining it. *Stamens* as many as the petals or fewer, rarely twice as many, perigynous, or inserted outside the disk, or on its edge. *Ovary* usually entire. *Ovules* one or two on each cell, erect, raphe ventral. *Leaves* undivided, except in *Ampelides* and *Staphyleæ*.

## Order AMPELIDÆÆ.

*Flowers* regular, hermaphrodite or unisexual. *Calyx* entire, or 4-5-toothed. *Petals* 4-5, free, or cohering, valvate. *Stamens* 4-5, opposite to the petals, inserted outside of the disk. *Disk* free, or adnate to the ovary. *Ovary* more or less perfectly 2-6-celled, with 1-2 erect ovules in each cell. *Fruit* a berry, the dissepiments frequently disappearing. *Seeds* 1-6. *Albumen* ruminant. *Leaves* alternate, or opposite, simple or compound, the petiole expanded in a membranous stipule. *Flowers* small, in leaf-opposed, or axillary inflorescences, never solitary or clustered.

VITIS, Linnaeus.

*Stamens* free. *Ovary* 2-celled, with 2 ovules in each cell. Tendril-bearing climbers. *Inflorescences* branched in the usual way, not dilated and confluent (*Vitis*).

§ Flowers in leaf-opposed or axillary true cymes. Flowers usually 4-merous (*Cissus*).

° Leaves compound, from simple and pedately 3-9 or more foliolate, to digitate, or if simple-leaved, jointed with the petiole (1-2-foliolate).

+ Leaves pedately or pinnately foliolate, very rarely spuriously digitate.

† Style short, spreadingly 4-lobed, or the 4-lobed or 4-cleft stigma sessile.

\* Style short, spreadingly 4-lobed at the apex. Flowers often unisexual.

V. TUBERCULATA, Laws.

Pegu (*fide* Lawson).

Leaves 3-foliolate. Berries  $1\frac{1}{2}$  inch in diameter. Seed obovoid, grooved on the back, the groove with a linear tubercle. Stem very warty.

Kurz suspects this may be a large-fruited 3-foliolate form of *V. lanceolaria*.

V. ASSIMILIS, Laws.

Hills East of Toung-ngoo 3000 to 4000 feet.

Flowers hermaphrodite. Leaves coriaceous, 3-foliolate, the leaflets very shortly petioluled.

V. OXYPHYLLA, Wall.

Tropical forests of Eastern Slopes of Pegu Range and Hills East of Toung-ngoo.

Flowers unisexual. Leaves sappy membranous, 3-foliolate to pedately 5-foliolate. Cymes short. Seeds oblong, smooth.

\*\* Stigma sessile, 4-lobed or cleft. Flowers often unisexual.

V. LANCEOLARIA, Wall.

Both varieties, but more so var.  $\beta$ , common in the Tropical forests of Tenasserim and the Andamans, and the Eastern slopes of the Pegu Yonā. Chittagong. Kamorta and Katchall.

*V. muricata*, W.A.

*Cissus lanceolaria*, Roxb.

Kyi-ni-nweh or Kyi-ehi-nweh.

Glabrous or the petioles and cymes often puberulous. Leaves pedate, or the upper ones often 3-foliolate, sappy coriaceous. Berries white, the size of a cherry or smaller. Seeds obovoid-oblong, rugulose, broadly and shallowly furrowed on the back.

var. *a lanceolaria*, Roxb. Cymes loose and ample, densely puberulous, the pedicels longer and slender. Petioles and petiolules puberulous.

var.  $\beta$  *tuberculata*, Bl. Cymes short and often somewhat compact, less puberulous or glabrous, the pedicels usually shorter and thicker. Petioles, etc., all glabrous. Berries and seeds usually smaller.

var. *a* is in my opinion the true Roxburghian plant, while var.  $\beta$  is Blume's *Cissus tuberculata* (Kurz).

V. SERRELATA, Wall.

Frequent along mountain-streams in Tropical forests of Martaban, up to 3000 feet. Khakyen Hills. Chittagong. var.  $\beta$  Khakyen Hills.

*Cissus capreolata*, Royle.

Glabrous. Leaves pedate, herbaceous-fleshy. Pedicels 2-3 lines long, umbellulate. Berries black, the size of a pea.

var. *a capreolata*. All parts quite glabrous.

var.  $\beta$  *subobtecta*. Branches and petioles rusty-pubescent, like those of *V. oblecta*, and forming a transition to it, the leaves partially becoming digitate.

V. OBTECTA, Wall.

Khakyen Hills.

Very much as the preceding, but young shoots and petioles rusty hirsute. Leaves spuriously digitate.

† † Style simple, entire.

\* Leaves all 3-foliolate.

V. SEMICORDATA, Wall.

var.  $\beta$  in the drier hill-forests of the Martaban hills, east of Toung-ngoo, at about 3000 feet.

*V. Himalayana*, Brand.

Glabrous. Cymes leaf-opposed, glabrous. Leaves glaucous beneath.

var. *a semicordata*, Wall. Young parts, inflorescence, leaflets beneath, shortly and sparingly hairy.

var. *β Himalayana*, Brand; *V. Neilgherrensis*, Wight; *Ampelopsis Himalayana*, Royle. All parts quite glabrous, leaflets glaucous beneath.

*V. TRIFOLIA*, L. In rubbishy spots, hedgerows, all over Burma, and forests, where it becomes a powerful climber.

All parts puberulous, rarely glabrous. Cymes axillary, puberulous.

var. *a genuina*. All parts shortly greyish pubescent.

var. *β glabrata*. All parts glabrous or nearly so. Katchall.

I follow Miquel in adopting Linné's oldest name, which is evidently given in allusion to the trefoil (*Trifolium*) (Kurz).

\* \* *Leaves pedate.*

× Cymes leaf-opposed and terminating an axillary leafy or leafless shoot.

*V. TEYSMANNI*, Miq.

Chittagong.

*V. mollis*, Wall.

All parts densely puberulous or pubescent.

*V. JAPONICA*, Thbg.

Pegu Range and Tenasserim, also

*Cissus leucocarpa*, Bl.

Taong-doung, Ava.

*V. cymosa*, Roxb.

All parts glabrous. Leaves sparingly pubescent along the nerves beneath.

× × Cymes truly axillary, long-peduncled.

*V. TENUFOLIA*, W. A.

Pegu Range and Arakan, also in bamboo forests in the Andamans.

Leaflets cuneate-obovate, rather blunt or acute, slightly pubescent along the nerves beneath. Seeds triangular with sharp margins, muricate on the back.

Possibly only a more luxuriant form of the preceding species, with more obtuse leaflets and truly axillary cymes (Kurz).

*V. PEDATA*, Wall.

var. *a* frequent in leaf-shedding forests and in hedges of the cultivated plains; var. *β* in tropical forests of the Andamans, Kamorta, and Nankowry.

All parts pubescent to almost glabrous. Leaflets finely acuminate. Seeds hemispherical, smooth.

var. *a genuina*. Leaves pedately foliolate, pubescent.

var. *β glabrata*. As preceding, but pretty glabrous.

+ + *Leaves truly digitate.*

*V. AURICULATA*, Wall.

Chittagong and Pegu Range.

Yin-noung-peing-nweh (Kurz).

All parts puberulous. Cymes axillary and terminal on axillary shoots. Leaflets 1½-2 inches long. Style simple.

*V. ERYTHROCLADA*, Kz.

Tropical forests of Kambalu Toung.

Wun-u-nweh or Myae-zu-nweh (Kurz).

Pegu Range, at 1000-2000. Also Taong-doung. Ava.

Leaves glabrous. Leaflets 4-6 inches long, fleshy herbaceous. Cymes puberulous. Berries globose, style simple, bark red.

Amongst the digitate species, this comes nearest to *V. saponaria*, Seem.

*V. (PANAX) MICRANTHUM*, Wall.

*V. campylocarpa*, Kurz.

Dioecious, remarkable for its minute flowers, and in this respect resembling *V. pubiflora*, Miq. (syn. *V. peduncularis*, Lawson). Lawson says that it has no tendrils, but in this he is mistaken. I believe it to be Roxburgh's *C. feminea*, but

not having seen the female flowers, I hesitate to pronounce its identity with that species. Lawson confidently reduces *C. feminea* to a synonym of *V. lanceolaria*, but the digitate leaves alone forbid a comparison with it (Kurz).

° ° *Leaves simple or very rarely (in V. Anomallayana) the uppermost ones 3-foliolate. Cymes leaf-opposite (except in V. Wallichii).*

× *Branches and branchlets cornered, sometimes almost winged and fleshy.*

*V. QUADRANGULARIS*, L.

Waste spots and dry forests in Ava and Prome.

Branchlets very fleshy, 4-cornered, jointed. Leaves small, fleshy, bluntish crenate. Cymes simple.

*V. PENTAGONA*, Voigt.

Chittagong. Arakan. Pegu Range. Andamans.

Branchlets bluntish 5-angular, thick and glossy. Leaves remotely bristly toothed, long-petioled.

*V. DISCOLOR*, Dalz.

var. *a* Tropical forests and bamboo-jungles of Arakan,

*Cissus velutinus*, Linden. Tenasserim, and the Andamans. var. *β* in the Martaban Hills, East of Toung-ngoo.

Branchlets sharply 6-cornered. Leaves bristly serrate, herbaceous. Cymes compound. Seeds obliquely obovate, transversely wrinkled on the faces.

var. *a discolor*. Leaves usually spotted, purplish beneath, on very long petioles (at least the lower ones). Cymes peduncled.

var. *β sessilis*, Miq. Cymes sessile and umbellately branched from the base.

*V. COSTATA*, Wall.

Arakan and Pegu.

As preceding. Leaves shorter petioled, while young appressed hairy on the nerves beneath. Seeds smooth, obovate.

× × *Branches and branchlets terete or nearly so.*

† *Cymes axillary. Branchlets angular?*

*V. (LEEAE) CORDATA*, Wall.

Near to *V. pallida*, W. A., but distinguished by its axillary cymes.

*V. WALLICHII*, Kz. (non DC).

Ava ('Mi-a-noung').

Leaves 3-lobed, glabrous, sappy membranous, large. Seeds globose, smooth.

†† *Cymes leaf-opposed.*

*V. (CISSUS) REPENS*, Lamk.

Tropical forests of Chittagong, Burma, the Andamans and Kamorta.

*V. glauca*, Roxb.

*Cissus Blumeana*, Stend.

*C. cerifera*, T. et B.

Branchlets terete, whitish pruinous. All parts glabrous. Seeds smooth.

*V. (CISSUS) ADNATA*, Roxb.

var. *a* rare in hill-toungyas of Martaban at 3000–4000 feet; var. *β* in all leaf-shedding forests and shrubberies, especially along choungs, all over Burma.

All parts, especially while young, rusty tomentose, more or less glabrescent. Leaves sharply acuminate, never lobed. Seeds obovate, shallowly lacunose.

var. *a glabrior*, Miq. All parts more glabrous, leaves only along the nerves beneath pubescent.

var. *β communis*. All parts more or less rusty tomentose. Leaves above glabrous or puberulous, beneath wholly or only along the nerves tomentose.

*V. (CISSUS) VITIGINEA*, L.

Mixed and open forests, shrubberies and grass

*V. Linnæi*, Kz. (non Wall.).

jungles, all over Burma; var. *riparia*, Wall., at

*V. repanda*, W. A.

Car Nicobar.

Yin-noung-nweh (Kurz).

All younger parts rusty tomentose or pubescent, glabrescent. Leaves large, often somewhat 3-lobed, bluntish acuminate, deciduous. Seeds obovate, smooth.

§ Inflorescence a modification of the tendrils, cymose-panicled, racemose, spiked, or the tendril-branches forming a panicle. Flowers 4- or more usually 5-merous.

\* Flowers pedicelled, in loose or contracted panicles.

† Seeds 2-4 lines long, shallowly grooved and radiately furrowed on the back.

× Glabrous or nearly so.

V. LATIFOLIA, Roxb. Frequent in the savannahs and village woods, but rare in the leaf-shedding forests, all over the Chin-douk-nweh-zouk (Kurz). Pegu plains, also Andamans in forests.

Cymose panicles ample, glabrous, with or without tendrils. Pedicels thick, nearly a line long. Leaves 3-5-lobed, the lobes usually acute.

× × All parts more or less woolly-tomentose.

V. BARBATA, Wall. Lower mixed forests of Ava, Martaban and Tenasserim; var.  $\beta$  Ava, Taong-doung.

Branchlets, peduncles and usually the petioles covered with a woolly tomentum intermixed with black spreading stiff hairs. Leaves almost glabrous.

var.  $\alpha$  *genuina*. Leaves thinly lanate beneath, black hairs numerous.

var.  $\beta$  *Jenkinsii*. Leaves entire or lobed, their under-surface as well as the stems densely tawny or rusty woolly-tomentose, black hairs very sparingly distributed.

V. TOMENTOSA, Heyne. Hills East of Toung-ngoo 3000 to 4000 feet.

Branchlets, etc. woolly, without black hairs. Leaves lobed to palmately lobed. Panicles tendril-bearing, short and rather compact. Pedicels very short and thick.

†† Seeds about a line long, furrowed on the back, almost smooth, glossy-black.

V. LANATA, Roxb. Chittagong. Ava. Tenasserim.

Branchlets, etc., woolly, without black hairs. Leaves tawny woolly beneath, slightly lobed. Panicles usually tendril-bearing, woolly, large and lax. Pedicels very slender,  $1\frac{1}{2}$  line long.

\*\* Flowers sessile, in spikes, the spikes forming elongate panicles.

V. HELIFER, Laws. Tenasserim.

Young parts thinly and fugaciously woolly. Leaves pedately 5-7-foliolate, glabrous except on the nerves beneath. Spikes in very slender panicles.

V. POLYSTACHYA, Laws. Tenasserim or Andamans (*sic* Lawson).

Quite glabrous. Leaves digitately foliolate, glaucous green. Spikes puberulous, forming  $1\frac{1}{2}$ -2-feet long stout panicles.

*Rachis of inflorescence leafy expanded and fleshy-membranous, the flowers sessile, unisexual (Pirisanthes).*

V. POLITA, Miq. Maulmain (*sic* Lobb).

Glabrous. Leaves simple. A very slender twiner.

Of the vine (*V. vinifera*, L.), Dr. Mason remarks: "The grape-vine may be seen in many of our gardens, but it very rarely produces fruit. I once saw a vine in Mergui, however, which had on it several fine bunches of grapes, and I have heard of grapes being occasionally brought to perfection in Maulmain."

*V. vinifera* is a native of Georgia and Mingrelia, and can be successfully cultivated<sup>1</sup> where the mean annual temperature does not fall below 66° Fahr. In the tropics the plant grows luxuriantly, but the fruit withers without ripening.

<sup>1</sup> For an account of the different sorts of grape usually met with in the Indian markets see Bell's *Highland and its People*, p. 287.

The vine is a plant whose origin, so far as its culture is concerned, dates from prehistoric times, and is one of those plants which shows in a marked degree the effect of cultivation, which fact was clearly enunciated by Virgil in his charming Second Georgic :

“ Sponte suâ quæ se tollunt in luminis oras,  
Infecunda quidem, sed læta et fortia surgunt ;  
Quippe solo natura subest. Tamen hæc quoque si quis  
Inserat, aut scrobibus mandet mutata subactis,  
Exuerint sylvestrem animum ; cultuque frequenti  
In quascunque voces artos, haud tarda sequentur.”

Georgic II. line 47.

This same contrast which exists between the cultivated and uncultivated vine has been very happily seized by another Roman poet as a symbol of the advantages of matrimony :

“ Ut vidua in nudo vitis quæ nascitur arvo  
Nunquam se extollit, nunquam mitem educat uvam,  
Sed tenerum prono deflectens pectore corpus  
Jam jam contingit summum radice flagellum,  
Hanc nulli agricolæ, nulli accolluere juvenci :  
At si forte eadem est ulmo conjuncta marito,  
Multi illam agricolæ, multi accolluere juvenci.”

Catullus, *Carm. Nup.* line 49.<sup>1</sup>

LEEA, *Linnaeus*.

*Stamens* and petals united with the disk. *Ovary* 3-6-celled, with a solitary ovule in each cell. Erect shrubs or trees, without tendrils.

× *Leaves ample, simple or rarely 3-foliolate.*

*L. MACROPHYLLA*, Roxb.

var.  $\beta$  frequent in the mixed forests, especially the upper ones, of Pegu and Martaban.

*L. simplicifolia*, Griff.

Kyā-bēt-gyi.

Leaves simple, large, very glaucous and shortly puberulous beneath. Lobes of the staminal tube entire. Shrubby.

var. *a genuina*. Leaves larger and somewhat lobed, and puberulous beneath.

var.  $\beta$  *oxyphylla*. Leaves ovate, acuminate, less glaucous beneath, glabrous.

*L. LATIFOLIA*, Wall.

Prome.

Leaves simple and pinnately 3-foliolate, hardly glaucescent, but minutely puberulous beneath. Lobes of the staminal tube notched. Shrubby.

× × *Leaves from simply pinnate to decompose.*

° *All parts (except the inflorescence in a few species) glabrous.*

† *Inflorescence with persistent and conspicuous bracts and bractlets.*

† † *Bracts and bractlets minute, usually already dropped before the flower-buds are properly developed.*

<sup>1</sup> So lies the solitary vine, prone in a naked field,  
Unfit to lift itself on high, or clustering grapes to yield,  
By its own weight bowed down to earth ; no comely youth or maid,  
No husbandman, delights to lie outstretched beneath its shade.  
But once, with some tall husband elm, effect its union gay ;  
And soon beneath its fruitful boughs will whispering lovers stray.

\* *Leaves coriaceous. Flowers greenish-white or green with a purplish hue.*

K. PARALLELA, Wall. var. *a* Ava. Irrawaddy Valley. var *β* frequent  
in the mixed forests and grass jungles of Pegu.

Leaves more or less glaucous, usually linear or lanceolate. Lobes of the staminal tube erect, notched. Seeds smooth and rounded on the back. Under-shrub.

var. *a genuina*. Leaves usually pinnate or occasionally bipinnate, leaflets oblong or oblong-lanceolate, more glaucous. Calyx-lobes rotundate.

var. *β angustifolia*, Laws. Leaves usually 2-3-pinnate, leaflets narrow-linear to linear, very acuminate, calyx-lobes in fruit obtuse, but not rotundate.

L. SAMBUCINA, Willd. Arakan, Pegu Range, Tenasserim, the Andamans,  
L. *staphylea*, Roxb. Katchall, Kamorta, and Nankowry.  
L. *ottilis*, DC.

Ka-let (Kurz).

Leaves dark-green, glossy. Lobes of staminal tube erect, notched. Seeds even and convex on the back. A tree.

"*Leea sambucina*, of the 'Flora of India' (not of authors), is a mélange of species, which Lawson explains, *more Kewensi*, by saying that there are transitional conditions so numerous that the species reduced by him cannot be maintained" (Kurz).

This is rather hard on Kew; but in all branches of natural science, both zoology and botany, it is a thankless task expunging shadowy species, but undoubtedly a meritorious one, since these shadowy species are the curse and opprobrium of science.

L. COMPACTIFLORA, Kz. Hills East of Toung-ngoo at 3000 feet.

Inflorescence with persistent and conspicuous bracts. Flowers sessile or nearly so.

L. GIGANTEA, Griff. Maulmain. Tavoy.

Leaves dark-green, glossy. Lobes of staminal tube reflexed, acuminate. Seeds tubercled-keeled, the edges tubercled-ribbed. A large shrub.

\*\* *Leaves more or less membranous. Flowers red, orange, or scarlet.*

L. LETA, Wall. Ava. Tropical forests of South Andamans.

Leaflets 6-8 inches long. Inflorescence rusty-tomentose. Under shrub.

L. COCCINEA, Planch. Not rare in the savannahs of Pegu, rare  
in the diluvial forests of Martaban.

Leaflets only 2½-4 inches long. Inflorescence glabrous or nearly so. Under-shrub.

More or less pubescent or stiff-hairy, at least the nerves beneath.

† *Leaves usually simply pinnate.*

L. CRISPA, L. Chittagong and Pegu.

L. *pinnata*, Andr.

Kalet-theing (Kurz).

Leaflets coarsely serrate, acute, roughish pubescent along the nerves beneath. Nerves all parallel. Petiolules thick and short. Stems, petioles, and peduncles curled-winged. Bracts and bractlets long, lanceolate-subulate. Shrub.

L. PUMILA, Kz. Pegu and Martaban.

Dwarf, all parts robust and densely pubescent or almost tomentose. Petioles and petiolules terete. Cymes tomentose. Bracts minute. Under shrub.

†† *Leaves usually 2- or 3-pinnate.*

L. ASPERA, Wall. Pegu.

Thakyā-nwel-than (Kurz).

Leaflets coarsely serrate, acuminate, roughish pubescent on the parallel nerves

beneath. Stems and petioles terete or nearly so. Peduncle compressed-cornered. Bracts and bractlets small, linear-lanceolate. Flowers greenish-white. Shrub.

*L. ÆQUATA*, L.

Tropical forests of Tenasserim and the Andamans.

*L. hirta*, Hornem.

Ngā-mouk (Kurz).

All parts stiff-pubescent. Leaflets membranous, beneath densely gland-dotted. Petioles terete. Bracts large, broadly ovate, blunt. Under shrub.

*L. ROBUSTA*, Roxb. (non Laws.).

Arakan and Pegu.

*L. diffusa*, Laws.

Almost glabrous or greyish puberulous. Leaves 2-3-pinnate. Leaflets puberulous or glabrous, not gland-dotted beneath. Bracts and bractlets none. Shrub.

*L. robusta*, Laws. = *L. Sundaica*, Miq. (Kurz).

*L. RUBRA*, Bl.

Attaran Valley.

Stems, petioles, etc., quite glabrous. Leaflets small, sprinkled with white stiff hairs. Bracts or bractlets none. Under shrub.

Kurz adds from the Nicobars :

*L. ACULEATA*, Bl.

Katchall.

*L. GRANDIFOLIA*, Kz.

Katchall, Trice and Track.

*L. SANGUINEA*, Wall.

Ava.

In his notes on Burmese Plants (J.A.S.B. ii. 1873, p. 66) Kurz describes *L. sanguinea*, Wall. ; but this species does not appear in his later paper.

#### Order RHAMNACEÆ.

*Flowers* regular, hermaphrodite, or rarely polygamous. *Calyx* 4-5-lobed or cleft, the tube persistent, and often adnate to the ovary or disk, valvate. *Petals* 4-5, alternating with the calyx-lobes, or none. *Stamens* 4-5, opposite to the petals if present. *Filaments* filiform, rarely dilated. *Anthers* small, often included in the petals, rarely exerted. *Disk* usually filling the calyx-tube, or lining it, or annular, rarely cup-shaped and free, or wanting. *Ovary* more or less inferior, 3- (or rarely 2-4-) celled, with a solitary erect ovule in each cell. *Style* short, with as many lobes as cells to the ovary. *Fruit* a drupe or capsule, the margin of the adnate calyx-base forming a ring at the base, or round, or at the summit of the fruit, the endocarp separating into as many cocci as cells, or forming a woody or bony 2-4-celled stone. *Flowers* small or minute, in cymes or umbel-like clusters, often collected in axillary, or terminal compound cymes, racemes or panicles.

#### ZIZYPHIEÆ.

*Drupe* containing a solid 1-3-celled putamen, or the fruit a capsule or indehiscent nut. *Ovary* superior or half-superior. *Disk* filling the calyx-tube.

\* *Ovary* half-superior or superior. *Fruit* a nut, dry, coriaceous, 1-celled and 1-seeded, or a capsule.

#### VENTILAGO, Gaertner.

*Nut* produced into a long terminal wing, indehiscent.

× *Calyx* adnate to the drupe, small and basilar.

*V. MADRASPATANA*, Gaertn. S.S.

Tenasserim.

Flowers in slender simple or branched racemes. Nut indistinctly puberulous, the wing only 1-1½ inch long.

× × *Calyx* adnate to the drupe for ½-⅓ of its length, and forming there a prominent ring.

° *Flowers and fruit more or less yellowish-pubescent or tomentose.*

V. CALYCLATA, Tul. Tenasserim.

17. *Madraspatana*, Roxb. non Gaertn.

Racemose panicles and flowers tomentose. Fruits puberulous, the wing  $1\frac{1}{2}$ –1 inch long, the calyx reaching the middle of the nut.

° *Fruits quite glabrous, even when young.*

V. LEOCARPA, Bth. S.S. Tenasserim.

All parts glabrous. Nuts about 3 lines in diameter, the calyx reaching the middle, and forming a sharp ring there, the wing rounded at the apex.

V. MAINGAYI, Laws. E.C.S. Tenasserim.

Glabrous? Nuts nearly  $\frac{1}{2}$  inch across, the calyx broad and flat, occupying only the basal part of the nut, the wing shortly acuminate.

SMYTHEA, Serrmann.

Capsule lanceolate or urn-shaped, 2-valved.

S. CALPICARPA, Kz. S.E.S. Tenasserim.

Leaves serrate, chartaceous, glabrous save along the pilose midrib beneath.

\*\* *Ovary superior. Drupe fleshy or dry, with a 1–3-celled hard putamen.*

ZIZYPHUS, Jussieu.

Leaves palmately 3–5-nerved.

\* *Flowers in axillary cymes or clusters.*

° *Leaves more or less tomentose or pubescent beneath. Drupes sappy, quite glabrous.*

Z. JUJUBA, Lamk.

All over Burma.

Zi. The 'byer' plum of India.

Leaves coriaceous, densely fulvous or whitish tomentose beneath, glabrous above. Drupe  $\frac{1}{2}$ – $\frac{3}{4}$  inch long, the putamen 2-celled. Erect shrub or tree.

Wood close-grained, strong, heartwood dark brown. Bark used for tanning (Kurz).

This tree, so common throughout the jungles of India, yields a pleasant acid berry, the size of a small cherry. The cultivated fruit grows much larger, but it loses in flavour what it gains in size, being less acid and refreshing, and more mucilaginous, especially when cooked, than the wild fruit. Lac is found on this tree. The timber is small, and large trees too valuable for fruit to be cut down.

Z. ENOPLIA, Mill. S.S.

All over Burma and the Andamans.

Z. *albens* and *napeea*, Roxb.

Tor-zi-nweh (Kurz).

Leaves membranous, above thinly, beneath densely silky pubescent. Drupe the size of a pea, the putamen 1- rarely 2-celled. Erect or scandent shrub.

var. *a glabrescens*. Leaves green on both sides, shortly and thinly pubescent.

var. *β ferrugineus*. Leaves tawny villous beneath. Usually a lofty climber.

var. *γ pedicellaris*, Wall. As preceding, but cymes longer peduncled and larger, pedicels about 3 lines long. Promex.

° *Leaves glabrous or sprinkled with a few hairs on the nerves beneath.*

Z. GLABRA, Roxb. S.S.

Tropical forests of Chittagong, Tenasserim, and the Andamans.

Leaves green, thin chartaceous. Young drupes tawny tomentose, adult woody.

\*\* *Cymes collected into leafy or leafless panicles. Drupes woody.*

Z. FUNICULOSA, Ham. E.S.S.

Ava Hills.

Leaves glabrous, rigidly chartaceous. Drupes glabrous. Climber.

*Z. rugosa*, Lam. *T.* All over Burma.  
Myouk-zi.

Leaves densely fulvous tomentose or pubescent beneath. Drupes glabrous.  
Kurz adds from the Nicobars:

*Z. subquincunervia*, Miq. Tropical forests of Kamorta and Katchall.

*BERCHEMIA*, Necker.

*Leaves* penninerved.

*B. floribunda*, Brongn. *S.S.* Khakyen Hills.

Drupes slightly compressed, smooth or pruinous, bluish-black, containing a woody 2-celled putamen.

*RHAMNIEÆ.*

*Fruit* dry or drupaceous, containing 3 (rarely 2-4) indehiscent or 2-valved cocci.

\* *Ovary* superior or half-superior. *Drupe* fleshy or dry, superior. *Disk* fleshy, filling the calyx-tube (*Rhamnæ veræ*).

*SAGERETIA*, Brongniart.

*Flowers* in terminal panicles. *Leaves* opposite or nearly so.

*S. theezans*, Brongn. Ava.

var. *β diospyrifolia*, Laws.

The leaves of this plant can be used as a substitute for tea.

*SCUTIA*, Commerson.

*Flowers* in fascicles or umbellets. *Leaves* opposite or nearly so.

*S. (Rhamnus) circumscissus*, L. Valley of the Attaran River.

*S. Indica*, Brongn. *S.*

*Rhamnus myrtinus*, Burm.

*R. lucidus*, Roxb.

A shrub armed with short curved spines, all parts glabrous.

*COLUBEKINA*, L. C. Rich.

*Flowers* in cymes. *Leaves* alternate.

*C. (CEANOTHUS) asiatica*, L. *S.* Arakan, Tenasserim, the Andamans, Kamorta,  
*Rhamnus acuminatus*, Colebr. Katchall, and Car Nicobar.

Kuē-nweh.

Leaves and cymes glabrous.

*C. pubescens* (Kz.). *S.S.* Pegu and Martaban.

Cymes and under surface of leaves pubescent.

Voight also records *C. macrophylla*, from Martaban.

\*\* *Ovary* and fruit inferior, the latter crowned by the calyx-limb.

*APTERON*, Kurz.

*Styles* 2. *Fruit* globose, not winged. *Flowers* clustered, in terminal panicles.

*A. lanceolatum*, Kz. Upper Tenasserim.

*GOUANIA*, Linnaeus.

*Fruit* dry, 3-cornered or winged. *Flowers* spicate or racemose, panicle.

*G. leptostachya*, DC. *S.S.* All over Burma by streams and villages.

*G. tiliaefolia*, Roxb.

Tor-yē-nyo-nweh.

Leaves glabrous or nearly so, crenate. Racemes puberulous, glabrescent. Disk glabrous, 5-horned. Capsules glabrous.

G. BRANDISII, Hassk.

*G. integrifolia*, Kurz (non Lamk.).

Leaves velvety above, densely tawny or rusty pubescent beneath, entire. Racemes rusty-tomentose. Capsules puberulous.

#### Order CELASTRINEÆ.

*Flowers* usually hermaphrodite. *Calyx* small, 4-5-lobed or parted, persistent, imbricate. *Petals* 4-5, imbricate. *Stamens* 3-5 (very rarely 2-10), inserted at the base of the disk, or its lobes. *Filaments* subulate, often short. *Anthers* 2-celled. *Disk* conspicuous, cushion-like or explanate or lobed. *Fruit* various, a capsule, drupe, berry, or samara. *Seeds* often arillate, sometimes winged. *Albumen* fleshy, or almost horny, or none. *Flowers* small, or minute, in axillary cymes, or racemes, or in terminal panicles. Most *Celastrineæ* are readily recognized by the peculiar large disk. From *Rhamnaceæ* they differ in having the stamens alternating with the petals.

#### Sub-order CELASTRACEÆ.

*Stamens* inserted outside the disk. *Seeds* albuminous.

\* *Capsule or follicle dehiscent.*

× *Orules from the axis of the cells. Leaves opposite.*

EVONYMUS, *Linnaeus*.

*Petals* free. *Disk* fleshy, broad. *Capsules* 3-5-lobed and celled.

† *Orules 2 in each cell.*

\* *Flowers solitary or clustered in the axils of the leaves.*

E. JAVANICUS, Bl. E.T.

Tropical forests of Tenasserim, Katchall, Kondal, and Great Nicobar.

Flowers nearly 5-6 lines across. *Petals* fringed. *Capsules* sharply angular, on  $\frac{1}{2}$ -1 inch long peduncles. *Leaves* glossy, entire.

E. CALOCARPUS, Kz. S.

Tenasserim.

*Capsules* globular, obtusely lobed, very shortly peduncled or almost sessile. *Leaves* green, opaque.

\*\* *Flowers in dichotomous cymes.*

× × *Branchlets terete or nearly so, or somewhat compressed.*

E. GLABER, Roxb.

Chittagong and Tenasserim.

E. TIMORENSIS, Laws.

Flowers small, usually 5-merous. *Petals* entire. *Capsules* angular. *Leaves* serrulate upwards.

× × *Branchlets sharply 4-cornered or almost winged.*

E. GRIFFITHII, Kz. E.S. var.  $\alpha$  Ava. var.  $\beta$  not unfrequent in the damp hill-forests of the Nāt-toung<sup>1</sup> ranges in Martaban, east of Young-ngoo, at 6000-7000 feet elevation.

Flowers small, in very slender cymes. *Capsules* small, smooth.

var.  $\alpha$  *genuina*. Petioles thick,  $\frac{1}{4}$  line long; leaves sub-sessile, sub-serrate.

var.  $\beta$  *dubia*. Petioles slender, 2-3 lines long. *Leaves* entire or nearly so.

var.  $\beta$  will prove a distinct species, but as my specimens are in very young bud only, I am unwilling to establish the species until better material comes to hand.

<sup>1</sup> Care must be taken not to confound the 'Nāt-toung' in Martaban East of the Salween, with the 'Nāt-toung' of the Arakan Range, W.S.W. of Thayet-myo.

†† *Orules solitary in the cells.*

*B. SCLEROCARPUS*, Laws. *E.T.* Tropical forests of Kambalu Toun in the Pegu Range.

Bark red. Petals 4, greenish purple, concave-orbicular, without grooves. Capsules very rough from scurfy fissures and warts.

*MICROTROPIS*, Wallich.

*Petals* united at the base. *Disk* none or annular. *Capsule* 1-celled, 2-valved.

*M. (EVONYMUS) GARCINIFOLIUS*, Roxb. *E.S.* Martaban and Tenasserim between *M. discolor*, Wall. 5000 and 7000 feet.

× *Cymes* not much longer than the petiole, robust and crowdedly flowered.

Leaves coriaceous, smooth, Capsules  $\frac{1}{2}$  inch long, grey.

× × *Cymes* much longer than the petiole, lax and dichotomously branched.

*M. BIVALVIS*, Wall. *E.T.* Tropical forests of Tenasserim.

Leaves smooth, glossy above. Peduncle slender, 1-1 $\frac{1}{2}$  inch long.

*M. LONGIFOLIA*, Wall. *E.S.* Tenasserim.

Leaves coriaceous, wrinkled, especially above, opaque. Peduncle  $\frac{1}{2}$ - $\frac{3}{4}$  inch long.

× × *Orules erect. Leaves alternate.*

*CELASTRUS*, Linnaeus.

*Ovary* free. *Capsules* 2-4-celled, loculicidal. *Seeds* arillate. *Flowers* in panicles or racemes.

*C. MONOSPERMA*, Roxb. Khakyen Hills.

*Cymes* forming racemose panicles, axillary and terminal. *Capsule* 1-celled and 1-seeded.

× *Capsule* 2-valved.

*C. ACUMINATUS*, Wall. *E.S.* Ava Hills.

*Cymes* short and slender, axillary.

× × *Capsule* 3-valved.

*C. MONTANUS*, Roxb. *T.* Prome (?).

*Cymes* dichotomously branched, axillary.

*C. PANICULATA*, Willd. *S.S.* Ava to Pegu.

*C. multiflora* and *nutans*, Roxb.

*Cymes* forming racemose panicles, slender, terminal. *Capsules* with 3-6 seeds.

var. *a genuina*. All parts quite glabrous or nearly so.

var. *β pubescens*. Leaves beneath and the petioles pubescent. Panicles densely puberulous.

*KURRIMIA*, Wallich.

*Ovary* free, styles 2. *Capsule* entire or 2-lobed, 1-2-celled, follicle-like and slowly dehiscent into 1 or 2 valves. *Flowers* in cymes or racemes, or paniced.

*K. ROBUSTA*, Roxb. *E.T.* Chittagong. Pegu Range. Tenasserim.

Kwē-douk.

*Capsule* an inch long, opening into 2 valves containing 1-2 large glossy black seeds enveloped in a yellow arillus. Wood brown, heavy, brittle (Kurz).

\*\* *Fruit* an indehiscent drupe or berry.

*SIPHONODON*, Griffith.

*Ovary* half inferior, 5-celled. *Berry* large, with many pyrenes. *Leaves* alternate.

*S. CELASTRINUS*, Griff. *E.T.*  
Myouk-ō-shyt (Kurz).

T. forests of Pegu Range and Martaban.

Berries the shape and size of a small citron, on a cylindrical peduncle 4-6 lines long, the pyrenes surrounded by a granular hard reddish-yellow endocarp.

Sub-order *HIPPOCRATLACEÆ*.

*Stamens* 3, rarely 2-5, inserted within or on the disk. *Seeds* exalbuminous.  
*Leaves* opposite.

\* *Fruit an indehiscent berry, 1-many-seeded. Seeds not winged.*

*SALACIA*, *Linnaeus*.

*Inflorescences* axillary. *Stamens* 3, rarely 2 or 4, inserted within the disk.

\* *Cymes peduncled and dichotomously branched, usually short.*

*S. LONGIFOLIA*, Wall. *S.S.*  
*S. floribunda*, Wight.

Tenasserim.

Branches terete. Pedicels thick, 6-8 lines long. Sepals not ciliate. Filaments very short, complanate and reflexed.

*S. TORTUOSA*, Griff. *S.S.*

Tenasserim.

Branches marked by decurrent lines and more or less angular. Pedicels about 4 lines long, slender, arising from the globose rusty-bracteoid ends of the cyme-branches. Sepals fringed. Filaments nearly  $\frac{1}{2}$  line long, terete and erect.

\*\* *Flowers springing from an axillary sessile tubercle or wart.*

× *Flowers large. Petals about 3-4 lines long.*

*S. GRANDIFLORA*, Kz. *S.S.*

Tenasserim.

Pedicels 2-3 lines thick. Leaves large, coriaceous.

× × *Flowers minute or small, the petals less than 2 lines long.*

† *Leaves turning brown or dark-coloured in drying. Filaments very short and complanate.*

*S. VERRUCOSA*, Wight. *S.S.*  
*S. polyantha*, Korth.

Tenasserim.

Branchlets dark-brown, corky-lenticellate. Leaves entire. Sepals ciliate. Ovary-cells 2-ovuled.

*S. ROXBURGHII*, Wall. *S.S.*

Chittagong to Tenasserim.

Branchlets pale-coloured, sparingly lenticellate. Leaves serrate. Berries as large as a crab-apple, 2-3-seeded. Sepals not ciliate.

†† *Leaves turning yellowish or pale green in drying.*

° *Petals clawed. Filaments terete, slender.*

*S. PRINOIDES*, DC. *S.S.*

Tidal forests of Chittagong, Tenasserim  
and the Andamans.

*Johnia Coromandeliana*, Roxb.  
*S. latifolia*, Wall.

Petals a line long. Pedicels as long or longer than the petiole. Berries 1-seeded.

° ° *Petals sessile. Filaments very short and dilated.*

*S. FLAVESCENS*, Kz. *S.S.*

Tenasserim.

Pedicels few, short, 1-1 $\frac{1}{2}$  line long.

*S. MULTIFLORA*, Wight. *S.S.*

Tenasserim.

Pedicels numerous, slender, longer than the petiole.

Kurz also gives from the Nicobars:

*S. PLATYPHYLLA*, Kz. *S.S.*

Katchall, Nankowry and Great Nicobar.

\*\* *Fruit capsular or samaroid, dehiscent. Seeds winged.*

× *Ripe carpels samaroid, 2-valved. Stamens 3, inserted within the disk.*

#### HIPPOCRATIA, *Linnaeus.*

Ripe *carpels* usually 3. *Seeds* usually winged at the lower end. *Inflorescences* terminal or terminal and axillary. Some species yield edible nuts.

H. INDICA, Willd. S.S.

Toukyeghat.

× *Petals*  $\frac{1}{2}$ –1 line long, imbricated in the bud.

*Petals* about  $\frac{1}{2}$  line long. *Leaves* glaucous.

H. FUSCESCENS, Kz. S.S.

Maulmain.

*Petals* about a line long. *Leaves* turning brown in drying.

× × *Petals* about 2 lines long, valvate in the bud.

H. MACRANTHA, Korth. S.S.

Chittagong to Tenasserim.

*Flowers* outside and *inflorescence* greyish puberulous. *Carpels* linear-oblong, 2–3 $\frac{1}{2}$  inches long.

H. LOBBII, Laws. S.S.

Upper Tenasserim.

*Petals* inside densely greyish hairy.

Kurz also gives from the Nicobars :

H. NICOBARICA, Kz. S.S.

Tropical forests of Katchall.

× × *Fruit* a capsule. *Erect trees or shrubs. Stamens* 5, inserted on the disk.

#### LOPHOPETALUM, *Wight.*

*Capsule* 3–4-celled and lobed. *Seeds* winged all round. Not gland-dotted.

\* *Petals* ciliate-crested or lamellate on the upper side. *Disk* 5-lobed.

L. FIMBRIATUM, Wight. T.

Martaban and Tenasserim.

*Flowers* nearly  $\frac{1}{2}$  inch in diameter. *Crest* of petals fringed.

\*\* *Petals* naked, in a dried state often turning wrinkled or corrugate on the inner face.

× *Panicles* glabrous. *Disk* smooth, in a dried state often conspicuously wrinkled. *Leaves* elliptical to ovate.

L. WALLICHII, Kz. T.

Pegu and Tenasserim.

Moung-taing (Kurz).

*Panicles* brachiate and stiff. *Flowers* about 3 lines in diameter. *Disk* wrinkled.

L. LITTORALE, Laws. E.T.

Low ground along the Pozoondoung Creek. Pegu.

As preceding, but *panicles* larger and slenderly branched. *Flowers* about 2 lines across. *Disk* wrinkled.

× × *Panicles* while young covered with a rusty-coloured or greyish tomentum.

L. FLORIBUNDUM, Wight.

Southern Tenasserim.

*Leaves* lanceolate to oblong-lanceolate. *Petiole* 3–4 lines long. *Flowers* about 1–1 $\frac{1}{2}$  line across. *Disk* smooth or nearly so.

#### OLACALES.

*Flowers* regular, hermaphrodite, or unisexual. *Calyx* small. *Disk* free, cupular or annular, rarely glandular, or none. *Ovary* entire, 1- to many-celled. *Ovules* 1 to 3 in each cell, pendulous, raphe dorsal, integuments confluent with the nucleus. *Albumen* usually copious, fleshy. *Embryo* small. *Shrubs* or trees. *Leaves* alternate, simple, exstipulate.

Order ILICINEÆ.

*Flowers* regular, hermaphrodite or unisexual. *Calyx* 3-6-partite or lobed, imbricate. *Petals* 4 or 5, rarely more, or wanting, free or united at the base, hypogynous, imbricate. *Stamens* hypogynous, as many as the petals, or rarely more, free, or slightly adhering to the petals. *Filaments* subulate. *Anthers* opening inwards. *Disk* none. *Ovary* free, 3-5- rarely many-celled, with 1-2 pendulous ovules in each cell. *Style* none, or terminal. *Stigma* discoid or capitate. *Fruit* a drupe containing a 2-5-celled stone or 4-8 crustaceous 1-seeded pyrenes. *Testa* membranous. *Albumen* copious, fleshy. Trees or shrubs, with alternate simple leaves. *Stipules* none. *Flowers* small, and in terminal cymes or clusters.

Sub-order ILICACEÆ.

*Petals* present. *Flowers* hermaphrodite.

ILEX, *Linnaeus*.

*Stamens* 5. *Ovary* 4-8-celled.

\* *Male inflorescence cymose, the female flowers clustered or solitary.*

I. GAULTHERIEFOLIA, Kz. *E.T.* Tenasserim.

Leaves 2-3½ inches long, beneath very opaque and brown. Sepals ciliate.

Dr. Hooker identifies this species with his *I. theaefolia*, but in this he is in error, his new species differing greatly, not only in the texture and polish of the leaves, but still more so in the inflorescence, doubly larger flowers, and very long pedicels; in my species they are only about ½ line long (Kurz).

\*\* *Female flowers in simple or compound umbels or cymes.*

◦ *Cymes head-like, contracted and small, on a long compressed peduncle.*

I. GODAYAM, Coleb. *E.T.* β not rare in Tropical forests of Martaban and Tenasserim.  
Glabrous, or the branchlets pubescent.

var. *a genuina*. Shoots, peduncles, and pedicels shortly puberulous. Calyx more or less pubescent or densely fringed.

var. β *sulcata*. All parts glabrous, except the puberulous pedicels, and calyx.

◦ ◦ *Cymes divaricately 2-cleft, on a rather short peduncle.*

I. MACROPHYLLA, Wall. Tenasserim.

Cymes divaricately 2-cleft. Leaves large, coriaceous. Branchlets pale-coloured.

I. CYMOsa, Bl.

Cymes twice or thrice dichotomously branched. Leaves beneath pale-coloured or glaucescent. Branchlets pure white. Style stout, distinct.

I. WALLICHII, H. f. Tenasserim.

As preceding, but stigma sessile.

Sub-order DAPHNIPHYLLACEÆ.

*Flowers* apetalous, unisexual.

DAPHNIPHYLLUM, *Blume*.

*Stamens* 5-18. *Ovary* 2-celled.

D. MAJUS, Muell. Tenasserim.

Calyx persistent? Pedicels about ½ inch long.

D. HIMALAYENSE, Muell. *E.T.* Martaban at about 5000 feet.

Calyx deciduous. Pedicels about 1-2 lines long.

One of the best known species of this Order is the Holly (*Ilex aquifolium*), the bark of which yields birdlime, and the wood of which is close-grained and hard. *Ilex Paraguensis* yields Paraguay tea, and several species are cultivated as ornamental plants. This *Ilex* must not be confounded with the tree which afforded so noble a simile to Horace in his ode to the Roman people, who had in view the Holm oak (*Quercus ilex*):

“Duris ut Ilex, tonsa bipennibus  
Nigræ feraci frondis in Alcido,  
Per damna, per cædes, ab ipso  
Ducit opes, animumque ferro.”

*Carm.* IV. 4. line 57.

#### Order OLACINEÆ.

*Flowers* regular, hermaphrodite or rarely unisexual. *Calyx* small, 4–6-toothed, free or adnate to the disk. *Petals* 4–6, free, or more or less united, valvate. *Stamens* as many, or twice as many as (rarely fewer than) the petals, adnate to the base of the petals, or free and hypogynous. *Anthers* 2-celled, versatile, or rarely adnate. *Disk* free or adnate to the ovary or to the calyx, rarely divided into scale-like glands. *Ovary* free, or immersed in the disk, 1 or imperfectly 2–3-celled, with 2–3, or rarely a solitary pendulous ovule in each cell. *Style* simple. *Fruit* usually an indehiscent drupe. *Seeds* solitary, pendulous, or spuriously erect. *Albumen* present, or none. Trees or shrubs with usually alternate, simple leaves.

#### Sub-order OLACEÆ.

*Stamens* as many or twice as many (rarely fewer) as petals and *opposite to them*.

#### Sub-tribe EU-OLACIÆ.

*Stamens* anisomerous, or isomerous. *Ovary* 2–5-celled at the base, 1-celled at the apex or completely 1-celled, the placenta central with 2–5 pendulous ovules.

\* *Stamens* twice as many as petals, or if fewer, accompanied by staminodes.

#### XIMENIA, *Linnaeus*.

*Calyx* not enlarging after flowering. *Stamens* all perfect.

X. AMERICANA, L. S.

Coasts of Tenasserim, the Andamans,

X. subscandens, Griff.

Car Nicobar and Katchall.

Pynleh-si or Pynleh-ku-yin (Kurz).

Drupe about an inch long, red, smooth, edible, containing a large not very hard nut. Wood of a yellow colour.

#### OLAX, *Linnaeus*.

*Calyx* inclosing the fruit. Perfect *stamens* 3, rarely 5. *Staminodes* 6 or fewer.

× *Enlarged calyx in fruit membranous, dry.*

O. SCANDENS, Roxb. S.S.

Ava. Chittagong and Tenasserim.

O. obtusa, Bl.

Toung-leh-lu or Lai-loo (Kurz).

Branchlets terete, like the under surface of the leaves and the racemes, puberulous.

O. ACUMINATA, Wall. S.

Ava, Mogoung River, and Khakyen Hills.

All parts also the racemes quite glabrous. Branchlets angular.

× × *Enlarged fruiting calyx coriaceous (fleshy in a fresh state).*

O. IMBRICATA, Roxb. C.

Chittagong. Tenasserim. Katchall.

Glabrous, the branchlets terete. Flowers 4–5 lines long.

- \*\* *Stamens as many as petals. Staminodes none.*  
 × *Fruiting calyx much enlarged, adnate to the drupe.*

ERYTHROPALUM, *Blume.*

*Ovary* 1-celled. Tendril-bearing climbers with 3-nerved leaves.

- E. SCANDENS*, Bl. S.S. Tropical forests of Pegu Range on  
*Decastrophia inconspicua*, Griff. Eastern slopes. Tenasserim.  
*E. populifolium*, Planch.

STROMBOSIA, *Blume.*

*Ovary* to near the summit 3-5-celled. Trees with penninerved leaves.

- S. JAVANICA*, Bl. E.T. Tenasserim.

- × × *Calyx in fruit unchanged.*

ANACOLOSA, *Blume.*

*Disk* in fruit much enlarged, adnate to the drupe and resembling an engrossed adnate calyx. *Petals* 6. *Ovary* 1 or imperfectly 2-celled.

- A. PUBERULA*, Kz. E.T. The Andamans, Kamorta, and Katchall.  
*Calyx* and pedicels densely puberulous. *Drupe* scarlet, thinly velvety.  
*A. GRIFFITHII*, Mast. Mergui.  
*Calyx* and slender pedicels glabrous.

Probably only a glabrous form of the preceding. The sepals and petals are not quite glabrous (Kurz).

- A. (GOMPHANDRA) CRASSIPES*, Mast. E.T. Rare in Pegu Range.

## OPILIEÆ.

*Stamens isomerous. Ovary* 1-celled with a single ovule. *Flowers* hermaphrodite.

- \* *Perianth dichlamydeous, i.e. consisting of calyx and corolla.*

CANSJERA, *Jussieu.*

*Spikes* axillary, without bracts. *Calyx* inconspicuous, shortly 4-lobed. *Corolla* gamopetalous. *Stamens* 4, alternating with as many hypogynous scales or glands.

- × *Spikes simple.*

- C. PARVIFOLIA*, Kz. Tenasserim.  
 Leaves small, oval, notched or blunt, pubescent. *Spikes* very short, solitary.  
*C. RUEDII*, Gmel. S.S. Tropical forests of Tenasserim, the  
 Andamans, and Kondul.  
 Leaves acuminate, opaque. *Spikes* solitary or by pairs.

- × × *Spikes branched, rarely the uppermost ones almost simple.*

- C. ZIZYFOLIA*, Griff. S.S. Tenasserim.  
 Leaves acute, glossy above. *Spikes* solitary.

NATSIATOPSIS, *Kurz.*

*Spikes* axillary, without conspicuous bracts. *Calyx* 4-lobed. *Corolla* gamopetalous. *Stamens* 4, free. *Staminodes* none.

- N. THUNBERGLEFOLIA*, Kz. S. Khakyen Hills.  
 Female flowers unknown.

OPILIA, *Roxburgh.*

*Inflorescence* while young conspicuously imbricate-bracted. *Petals* five. *Filaments* filiform. *Staminodes* 5.

- O. AMENTACEA*, Roxb. S.S. Prome.

\*\* *Perianth monochlamydeous.*

LEPIONURUS, *Blume.*

*Inflorescence* while young conspicuously imbricate-bracted. *Flowers* 4-merous. *Filaments* very short, complanate.

L. SYLVESTRIS, Bl.

Khakyen Hills.

*Leptonium oblongifolium*, Griff.

CHAMPEREYA, *Griffith.*

*Inflorescence* with very deciduous minute bracts. *Flowers* 5-merous. *Filaments* slender, exserted.

C. GRIFFITHIANA, Planch.

Tenasserim and the Andamans.

C. GNETOCARPA, Kz.

Tropical forests of Kamorta and Car Nicobar.

Wherever *Lepionurus* may be placed, *Champerëya* must accompany it (Kurz).

Sub-order ICACINELÆ.

*Stamens* as many as petals and alternating with them.

EU-ICACINIELÆ.

*Cotyledons* small or dilated. *Trees* or erect shrubs.

\* *Calyx* minutely toothed or lobed. *Petals* usually glabrous.

STEMONURUS, *Blume.*

*Anthers* pendulous. *Drupe* without fleshy appendage.

× *All parts* glabrous.

S. (GOMPHANDRA) PENANGIANUS, Miers. *E.T.* Tenasserim.

Leaves  $2\frac{1}{2}$ –5 inches. *Cymes* leaf-opposite, the peduncle stiff and  $\frac{1}{2}$ –1 inch long.

S. JAVANICUS, Bl. *E.T.*

Tenasserim.

*Gomphandra affinis*, Mast.

Leaves 2–3 inches long. *Cymes* slightly puberulous, axillary and peduncled. *Drupe*s elliptically oblong, the putamen sulcate.

× × *Younger branchlets* tomentose. *Petioles*, under surface of leaves, and *inflorescence* puberulous or tomentose.

S. (GOMPHANDRA) TOMENTELLUS, Kz.

Tenasserim (?).

*Cymes* peduncled, leaf-opposed.

APODYTES, *E. Meyer.*

*Anthers* attached at the back above the 2-lobed base. *Ovary* oblique. *Drupe* with a fleshy puffy sarcocarp, covering only the one half of the nut.

A. ANDAMANICA, Kz. *E.T.*

T. forests of the Andamans and Nicobars.

DAPHNIPHYLLOPSIS, *Kurz.*

*Anthers* attached to the back. *Drupe* berry-like. *Flowers* sessile, in heads.

D. CAPITATA, Kz. *E.T.*

Martaban, between 4000 and 6000 feet.

An incompletely known genus, but its position in *Olacineæ* is certain. *Inflorescence* is exactly that of *Ilex sulcata*, while the leaves resemble those of *Daphniphyllum Himalayense*. It is nearest allied to *Mappia* (Kurz).

\*\* *Calyx* 5-cleft or the sepals distinct, imbricate.

GONOCARYUM, *Miquel.*

*Flowers* unisexual. *Drupe*s dry, woody. *Albumen* many-lobed.

*G. GRACILE*, Miq. Tenasserim.  
*Phlebocalymna Wallichii*, Mast.

Leaves opaque. Drupes obtusely 1-3-angular, acute. The drupes in this species are obtusely angular, but the seeds being all aborted, no stress can, consequently, be laid upon this character, until perfected fruits with seeds become known (Kurz).

*G. GRIFFITHIANUM*, Miers. *E.T.* Southern Pegu and Tenasserim.  
*Platea Lobbiana*, Miers.

Leaves glossy. Drupes terete, rounded at apex.

#### PHYTOCRENIEÆ.

*Cotyledons foliaceous or fleshy. Flowers dioecious. Climbers. Fruit drupaceous.*

\* *Stamens alternating with the petals.*

× *Flowers in heads.*

PHYTOCRENE, *Wallich.*

*Filaments longer than the anthers. Albumen lobed. Drupes villous or echinate.*

*P. GIGANTEA*, Wall. *W.C.* Pegu Range and Tenasserim.

Male flower-heads usually more tawny, tomentose, on short but very thick pedunclets, numerous in very compound racemes terminating in the young state in short thick tomentose bract-like axes.

The stem of this great creeper contains a great quantity of limpid potable water, and is well known to the natives, who make use of it when thirsty in the forests.

*P. BRACTEATA*, Wall. South Tenasserim.

Male flower-heads somewhat smaller and usually greyish, tomentose, on short but slender pedunclets, few (8-5), in simple short racemes terminating in long bract-like greyish-tomentose slender axes.

The so-called bracts of the male inflorescences in this genus are, in my opinion, only the sterile end-branchings of the partial racemes (Kurz).

× × *Flowers in spikes, racemes, or panicles.*

SARCOSTIGMA, *Wight and Arnott.*

*Flowers interruptedly spiked; filaments longer than the anthers. Stamines none. Stigma sessile. Albumen none.*

*S. (CHAILETIA) EDULE*, Kz. *W.C.* Tropical forests of the Andamans.

The nut is inclosed in a thin edible sweetish pulp.

Masters say that this species (*S. edule*) is probably only a form of *S. Kleinii*, but in this he is mistaken, for the latter differs by quite glabrous drupes and inflorescences; and he evidently confounds two species under this name. I would suggest to him to compare Maingay's No. 378 from Malaya (of which I have seen only leaves) with *S. Horsfieldii* (Kurz).

#### NATSIATUM, *Hamilton.*

*Flowers racemose. Filaments very short, alternating with 5 staminodes.*

*N. HERPETICUM*, Ham. *C.* Chittagong and Pegu Range.

Drupes the size of a pea, glabrous, black. Styles 2. Albumen fleshy.

\* \* *Stamens opposite to the petals.*

LODES, *Blume.*

*Flowers cymose-panicled. Stamens 8, filaments very short. Stigma sessile. Albumen fleshy.*

× *Pedicels not woody, slender.*

*L. BRANDISHI*, Kz. *C.* Upper Tenasserim, Thoung-yeen.

Leaves oblong, not cordate at the base, membranous, the petiole  $\frac{1}{2}$ – $\frac{3}{4}$  inch long. Pedicels slender, about  $\frac{1}{2}$  line long.

I. TOMENTELLA, Miq. *E.C.*

Upper Tenasserim.

Leaves more or less oval, cordate at the base, coriaceous, the petiole 2–4 lines long. Flowers almost sessile.

× × *Pedicels thick and woody.*

I. HOOKERIANA, Baill. *W.C.*

Chittagong.

Drupe orange, smooth, about an inch long. Fruits and habit of *Sarcostigma*. An ovary, already engrossed, showed a solitary erect basal ovule (Kurz).

CARDIOPTERIS, Wallich.

*Sepals* and petals imbricate. *Fruit* dry, winged, juice milky. Annual twiners.

C. LOBATA, Wall.

Ava to Tenasserim.

*C. hamulosa*, Griff.

*C. Javanica*, Bl.

### GERANIALES.

*Flowers* often irregular. *Disk* usually annular, adnate to the stamens or reduced to glands, rarely none. *Ovary* of several carpels, syncarpous or sub-apocarpous. *Ovules* one or two, rarely many, ascending or pendulous, raphe usually ventral.

### Order CHAILLETIACEÆ.

*Flowers* hermaphrodite, or unisexual. *Sepals* 5, united, or free, imbricate, sometimes unequal. *Petals* 5, free, and equal, or connate and unequal, 2-cleft or 2-lobed. *Stamens* 5, alternating with the petals, and adnate to their base, alternating with as many hypogynous glands or disk-lobes. *Ovary* free, 2–3-celled, with paired pendulous ovules in each cell. *Styles* 2–3, free, or united higher up. *Stigma* simple, or capitate. *Drupe* dry, containing a 1–2-celled bony or crustaceous, sometimes 2-parted stone.

CHAILLETTA, *De Candolle*.

× *Nerves and net-venation beneath more or less conspicuous.*

C. GELONIODES, Bth. *E.T.*

Chittagong.

Cymes cluster-like and almost sessile. Leaves green, cuneately narrowed into a very short petiole.

C. MACROPETALA, Turcz. *E.T.*

Tenasserim.

Cymes spreading, peduncled? Leaves dark-brown in a dried state.

× × *Nerves and net-venation beneath very faint and almost impressed.*

C. HELFERIANA, Kz.

Tenasserim.

Cymes on a 2–3 lines peduncle. Leaves brown when dried, shortly petioled.

### Order MELIACEÆ.

*Flowers* regular, usually hermaphrodite, rarely polygamous, diœcious. *Calyx* usually small, 4–5-lobed, or the sepals distinct, imbricate, very rarely valvate. *Petals* 4, 5, rarely 5–7 or 3 only, the filaments inserted outside on the disk, more or less united in a tube, very rarely quite free. *Anthers* sessile, or rarely stipitate, on the inside or at the summit of the staminal tube, 2-celled, the cells opening longitudinally. *Disk* various, free or adnate. *Ovary* 3–5-celled, with usually 2 (rarely 1–6 or more) ovules in each cell. *Stigma* disk-shaped or pyramidal. *Fruit* a capsule, berry, or

drupe, indehiscent or opening loculicidally, rarely septicidally. *Albumen* fleshy or none. *Radiæ* superior. Trees or shrubs with alternate, usually pinnate leaves. *Stipule* none. *Flowers* usually small, in panicles.

**A.** Ovary-cells 1-2-ovuled. Seeds not winged.

MELIÉE.

*Stamens united into a tube. Albumen thin, fleshy. Cotyledons thin.*

\* *Capsule loculicidally 5-valved.*

MUNRONIA, Wight.

*Calyx-lobes* 5, almost leafy. *Petals* adnate to the elongate staminal tube. *Disk* tubular, sheathing the ovary. *Leaves* pinnate or pinnately 3-foliate.

M. (TURREA) PINNATA, Wall. S. Pegu Range.

M. Wallichii and Neilgherria, Wight.

\*\* *Fruit a drupe.*

MELIA, Linnaeus.

*Calyx* 5-6-parted. *Petals* free. *Disk* annular. *Drupe*s containing a single 1-5-celled putamen. *Leaves* pinnate or decomposed.

\* *Leaves simply pinnate. Ovary 3-celled.*

M. EXCELSA, Jack. E.T. Mergui (probably cultivated).

Leaflets entire.

\*M. AZADIRACHTA, L. T. Ava and Prome.

Azadirachta Indica, A. Juss.

Then-bor-kha-ma-kha. The 'Neem' of India.

Leaflets serrate. *Drupe*s small, by abortion 1-celled and 1-seeded.

Mason remarks: "It is cultivated by the Burmese for its medicinal qualities, for which it is famous all over India. The bark has been successfully used in India as a substitute for cinchona: the bitter oil of the fruit is a valuable anthelmintic: the seeds are used in the destruction of insects, and the leaves, remarks Dr. Wright, beaten into a pulp and thus externally applied, act as a charm in removing the most intractable form of psora and other pustular eruptions."

This valuable tree must not be confounded with the next species, which it much resembles. Kurz describes the wood as like mahogany, hard, heavy, and close-grained, durable and taking a good polish. The tree also exudes a gum. It is a tree highly deserving of being largely planted.

\* \* *Leaves twice pinnate. Ovary and drupe*s 5-8-celled, some of the cells in fruit usually empty.

× *Drupe*s about  $\frac{1}{2}$  inch long, oblong or elliptical.

M. AZADIRACHT, L. T. Ava. Prome.

M. sempervirens, Sw.

M. sambucina, Bl.

Kha-ma-khā. Bead tree.

Leaflets serrate; staminal tube blue or dark lilac, slender, glabrous outside, about 3 lines long.

The wood of this tree is pale brown, or reddish, rather loose-grained. It is light, and much used for coarse furniture, but is an inferior wood, though this tree is often mistaken for the last.

× × *Drupe*s large, 1 inch long or longer. *Staminal tube* white.

M. BIRMANICA, Kz. T. Tropical forests of Martaban.

Tor-kha-ma-khā (Kurz).

Drupes twice as large, almost globose-obovoid, 5-8-celled; staminal tube 2 lines long, woolly at the summit; flowers larger, scurvy-tomentose outside.

CIPADESSA, *Blume*.

*Calyx* 5-toothed. *Petals* free, short. *Disk* cupular. *Drupes* with 5 horny pyrenes.

C. BACCIFERA, Miq. *E.T.* or *E.S.* var  $\beta$  Ava, Taong-doung.

*Ekebergia Indica*, Roxb.

*Mullea Rothii*, A. Juss.

var.  $\alpha$ . *Rothii*. Leaflets coarsely serrate or serrate-toothed.

var.  $\beta$ . *integerrima*. Leaflets all entire.

TRICHILIEÆ.

*Stamens* united into a tube, very rarely free. *Ovary-cells* with one or two, rarely more ovules. *Albumen* none. *Cotyledons* thick.

\* *Disk* free, tubular or cylindrical. *Style* usually elongate.

° *Leaves* pinnate (leaflets 5 or more).

DYSOXYLON, *Blume*.

*Calyx* small, 4- or 5-toothed, opened while in young bud. *Petals* valvate, free. *Ovary* 3-5 celled. *Capsule* pear-shaped, opening loculicidally. *Arillus* none.

× *Flowers* in panicles.

D. BINECTARIFERUM, Roxb. *E.T.* Chittagong.

*D. macrocarpum*, Thwaites.

*Calyx*, petals and reproductive organs perfectly glabrous.

D. PROCERUM, Hiern. *E.T.* Tropical forests of Pegu Range and Tenasserim.

*Calyx*, petals and staminal tube minutely pubescent.

× × *Flowers* in spikes or racemes.

D. CAULIFLORUM, Hiern. Tropical forests of South Andaman.

Spikes arising from the trunk or old branches, densely flowered. Leaflets opposite or nearly so, pale green.

SCHIZOCHITON, *Blume*.

*Calyx* usually campanulate, obscurely 4- rarely 5-toothed, open already in bud. *Petals* valvate or imbricate, united for  $\frac{1}{3}$  to nearly  $\frac{1}{2}$  of their length with the toothed or lobed staminal tube and appearing tubular. *Ovary* 3-4-celled. *Capsule* usually pyriform, opening loculicidally. *Arillus* complete or incomplete.

\* *Flowers* almost sessile or very shortly and robustly pedicelled.

S. DYSOXYLIFOLIUS, Hiern. *E.T.* Upper Tenasserim.

Leaflets quite glabrous. Anthers 6.

S. GRANDIFLORUS, Hiern. *E.T.* Tropical forests of Martaban and Tenasserim.

Leaflets softly pubescent beneath. Anthers 6-7.

\*\* *Flowers* on slender pedicels.

S. PANICULATUS, Hiern. *E.T.* Tavoy. Also Ava, Taong-doung.

Young parts and panicle and also the under surface of leaves pubescent.

° ° *Leaves* pinnately 3-foliate.

SANDORICUM, *Cavanilles*.

*Calyx* tubular. *Petals* imbricate. *Berry* globular, indehiscent.

S. INDICUM, Cav. *E.T.* Tropical forests of Pegu Range and Tenasserim.

Thyt-to (Kurz) seed?

Wood dark brownish-grey, hard and heavy (Kurz). The name Thyt-to is, I believe, applied to a very different tree, with a light wood of 35 lbs. weight, and a pale-reddish colour something like *Pyongmā*. Mason says, "The sandoricum tree bears a fruit the size of an orange, occasionally called the wild mangosteen, to which it bears some resemblance. It has a fleshy acid pulp and makes a very good jelly, but has a peculiar odour. The natives eat the fruit raw and esteem it excellent."

\* \* *Disk none, annular or confluent with the staminal tube. Style short or none.*

† *Anthers included, or almost included in the staminal tube. Seeds urillate.*

*AGLAI, Loureiro.*

*Petals 5. Anthers as many. Ovary 1-3-celled. Berry 1-2-celled, indehiscent.*

\* *Inflorescence and often also the other parts more or less scaly, especially while young.*

× *Leaflets usually in 2 or 1 pair, with an odd one, nearly glabrous.*

A. CHITTAGONGA, Miq. *E.T.* Tropical forests of Chittagong and Arakan.

Leaves pinnately 3-foliolate. Panicles short and peduncled. Scales of younger parts pale-coloured.

A. ANDAMANIA, Hiern. *E.T.* Tropical forests of the Andamans and Nicobars.

Leaflets in 2 pairs with an odd one. Scales of younger parts pale-coloured. Panicle small, sessile.

A. PANICULATA, Kz. *E.T.* Pegu Range and Tenasserim.

Leaflets in 2 pairs with an odd one. Scales of younger parts rusty-brown. Panicles ample, about as long to half as long as the leaves, rather long-peduncled.

× × *Leaflets in 8-5 pairs, with an odd one, beneath silvery or coppery scaly.*

A. ARGENTEA, Bl. *E.T.* Eastern slopes of Pegu Range. The Nicobars.

Panicle ample, densely silvery or coppery lepidote. Flowers sessile.

\* \* *Calyx, pedicels, and usually the whole inflorescence rusty puberulous or tomentose from short stellate hairs.*

× *Leaflets in 6-8 or more pairs.*

A. CRASSINERVA, Kz. *E.T.* Tenasserim.

Leaflets beneath minutely and indistinctly scaly-tomentose, glabrescent, the lateral nerves all sharply prominent beneath. Panicles, etc., rusty puberulous. Flowers pedicelled. Berries tawny velvety.

A. (EUPHORIA) EXSTIPULATA, Griff. *E.T.* Tenasserim.

*A. Griffithii, Kz.*

Leaflets beneath sparingly fascicled-hairy. Petiole, panicle and nerves beneath densely rusty tomentose.

× × *Leaflets in 1 or 2 pairs, with an odd one, rarely 1-foliolate.*

A. OLIGOPHYLLA, Miq. *E.T.* Tenasserim.

*Meliaca Singaporeana, Wall.*

Panicles slightly stellately pubescent, soon glabrous. Calyx and pedicels glabrous. Net-venation conspicuous.

Kurz adds from the Nicobars.

A. GANGGO, Miq.

Katchall and Great Nicobar.

*AMOORA, Roxburgh.*

*Petals 3-5. Anthers twice as many or more than twice as many as petals. Ovary 3-5-celled. Capsule leathery, opening loculicidally.*

\* *Petals 3. Anthers 6-8.*

× *Flowers sessile, spiked, the male spikes forming large panicles.*

A. ROHITUKA, W. A. *E.T.*

Tropical forests of Pegu Range and  
Tenasserim up to 3000 feet.

Thyt-ni (Kurz).

Leaflets shortly acuminate. Fertile spikes simple, many-flowered. Male flowers about 4 lines in diameter, the staminal tube entire at the apex. Wood white or reddish, heartwood darker coloured, weight 40 lbs. (*vide* Gamble), takes a good polish. Seeds yield an oil. Brandis says Thyt-ni is 80 lbs., but this must be some other wood.

× × *Flowers pedicelled, cymose or racemose-cymose and panieled.*

° *Male panicles ample, as long to half as long as the leaves.*

A. SPECTABILIS, Miq.

Rangoon (*vide* Hiern.).

Leaflets shortly acuminate, thin coriaceous, the nerves prominent on both sides, the veins and net-venation distinct.

A. CUCULLATA, Roxb. *E.T.*

Southern Pegu and Tenasserim.

Thyt-ni (Kurz).

Leaflets blunt, smaller, coriaceous, the nerves above hardly visible and impressed, the veins and net-venation obsolete. Fertile spikes few-flowered. Flowers about 2 lines in diameter, the staminal tube slightly 3-toothed.

° ° *Panicles slender, shorter than or as long as the petiole.*

A. LACTESCENS, Kz. *E.T.*

Tropical forests Hills East of Toung-ngoo.

Leaflets green, conspicuously nerved and net-veined on both sides. Flowers long pedicelled. Panicle very lax, densely lepidote.

\*\* *Petals 5. Stamens 10.*

A. DYSOXYLOIDES, Kz. *E.T.*

Martaban, Yunzalin.

Panicles shorter than the petiole, like the petiole densely lepidote. Leaves sparingly lepidote beneath.

† † *Anthers exerted or the filaments upwards free.*

WALSURA, Roxburgh.

*Petals 5. Berry indehiscent or follicular-dehiscing along the suture. Seeds arillate. Sub-genus EU-WALSURA.*

*Berries indehiscent or only very slowly and incompletely dehiscing along the sutures, usually velvety or tomentose.*

\* *Panicles densely pubescent. Young shoots and petioles of young leaves puberulous.*

W. TRICHOSTEMON, Miq.

Ava. Pegu and Tenasserim.

*W. villosa*, W.A.

Jyō-bō (Gyo-bo, Kz.).

*Petals pubescent. Filaments flat, at the very broad base somewhat coherent. Heartwood dark brownish-red, hard and close-grained, 61 lbs. weight.*

\*\* *Panicles minutely puberulous. Leaves and petioles glabrous.*

° *Leaves coriaceous or firmly chartaceous.*

W. ROBUSTA, Roxb. *E.T.* Tropical forests of Tenasserim; rare in Pegu Range.

Jyō-bō.

Leaves beneath usually white-arcolate within the net-venation. Filaments broadly lanceolate, sprinkled with minute hairs.

W. HYPOLEUCA, Kz. *E.T.*

Tropical forests of the Andamans.

Leaflets uniformly glaucous beneath. Filaments linear, densely pubescent. Flowers larger.

°° *Leaves thin chartaceous or almost membranous, the net-venation inconspicuous.*

W. OXYCARPA, Kz. *E.T.*

Tropical forests of the Andamans.

Leaves acuminate, glaucous beneath. Young fruits acuminate, greyish velvety.

*W. piscidia*, Roxb., apud MacClelland, is included by Mason, but not by Kurz, and it is probably therefore one of the above-mentioned species from Tenasserim. Roxburgh's species is so named from the bark being used to stupify fish. The timber of *Walsura* is strong and excellent, being termed 'male jyo,' jyo being that very strong and admirable wood, *Schleichera trijuga*.

Sub-genus HEYNEA, Roxb.

*Berries* dehiscing along the sutures, usually glabrous.

W. TRIJUGA, Roxb.

var. *a* Upper Tenasserim. var. *β* rare in the tropical

*W. quinquejuga*, Roxb.

forests of the Pegu Yomah, and in the Martaban Hills, up to 2000 feet elevation.

Glabrous or pubescent. Leaflets in 3-6 pairs. Panicles long-peduncled.

var. *a genuina*. All parts (also the panicle) quite glabrous, or only the young shoots slightly pubescent. Leaflets in 3-6 pairs.

var. *β pubescens*. All softer parts, inflorescence, and under surface of leaves, softly pubescent. Leaflets usually in 4 pairs.

**B.** Ovary-cells 3- to many-ovuled. Seeds usually winged.

#### SWIETENIÆ.

*Stamens united into a tube. Albumen present or not. Leaves pinnate.*

CARAPA, Aublet.

*Petals* 4 or 5. *Ovary-cells* with 6-3 ovules. *Capsule* large, thick coriaceous, opening loculicidally. Seeds very large, with corky testa, without arillus.

C. MOLUCCENSIS, Lamk. *E.T.*

Shores of the Andamans. Katchall.

*Granatum littoreum*, Rumph.

*Xylocarpus granatum*, Koen.

Pyn-leh-ōng.

Leaflets more or less ovate. Flowers 5-merous, about 2 lines across.

C. OBOVATA, Bl. *E.T.*

Littoral and tidal forests from Chittagong to Tenasserim and the Andamans.

*Guarea oblongifolia*, Griff.

Wood reddish-brown, not very close-grained, strong. The fruits are used for tanning, and the tree produces a gum (Kurz). This is an excellent wood, much used for house building. It is easy to work, and looks like a pale and coarse mahogany. Weight 11 lbs.

SOYMIDA, *A. Jussieu*.

*Petals* 5. *Staminal-tube* cup-shaped, 10-lobed, the lobes 2-toothed. *Disk* rather broad. *Seeds* winged at both ends. *Albumen* none.

S. (SWIETENIA) FEBRIFUGA, Roxb. *T.*

Prome (?).

CHICKRASSIA, *A. Jussieu*.

*Petals* 4 or 5. *Staminal-tube* cylindrical, 10-crenate. *Disk* none. *Seeds* winged below. *Albumen* none.

C. TABULARIS, A. Juss.

var. *a* rare in the tropical forests of Chittagong, Pegu, Tenasserim, and the Andamans. var. *β* frequent in the dry forests of Prome and Pegu.

Yi-mā or Yeng-mā (Kurz).

var. *a gemina*. Leaves and panicles glabrous. Capsules greyish, wrinkled.  
var. *β velutina*, Roem. All softer parts, as well as the panicle, softly pubescent. Capsules black, almost smooth.

Kurz describes the wood as light-coloured, and weighing 24 lbs. only! It would seem in this and other cases he only follows Brandis, who is certainly wrong as to weight. Yimmah is a somewhat coarse brown wood weighing 53 lbs., and is an excellent wood for common purposes.

#### CEDRELIEÆ.

*Filaments free, inserted outside of the disk. Valves of capsule separating from the axis. Seeds many. Leaves pinnate.*

#### CEDRELA, Linnæus.

*Petals erect. Stamens 4-6. Disk raised or thin. Ovary 5-celled. Capsule opening septicidally. Seeds winged.*

\* *Seeds winged at both ends. Leaflets entire.*

*C. TOONA*, Roxb. *T.* Chittagong, Arakan, and rare in Pegu Range.  
*C. febrifuga*, Bl.  
*C. Teysmanni*, Miq.

Calyx minute, the sepals rounded, hardly  $\frac{1}{3}$  line long. Leaflets usually on long slender petioles.

Thyt-kadō (scented wood). The 'Toon' of India.

Wood reddish, weight 34 lbs., Kurz gives 28, but this is too low. It is an excellent wood for furniture, but given to creaking during changes in the weather and at night.

*C. MULINTGA*, Kz. *E.T.* Rare in Pegu Range West of Toung-ngoo.  
Toung-ta-mā.

Calyx large, the sepals  $1\frac{1}{2}$  line long, acute. Leaflets usually shortly petioled.

\*\* *Seeds winged only below.*

*C. SERRATA*, Royle. *T.* Ava.  
*C. longifolia*, Wall.

Leaflets serrate or serrulate. Calyx minuto.

Many species of this Order yield bitter and tonic principles which are useful as febrifuges, and some are emetic, purgative, or anthelmintic. The main value however of trees of this Order lies in the excellent timber they supply. Foremost among these stands Mahogany, *Swietenia Mahagoni*, which may be regarded as displaying the type of excellence for a furniture wood, but which some Burmese woods but little known or regarded closely approach. Another famous tree held in high esteem for the sanative properties of its oil and leaves is the Nim (of India), *Melia azadirachta*, which also yields a fine wood. Other excellent timbers are yielded in Burma by various species of *Carapa*, *Amoora*, *Walsura* and *Cedrela*, not to mention others of less value.

#### Order BURSERACEÆ.

*Flowers* hermaphrodite, or polygamous, regular. *Calyx* gamosepalous, or the sepals distinct, imbricate or valvate. *Petals* 3-5, usually free, deciduous, valvate, or imbricate. *Stamens* twice as numerous as petals, or more (rarely 3-5), equal or unequal, free. *Anthers* usually versatile. *Disk* usually conspicuous, annular or cup-shaped. *Ovary* free, 2-5 celled, with 2 (rarely a solitary) usually pendulous ovules in each cell. *Style* usually short, with an entire or 2-5-lobed stigma. *Drupe* indehiscent, containing 2-5 nuts, or a longer chartaceous stone, the fruit rarely capsular, inclosing 2-5 bony nuts. *Seeds* pendulous. *Albumen* none. *Trees* or shrubs, with pinnate, or rarely 3-1-foliate leaves, the lower pair of leaflets usually stipule-like. *Flowers* small in racemes or panicles.

## GARUGA, Roxburgh.

*Torus* broadly filling the urceolate calyx-tube. *Calyx* 5-cleft.

G. PINNATA, Roxb. T.

From Chittagong to Tenasserim and the Andamans.

Chyu-y-ök.

var. *a genuina*. More glabrescent; drupes glabrous.

var. *β mollis*, Turcz. More pubescent, the drupes densely villous or pubescent.

Kurz says the bark is used for tanning, and describes the wood as greyish or yellowish, and 52 lbs. weight. The seasoned wood however is only 45 lbs. and reddish. It is coarse in grain and little used.

## BURSERA, Linnaeus.

*Calyx* 4-6-parted. *Stamens* 8-12, inserted at the base of the annular disk.

B. SERRATA, Wall. E.T.

Pegu Range and Martaban.

*Limonia pentagyna*, Roxb.

Thadi (Kurz).

## CANARIUM, Linnaeus.

*Calyx* 3- (rarely 2-5)cleft, valvate. *Petals* 3-5. *Stamens* 6-10. *Drupe*s ovoid, more or less 3-angular, with a bony or hard putamen.

\* *Stipules* subulate, entire, very deciduous.

C. EUPHYLLUM, Kz. E.T.

Tropical forests of South Andaman.

Leaflets serrulate. Disk-glands smooth, 6, free, cohering by pairs.

C. BENGALENSE, Roxb. E.T.

Rare in the Pegu Range.

Leaflets entire. Disk-lobes 3, hairy, united into a cup. Wood rather light pale brown, polishes well. Tree exudes a brittle amber-coloured resin, like Copal (Kurz).

\* \* *Stipules* 2-cleft and pectinately cut, persistent.

C. COCCINEO-BRACTEATUM, Kz. E.T.

Tropical forests of South Andaman.

Young buds covered by the crimson velvety bracts; leaflets entire and serrate.

The Order *Burseraceæ* is chiefly remarkable for the balsamic products of many trees belonging to it. For example, Myrrh is produced by *Balsamodendron Myrrha*, an Arabian tree. Balm of Mecca or Gilead, an odoriferous balsam, is produced by two other Arabian species of *Balsamodendron*, and Kafal, an odoriferous wood and gum, by *B. opobalsamum* and *B. kafal*. Hence, no doubt, the allusion of Virgil, "India mittit ebur, molles sua thura Sabæi," and the epithet *molles* 'effeminate' may have been applied to them from the poet's being aware of their having been ruled over by a Queen who visited the Court of Solomon. The Indian Olibanum is produced by *Boswellia thurifera*; Ceylon Elemi by *Canarium commune*; the Elemi of Java by *Bursera gummifera*; and that of Mexico by *Elaphrium elemiferum*. Bdellium by *Balsamodendron Africanum*; the Guggur resin of Seind, by *B. mukul*; and the Gagal of Bengal, by *B. Roxburghii*. But various other trees of this Order yield similar resins, which possess identical properties with the above. The Ceylon *Canarium Zeylanicum* yields a resinous oil used for torches; *C. commune* an edible oil from its seeds, and a terebinthaceous oil possessing the properties of Copaivi; while *C. strictum* is the black-dammar tree of Malabar, though the resin is really amber-coloured.

## Order OCHNACEÆ.

*Flowers* hermaphrodite. *Sepals* 4-5, free, usually scarious, imbricate. *Petals* 5 (rarely 4-10), free, deciduous, almost sessile or clawed, imbricate or convolute. *Torus* never annular or glandular, enlarged under the fruit. *Stamens* 4-10 or many, equal, or unequal, 1-sided or declinate. *Filaments* persistent. *Anthers* linear, basifixed, dehiscing longitudinally, or by terminal pores. *Ovary* central, or excentrical,

1-10-celled, terete or lobed, with 1 or 2 (rarely more) ovules in each cell. *Style* simple, or rarely 2-10-cleft at summit. *Fruit* either 3-10 one-seeded drupes, seated on the enlarged torus, or 2-4-lobed, 1-4-seeded, indehiscent, berry-like, or septicidally capsular, coriaceous or woody. Trees or shrubs, with simple, usually serrulate leaves. *Stipules* present. *Flowers* showy, often bright yellow, in panicles or fascicles, rarely solitary.

## OCCHNIEÆ.

*Ovary* 2-10-celled, with a solitary ovule in each cell. *Albumen* none.

## OCHNA, Schreber.

*Stamens* indefinite. *Drupes* 3 to 10, on the enlarged torus. *Corymbs* lateral.

\* *Styles* free at the summit for nearly a line in length.

O. ANDAMANICA, Kz. T. The Andamans and Nicobars.

Fruiting sepals erect-conniving. Filaments as long as or longer than the anthers.

\*\* *Styles* united to the apex.

× *Filaments* as long as or longer than the anthers.

O. WALLICHII, Planch. T. Pegu Range and Tenasserim.

*O. obtusa*, Wall.

*O. lucida*, Griff.

Yō-da-yā (Kurz).

Petals usually 5. Fruiting sepals reflexed.

O. FRUTICULOSA, Kz. E.S. Pegu and Martaban.

Petals 5. Fruiting sepals erect-connivent.

× × *Filaments* almost 4 times shorter than the anthers.

O. SQUARENSA, Roxb. T.

*O. lucida*, Lamk.

Hsen-weh.

Petals usually 7-8. Fruiting sepals erect-conniving.

## GOMPHIA, Schreber.

*Stamens* 10. *Drupes* 3-5, seated on the enlarged torus. *Panicles* terminal.

G. SUMATRANA, Jack. E.T. Mergui.

*Ochna crocea*, Griff.

## TETRAMERISTA.

*Flowers* 4-merous. *Stamens* 4. *Fruit* a coriaceous 4-seeded berry.

Mr. Bennet has a *Tetramerista glabra*, var. *sagittata*, based upon *Ancistrocladus? sagittatus*, Wall. Cat. 1055, a plant which I have not seen, and which, on account of its sagittate-based leaves, cannot be a *Tetramerista*. He gives Tenasserim as one of the localities for it (Kurz).

## Order SIMARUBEÆ.

*Flowers* regular, dioecious or polygamous, rarely hermaphrodite. *Calyx* gamosepalous, or 3-5-sepalled. *Petals* 3-5, hypogynous or slightly perigynous, imbricate or valvate, rarely wanting. *Stamens* as many or twice as many. *Anthers* versatile, the cells opening by longitudinal slits. *Disk* under or round the ovary, various, rarely wanting. *Ovary* of 3-5 (rarely more or fewer) carpels, either quite distinct or more or less united into a lobed or rarely entire ovary, with a solitary (rarely two) ovule in each cell. *Styles* as many as carpels, free or united at the base with their stigmas only. Trees or shrubs, with pinnate or simple leaves, seldom gland-dotted. All the species are intensely bitter.

## SIMARUBEÆ.

*Ovary deeply lobed or the carpels distinct.*

\* *Stamens twice as many as petals.*

° *Leaves simple.*

SAMADERA, Gaertner.

*Calyx* 3-5-parted. *Disk* large. *Stamens* 8-10. *Drupe* variously winged.

S. INDICA, Gaertn. E.T.

Upper Tenasserim.

Kathai (Kurz).

Kurz says this tree yields the 'niepa bark' of commerce. It is presumably the same tree as Mason records as follows, though the habitat differs: "The low grounds near the sea coast are ornamented with a handsome shrub which is a species of samadera, and bears a rather curious flower. Like the quassia of the same tribe, its leaves are most intensely bitter, and may perhaps possess the virtues of quassia. Wight says it is cultivated in the gardens about Batavia; but I have never seen it out of its native jungles on this coast."

°° *Leaves pinnate.*

AILANTHUS, Desfontaines.

*Calyx* 5-cleft. *Disk* 10-lobed. *Stamens* 10. *Fruit* of 1 to 5 samaras.

\*\* *Stamens as many as petals. Leaves pinnate. Carpels drupaceous.*

° *Styles free or cohering at the base only.*

A. MALABARICUS, DC. T.

Rare along the Khaboung choung,  
Eastern Slopes of Pegu Range.

Leaves unpaired-pinnate, 1-2½ feet long, glabrous.

BRUCEA, Miller.

*Disk* 4-lobed. *Stamens* glabrous. *Flowers* cymose-racemose.

B. SUMATRANA, Roxb. E.S.

Mergui.

Leaflets coarsely crenate-toothed. *Drupe*s about 2 lines long.

B. MOLLIS, Wall. S.

Upper Tenasserim 3000 to 4000 feet.

Leaflets quite entire. *Drupe*s about 3-4 lines long.

°° *Styles connate. Flowers in panicles.*

PICRAMMA, Blume.

*Disk* thick. *Stamens* pilose.

P. JAVANICA, Bl. E.T.

Rare on Pegu Range; common in Tenasserim  
and the Andamans.

P. ANDAMANICA, Kz.

Leaves unpaired-pinnate, 8-9 inches long. Leaflets in 3 pairs, with an odd one.

EURYCOMA, Jackson.

*Disk* none. *Stamens* glabrous.

E. LONGIFOLIA, Jack. E.S.

Tenasserim and the Andamans.

E. MERGUENSIS, Planch.

Leaves unpaired-pinnate, 2-2½ feet long, glabrous.

PICRAMNIEÆ.

*Ovary* entire, 2-5-celled.

HARRISONIA, R. Brown.

*Calyx* 4-5-cleft. *Stamens* 4 or 10. *Ovary* 4-5-celled. *Leaves* pinnate, or pinnately 1-3-foliate.

- H. BENNETT, Bth. *T.* Prome and the Yunzaleen at 2000 feet.  
*Lasiolipsis paucijuga*, Benn.  
 Tapu-ben (Kurz).  
 Leaves unpaired-pinnate, the puberulous rachis winged.

BALANITES, *Delile*.

*Sepals* 5. *Stamens* 10. *Ovary* 5-celled. *Leaves* bifoliolate.

- B. ROXBURGHII, Planch. *T.* or *S.* Ava. var.  $\beta$  in Prome.  
*Ximenia aegyptiaca*, Roxb.

var.  $\beta$  *gracilis*. Branchlets slender and glabrous or nearly so. Inflorescence more glabrous than in the normal form and only puberulous, the peduncles and pedicels all very slender.

## Order RUTACEÆ.

*Flowers* regular, usually hermaphrodite. *Calyx* various, gamosepalous, or the sepals free. *Petals* as many as sepals, or twice as many, or rarely more, free or rarely cohering, imbricate or valvate. *Stamens* definite or rarely numerous. *Anthers* usually versatile, the cells opening lengthwise. *Torus* inside the stamens, usually more or less thickened into a disk. Trees or shrubs, very rarely herbs, all herbaceous parts pellucid-gland-dotted. *Stipules* none. *Leaves* opposite or alternate, simple or compressed.

Many members of this Order possess aromatic, pungent, and therapeutic properties. The bark of some species of *Toddalia* is used as a febrifuge. The limes and citrons abound in a volatile fragrant oil and salts of potash, rendering them of great therapeutic value in many diseases. The Bael is esteemed for sherbet, and several species yield good wood.

## A. Fruit separating into 2-5 distinct 2-valved carpels.

## ZANTHOXYLIEÆ.

*Flowers* usually polygamous. *Disk* free, or rarely wanting. *Styles* basilar or ventral, free. *Fruit-carpels* coriaceous, the endocarp persistent or separating elastically.

× *Leaves* opposite or nearly so, rarely intermixed with nearly alternate ones. *Unarmed*.

EVODIA, *Forster*.

*Stamens* 4-5. *Leaves* often compound, rarely 1-foliolate.

- E. VITICINA, Wall. *E.S.* Tavoy.

× *Panicles* small, contracted, usually much shorter than the petioles.

Branchlets 4-cornered and marked with 4 prominent longitudinal lines. *Leaves* 1-3-foliolate, the leaflets sessile. *Stamens* shorter than the petals.

- E. TRIPHYLLA, DC. *S.* Tenasserim between 3000 and 5000 feet.  
*E. gracilis*, Kz.

Branchlets terete. *Leaves* 8-foliolate, the leaflets short petioluled, green.

× × *Panicles* corymbose, spreading, as long or longer than the petiole.

- E. ROXBURGHIANA, Bth. *E.T.* Tropical forests of Tenasserim, the  
*Xanthoxylon triphyllum*, Wight. Andamans, and Kamorta.

Branchlets terete, thick. Leaflets shortly petioluled, dark bluish-green.

MELICOPÆ, *Forster*.

*Stamens* 8. *Leaves* often 1- rarely 3-foliolate.

- M. HELFERI, Hf. Tenasserim (Helfer).

Quite glabrous. Bark wrinkled. Disk 8-lobed.

× × *Leaves all alternate. Often armed.*

*ZANTHOXYLON, Linnaeus.*

*Petals 3-5, rarely none. Stamens as many. Leaves often pinnate.*

\* *Cymes axillary, or axillary and terminal. Branches alternate. Leaves pinnate.*

× *Rachis of leaves winged. Flowers apetalous.*

*Z. ACANTHOPIDIUM, DC. T. Hills East of Bhamo.*

Leaflets 2-3 inches long, glandular-crenulate. Cymes dense,  $\frac{1}{2}$ -1 inch long.  
Fruit-carpels usually by 4-2.

*Z. ANDAMANICUM, Kz. E.S. Tropical forests of Ternokli Island.*

Leaflets coarsely crenate,  $\frac{1}{2}$ -1 inch long. Flowers and fruit unknown.

× × *Rachis of leaves not winged. Flowers 4-5-petalous.*

*Z. HAMILTONIANUM, Wall. E.S. Burma (fide Helier).*

Leaflets in 2-3 pairs, glossy on both sides. Cymes axillary.

\* \* *Cymes terminal. Branches opposite.*

*Z. BUDRONGA, DC. E.T. Tropical forests from Chittagong to Tenasserim.  
Maya-nen (Kurz). Ka-thit-hsu (Mason).*

Leaflets glandular-crenate, in 7-10 pairs. Wood heavy, white, close-grained (Kurz).

**B.** Fruit a drupe or berry, rarely a capsule.

#### TODDALIEÆ.

*Flowers usually polygamous. Disk free. Style single. Albumen usually present.*

*ACRONYCHIA, Forster.*

*Petals 4. Stamens 8. Drupe or capsule 4-celled. Erect unarmed trees, with 1-3-foliolate leaves.*

*A. LAURIFOLIA, Bl. T. Chittagong, Pegu, the Andamans, and Kamorta.*

*A. cyminosma, F. Muell.*

*Cyminosma pedunculata, DC.*

All parts glabrous. Leaves 1-foliolate, rather shortly petioled.

*TODDALIA, Jussieu.*

*Petals 2-5. Stamens as many. Berry 4-7-celled. Climbers, often armed, with usually 3-foliolate leaves.*

*T. ASIATICA, L. S.S.*

Ava and Pegu up to 3000 feet.

*T. aculeata, Pers.*

*Scopolia aculeata, Roxb.*

Kyāu-zā.

var. *a aculeata*, Pers. Petioles and often also the midrib beneath hooked-prickly. Panicles usually smaller and less branched.

var. *β gloribunda*, Wall. Petioles and midrib of leaves unarmed. Panicles often more compound.

#### AURANTIEÆ.

*Flowers hermaphrodite. Petals and stamens free or connate. Style simple. Ovules 1, 2 or more in each cell. Berry often pulpy, with a coriaceous rind. Albumen none.*

× *Ovary-cells with 1 or 2 ovules only.*

+ *Style persistent, not jointed at the base.*

*GLYCOSMIS, Correa da Serra.*

*Calyx 5-parted or toothed. Stamens 10, free. Ovules solitary. Leaves pinnately 5-1, or rarely 7-foliolate.*

+ + *Style jointed at the base, deciduous.*

† *Leaves pinnate or 3-foliolate.*

\* *Ovules 2 in each cell.*

° *Leaves pinnate or pinnately 3-foliolate.*

‡ *Cotyledons plano-convex, fleshy. Petals imbricate.*

\*\* *Anthers blunt, not gland-tipped.*

° *Berries obovul-oblong to oblong, leaden blue.*

G. CYANOCARPA, Spreng. *E.S.*

Pegu Range.

Tor-shouk.

Petals longer, persistent. Filaments flat, from a narrower base gradually broader towards the triangular apex. Bark pale-coloured.

var. *α genuina*. Flowers in peduncled terminal and axillary panicles.

var. *β cymosa* (*G. tetraphylla*, Wall., and *G. oxyphylla*, Wall.). Flowers in short peduncled or almost sessile, quite glabrous, or rarely rusty tomentose, cymes axillary, or axillary and terminal, rarely transformed into panicles.

° ° *Berries more or less globular, from watery flesh-coloured to crimson.*

G. TRIFOLIATA, Spreng. *E.S.*

Chittagong to Tenasserim, the Andamans and Katchall.

Petals very deciduous. Filaments from a broader base attenuated upwards. Nerves of leaflets prominent above. Bark pale-coloured. Wood heavy, close-grained, yellowish-white, darkening with exposure (Kurz).

G. (LIMONIA) ARBOREA, Roxb. *E.T.*

Andamans and Nicobars.

Petals very deciduous, lanceolate, about 3 inches long. Filaments elongate, filiform. Bark brown.

\*\*\* *Anthers gland-tipped.*

G. (LIMONIA) PENTAPHYLLA, Retz. *E.S.* All over Burma.

Petals longer, persistent, about 1½ line long. Anthers cordate. Filaments flat, from a narrower base gradually broader towards the triangular apex. Bark white.

MURRAYA, *Linnaeus*.

*Stamens* 10, free. *Ovary* 2-5-celled. 1 or 2 ovules in each. *Filaments* linear-subulate. Unarmed, the flowers in terminal cymes.

M. EXOTICA, L. *E.T.*

Tropical forests of Pegu, Tenasserim, and the Andamans.

*Chaëas paniculata*, Roem.

Leaflets 3 to 8. Petals nearly ½ inch long.

"Burmese Boxwood," white, heavy, and close-grained (Kurz).

M. KOENIGII, Spreng. *E.T.*

Chittagong. Pegu Range.

Leaves 4-6-foliolate.

° ° ° *Leaves digitately 3-foliolate.*

LUVUNGA, *Hamilton*.

*Calyx* cup-shaped. *Stamens* 8 or 10. Armed or not.

\* \* *Ovules solitary in each cell.*

L. (LIMONIA) SCANDENS, Roxb.

Chittagong. Ava (?).

Filaments glabrous, more or less connate.

L. FLEUTHERANDRA, Dalz.

Tavoy.

*L. Tacoyana*, Wall.

TRIPHASIA, *Loureiro*.

*Calyx* 3-lobed. *Stamens* 6, spiny. *Leaves* digitately 3-foliate. *Flowers* almost solitary.

\* *T. trifoliata*, DC. *E.S.* Tenasserim (wild?). Nankowry and Katchall. This shrub yields the Lilliputian oranges, often seen in Chinese preserves.

LIMONIA, *Linnaeus*.

*Calyx* 4- or 5-lobed or parted. *Stamens* 8-10, armed. *Leaves* pinnate.

*L. acidissima*, L. *T.* Ava, Taong-doung, and Promé Hills.

*L. crenulata*, Roxb.

Thi-paya-zā (Kurz).

Leaflets opposite. Inflorescence puberulous. Berries globose, sessile.

var. *β pubescens*. Prickles on the branches short, the wings of the petiole narrow, leaflets bluntish, the terminal one long but bluntish acuminate, the petioles and nerves beneath softly puberulous.

*L. alternans*, Wall. *S.* Arakan, Pegu and Tenasserim.

Unarmed shrub. Leaflets alternate. Inflorescence glabrous. Berries ovoid.

†† *Leaves* 1-foliolate or simple.

PARAMIGNYA, *Wight*.

*Anthems* linear-oblong. *Disk* elongate. *Calyx* usually cup-shaped. Climbers, armed. *Berries* without pulp.

\* *Petals* about 8 lines long. *Calyx* largish, cupular, broadly lobed.

*P. monophylla*, Wight. *E.S.* Near Maulmain at 5000 feet.

Style elongate. *Calyx* and pedicels tomentose, the latter as long as or a little longer than the calyx.

*P. grandiflora*, Oliv. *T.* Tavoy.

Style short. *Calyx* and pedicels glabrous, the latter 1 inch or thereabouts long.

\*\* *Petals* 2-4 lines long. *Calyx* small, with acute lobes.

*Berries* terete.

*P. Griffithii*, H. f. *E.S.S.* Ava, Serpentine mines of the Hookam Valley. Pegu (*vide* Helfer).

Young shoots more or less puberulous. Style short, hirsute or villous.

*P. (Limonia) citrifolia*, Roxb. *S.S.* Tropical forests of Chittagong, the Andamans and Nicobars.

*P. micrantha*, Kz.

Glabrous. Style very short, like the ovary glabrous.

*Berries* 3-4-angular.

*P. angulata*, Willd. *T.* Tidal forests of Pegu and Tenasserim.

*Limnelli angulosus*, Rumph.

*Limonia angulosa*, W. A.

*P. longispina*, H. f.

*Gonocitrus angulatus*, Kz.

Erect tree, the spines 1-1½ inch long, straight. *Calyx* glabrous.

This species has got quite an array of synonyms. I attempted to establish a new genus upon it on account of the angular fruits and absence of pulp, but on examining the fruits of several other *Paramignyas*, I find that they also seem to be

pulpless (*P. littoralis*, Miq.), when dried. *Atalantia missionis*, Oliv., has curiously enough retained its place in *Atalantia*, although habit and generic characters place it beyond any doubt in *Paramignya*, and in habit it approaches very much the above species (Kurz).

C. KOENIGII, Spreng. Tropical forests of Chittagong and the Pegu  
*Murraya fetidissima*, T. et B. Range, along streams.  
 Leaflets 10 to 20. Petals about 2 lines long.

CLAUSENA, *Burmans.*

*Filaments* dilated at the base. Unarmed, the flowers in panicles or racemes.

\* *Panicle terminal.*

° *Ovary glabrous.*

C. MACROPHYLLA, H. f. Bank of the Salween at Trokla.

Softly villous. Leaves pinnately 5-foliate. Flowers 4-merous.

C. (AMYGDALUS) HEPTAPHYLLA, Roxb. S. Chittagong. Tenasserim (*vide* Helfer).  
 Pyin-dor-thein (Kurz).

Inflorescence and leaves glabrous. Petiole and rachis terete or nearly so. Leaflets usually 7 (5-9), not, or hardly oblique. Flowers usually 4- rarely 5-merous.

C. WALLICHII, Oliv. S. Pegu Range and Tenasserim.

Inflorescence and leaves glabrous. Rachis more or less winged. Leaflets 13-17, oblique. Flowers 5-merous.

°° *Ovary more or less hirsute or pubescent.*

C. EXCAVATA, Burm. E.S. All over Burma.

Leaflets 15-30, oblique. Flowers 5-merous.

\* C. WAMPI, Blanco. E.T. Chittagong (in gardens).

Inflorescence and the tubercled petioles densely and shortly tawny tomentose. Leaflets 5-9. Young berries densely fascicled-tomentose. Flowers 5-merous.

\*\* *Panicles or racemes axillary.*

C. (AMYRIA) SUFFRUTICOSA, Roxb. S. Chittagong and Prome.

All parts shortly pilose. Leaflets 5 to 17. Ovary and the long red berries glabrous. Flowers 4-merous.

‡‡ *Cotyledons crumpled, leafy. Petals valvate.*

MICROMELUM, *Blume.*

*Filaments* linear-subulate. Unarmed, the flowers in terminal corymbs.

M. PUBESCENS, Bl. E.T. All over Burma and the Andamans.

*Bergera integerrima*, Roxb.

Ta-nyeng-lipo (Kurz).

Petals 2½ lines long. Ovary slightly appressed-pubescent. Young berries stalked glabrous. Wood heavy, close-grained, yellowish.

M. HIRSUTUM, Oliv. S. All over Burma.

*M. Zeylanicum*, Wight.

Meagre shrub up to 4 feet high. Petals 2 lines long. Ovary densely tawny hirsute. Young berries sessile or nearly so, puberulous.

ATALANTIA, *Correa da Serra.*

*Anthers* ovate or cordate. *Disk* cup-shaped. *Calyx* often irregular. Trees or shrubs, often armed. *Berries* with vesicular pulp.

× *Calyx irregularly lobed, split to the base on one side.*

A. MONOPHYLLA, L. *E.S.*

Ava, Segain. The Nicobars.

*A. floribunda*, Wight.

*A. puberula*, Miq.

*Chilocalyx ellipticus*, Turcz.

Berries the size of a large pea or small cherry. Wood heavy, hard, and close-grained, white, or yellowish, resembling 'boxwood,' suitable for turning (Kurz).

A. MACROPHYLLA, L. *E.T.*

Coasts of Andamans and Tenasserim.

*A. monophylla*, var. *macrophylla*, Oliv.

Berries the size of a wood-apple.

× × *Calyx regularly 4-lobed.*

A. CAUDATA, H. f.

Along streams in the Pegu Range.

The Burmese plant is a middling-sized tree of elegant appearance, but spiny. I have not met either with flowers or fruits, and therefore the identification must remain doubtful (Kurz).

× × *Ovary-cells with numerous orules.*

† *Rind of berry leathery. Leaves 1-foliate.*

CITRUS, *Linnaeus.*

× *Young shoots and nerves of leaves beneath pubescent or puberulous. Flowers and fruits large.*

*Stamens* 20-60, often connate. Trees, usually spiny.

\* CITRUS DECUMANA, L.

Cultivated.

Shouk-tong-ō.

× × *All parts glabrous.*

° *Style very short.*

\* C. HYSTRIX, DC.

Tropical forests of Martaban, the Nicobars, and Siam.

Shouk-pōk.

Flowers small. Stamens free. Petioles leafy, and almost as long and as broad as the blade itself.

° *Style as long as the ovary or much longer.*

† *Petals 8 to 10 lines long.*

\* C. AURANTIUM, L. *E.T.*

Occasionally cultivated.

Leaves acuminate or acute, the petiole often winged. Berries globular, without a knob. Filaments cohering by 3-4.

\* C. MEDICA, L. *E.S.*

Shouk-ta-khwā.

Leaves blunt or nearly so, the petiole not winged. Berries oblong to globose, with a knob, the skin usually thick. Filaments free or polyadelphous.

var. *α gemina*.

var. *β limonum*, Brand.

var. *γ acida*, Roxb.

var. *γ* apparently wild in the Khaboung forests of the Pegu Yomah, west of Young-ngoo (Brandis); the other varieties only cultivated.

†† *Petals 3-4 lines long.*

\* C. NOBILIS, Lour. *E.T.*

Cultivated all over Burma and Ava.

*Aurantium Sinense*, Rumph.

Wild on Kamorta and Katchall.

*C. medica*, var. *limetta*, Brandis.

Calyx small. Berries globular, sweet or acid, the skin usually thin.

The fruits of this genus are the most wholesome and refreshing which we know, their therapeutic value depending on the presence of salts of potash, and contain bitter and aromatic principles, chiefly lodged in the rind. The juice of several varieties of lime is of immense value both as preventing and curing that formidable disease, scurvy, which is by no means (as some suppose) confined to the sea-faring classes, and is accompanied by a deficiency of potash salts in the blood. Lime-juice is also used by the Burmese for the cure of bilious diarrhœa, and in some cases of dysentery (probably complicated by a scorbutic taint) lime juice is of service. In rheumatism and rheumatic gout, and the sickness of pregnancy, lime-juice is of great value; and the rind of both sweet and bitter oranges forms a most wholesome preserve, and yields an infusion which is a valuable adjunct to other tonics.

Orange-flower water is distilled from the flowers of the Seville orange (*C. communis*), which by the same process yield the volatile oil called "Essence of Neroli," and the rind gives the peculiar flavour to Curaçoa. Bergamot is an essence expressed from the rind of a species of lemon.

† † Rind of berry woody. Leaves compound. Trees.

FURONIA, *Correa da Serra*.

Ovary 5-6-celled. Leaves pinnate.

F. ELEPHANTUM, COIT.

Prome.

'Thi' (though Kurz gives 'Mahan'). Yields a gum.

ÆGLE, *Correa da Serra*.

Ovary 8- to many-celled. Leaves trifoliate.

\* Æ. (CRATEVA) MARMELOS, L.

Ok-shyt or Ō-shyt. Bael of Hindustan.

Much cultivated, especially in the Prome district, and said to occur wild in the forests also: I found the tree in those of the Toukyeghat, east of Toung-ngoo (Kurz).

The ripe fruit is very fragrant, and forms a mucilaginous 'sherbet,' much esteemed for its mildly astringent properties; it is however of small medicinal value.

#### Order GERANIACEÆ.

Flowers hermaphrodite, regular or irregular. Sepals 5, rarely 4 or 2, free or connate to the middle, imbricate or rarely valvate. Petals as many or fewer, rarely none, hypogynous or almost perigynous, variously imbricate. Torus scarcely expanded into a disk, with glands, alternating with the petals, or without glands, raised in the centre into a beak, rarely flat. Stamens as many as the sepals, or 2 or 3 times as many; rarely fewer. Filaments free, or connate in a ring. Anthers 2-celled, the cells opening lengthwise. Fruit a capsule, dry, and the valves separating from the axis; or fleshy and elastically dehiscent; rarely a drupe or berry. Herbs or shrubs, rarely trees. Flowers various, often thorny.

#### OXALIDIEÆ.

Flowers regular. Sepals imbricate. Glands none. Stigmas capitate. Ovary-cells with 2 or more ovules.

\* Capsule dry or nearly so, dehiscent. Herbs.

#### OXALIS, *Linnaeus*.

Stamens 10. Capsule dehiscent loculicidally, the valves cohering with the axis. Leaves usually digitately compound.

- O. CORNICULATA*, L. In rubbishy places all over Burma.  
*O. pusilla*, Salisb.

BIOPHYTUM, *De Candolle*.

*Stamens* 10. *Capsule* dehiscent loculicidally, the valves usually separating from the axis to the base. *Leaves* pinnate.

- \* *B. (OXALIS) SENSITIVUM*, L. In rubbishy places all over Burma.  
*B. Candolleanum*, Wight.

Leaflets nearly straight, in 10-11 pairs. Flowers larger. Capsule usually much shorter than the calyx. Seeds obliquely transverse-furrowed.

- B. ADIANTOIDES*, Wight. Mergui.

Leaflets very unequal at base, in 12-25 pairs. Peduncles with a clubbed mass of bracts at apex.

- B. REINWARDTII*, Walp. On poor soils all over Burma.

Leaflets equal, in 10-20 pairs. Flowers smaller. Capsule almost as long as or a little longer than the sepals, small. Slender herb.

\* \* *Berry fleshy, indehiscent. Shrubs or trees.*

AYERKHOA, *Linnaeus*.

*Stamens* 10, of which 5 are often reduced to staminodes. *Styles* distinct. *Ovary-cells* many-ovuled. *Seeds* arillate or without arillus. Trees with pinnate leaves.

- \* *A. CARAMBOLA*, L. *E.T.* Cultivated.

Soung-yah ('*Kamranga*' of India).

Fruits sharply angled. Seed arillate.

- \* *A. BILIMBI*, L. *E.T.* Occasionally cultivated.

Fruit bluntish angular. Seed without arillus.

The differences between *A. carambola* and *A. bilimbi* appear to me to be of generic value (Kurz). These trees produce very sour fruits, which are eaten in stews and tarts; especially the *Kamranga*.

## BALSAMINIEÆ.

*Flowers* regular. *Sepals* coloured, the posticous spurred. *Anthers* almost connate.

IMPATIENS, *Linnaeus*.

\* *Leaves* all opposite or occasionally ternately-whorled.

- I. CHINENSIS*, L. Tenasserim.  
*I. fasciculata*, Lam.  
*I. heterophylla*, Wall.  
*I. setacea*, Coleb.

Leaves almost sessile. Flowers rather large, wings obtuse, the spur long and slender, inflexed.

- I. RETICULATA*, Wall. Common all over Burma.

Exactly as the preceding, but the spur short and inflexed.

Hardly more than a form of the preceding. *I. tomentosa*, Heyne, is stated by H. f. and Thoms. to grow in Pegu, but the habitat is omitted in Hf. Fl. Ind. It seems to be the above species, at any rate the Wallichian specimens cited belong here (Kurz).

- I. CIRCEOIDES*, Wall. Moist forests of Pegu and Tenasserim.

Leaves on long petioles. Flowers rather small, the wings acuminate, the spur short, incurved.

\*\* *Leaves all alternate.*

° *Flowers shortly racemose, umbellate or corymbose at the ends of the long peduncles.*

I. TAYOYANA, Bth.

Tenasserim.

Leaves petioled. Flowers small, with a long, straight or curved spur.

° ° *Peduncles 1- or rarely 2- or 3-flowered, shorter than the leaves.*

× *Spur usually much shorter than the corolla.*

† *Flowers 1-2 inches long.*

\* I. BALSAMINA, L.

Cultivated and in rubbishy places  
near villages.

I. *Malayensis*, Griff.

Stem succulent, the thickness of a goose-quill. Leaves narrow, pubescent or glabrescent, shortly petioled. Spur often very long and slender.

I. PARISHII, H. f.

On limestone rocks near Maulmain.

Stem the thickness of the finger, short. Leaves elliptic or ovate, glabrous, long-petioled.

†† *Flowers small.*

I. CAPILLIFES, H. f. and Th.

On limestone rocks near Maulmain.

Glabrous, slender. Leaves long-petioled, narrow.

× × *Spur longer than the corolla.*

I. VIOLEFLORA, H. f.

Maulmain.

Very slender, glabrous. Capsule puberulous. Flowers rather large.

I. ARGUTA, H. f.

HYDROCERA, *Blume.*

All petals free. *Drupe*s sappy, indehiscent.

H. (IMPATIENS) NATANS, Willd.

Ditches and water-courses in Pegu.

H. *triflora*, W. A.

#### Order MALPIGHIACEÆ.

*Flowers* hermaphrodite, regular or irregular. *Calyx* usually 5-partite, imbricate, or valvate, one or more of the 5 segments furnished with a large gland, rarely absent. *Petals* 5-clawed, or sessile, imbricate. *Disk* obsolete. *Stamens* 10 or more, hypogynous or nearly so. *Filaments* free, or more or less basally connate. *Anthers* 2-celled. *Fruit* a 1-3-winged samara, or capsule, or drupe. *Albumen* none. Trees or shrubs with opposite simple leaves. *Stipules* minute or none. *Flowers* in axillary or terminal inflorescences.

#### MALPIGHIEÆ.

*Carpels* never winged, free or united into a fleshy or drupaceous 1- to 3-celled fruit. Usually erect shrubs, with opposite leaves and connate stipules.

#### MALPIGHIA, *Linnaeus.*

*Calyx* 6-10-glandular. *Filaments* at base glabrous. *Ovary* entire, 2-4-celled, styles terminal and free. *Drupe*s containing 3 or fewer crested nuts.

\* M. COCCIGERA, L. S.

Chittagong (wild and cultivated as  
an ornamental shrub).

M. *heteranthera*, Wight.

#### HIRIEÆ.

*Samaras* 1-3, obliquely accumbent to a short pyramidal torus, or the carpels united

into a winged indehiscent capsule. Woody climbers or rarely erect shrubs or trees, the stipules minute or wanting.

\* Stamens definite, usually 10, all perfect.

° Style 1, rarely 2.

HIPTAGE, Gaertner.

*Calyx* with a single large gland adnate to the pedicel. *Carpels* 3-winged. Trees or woody climbers.

M. BENGALENSIS, L. S.S.

Pegu and Tenasserim.

*Gaertnera racemosa*, Roxb.

Scandent diffuse shrub, branched almost from the base. Leaves larger, more acute and greyish-green. Bark grey.

H. OBTUSIFOLIA, DC. C.

Pegu Range and Khakyen Hills.

A lofty climber, the stem simple, cable-like, up to 100 feet long. Leaves smaller, broader, often bluish apiculate, glabrous and glossy, dark-green. Bark dark-brown.

H. CANDICANS, H. f. T.

Dry forests of Prome.

*H. arborea*, Kz.

Toung-htsu-khā-pān (Kurz).

A small tree. Flowers often pale pink with the usual yellow basal blotch. Capsule not ridged on top, the wings shorter and broader, obliquely truncate. Bark thick and corky, dark-brown. Growth erect, not scandent.

H. SUMATRANA, Miq.

Nankowry.

Identical, Kurz thinks, with *H. Javanica*.

°° Styles 3. *Calyx* without glands.

ASPIDOPTERYS, A. Jussieu.

*Petals* not clawed. *Stigmas* capitellate. *Samaras* broadly winged all round. Woody climbers.

\* *Gynobase* persistent after the fall of the samaras, conical, acute, exerted, surrounded by 3 smooth acute disk-lobes.

A. (HIREA) NUTANS, Roxb. W.C.

Chittagong. Bhamo.

*A. lanuginosa*, A. Juss.

Leaves tomentose beneath, acuminate. Ovary hirsute. Nucleus of samara with or without a crest.

A. (HIREA) TOMENTOSA, Bl. W.C. Khakyen Hills and Hills East of Toung-ngoo.

Leaves tomentose beneath, more or less glabrescent, apiculate. Ovary quite glabrous. Nucleus of samara with a crest.

\*\* *Gynobase* absent after the fall of the samaras or minute and shorter than the disk lobes, the thick 3-lobed often cup-shaped disk usually wrinkled.

× *Samara* nearly as broad as long, with a vertical crest between the wings.

A. CONCAVA, A. Juss. W.C.

Tenasserim.

All parts, also the ovary, quite glabrous. Disk in fruit about 1 line broad.

A. HELFERIANA, Kz.

Tenasserim.

Leaves puberulous along the nerves beneath. Disk smaller, hardly wrinkled.

× × *Samara* more than twice as long as broad, not crested.

A. (TRIOPTERIS) INDICA, Willd.

Ava. Salween Valley.

*A. Roxburghiana*, A. Juss.

All parts glabrous. Ovary hirsute.

A. (HIREA) HIRUTA, Wall.

Avā. Taong-doung. Prome.

All parts hirsute. Ovary glabrous.

\*\* *Stamens* numerous. *Styles* 3, consolidated. *Calyx* minute, without glands.

PLAGIOPTERON, Griffith.

*Capsules* indehiscent, 3-4-winged as in *Hiptage*. *Petals* reflexed.

P. SCAVEOLENS, Griff. W.C.

Mergui.

#### Order ZYGOPHYLLÆ.

*Flowers* hermaphrodite, white, red or yellow, rarely blue. *Petals* 5-4 (rarely none), hypogynous, free. *Disk* hypogynous, rarely annular. *Stamens* usually double the number of petals, 2-seriate. *Seed* usually solitary, rarely 2 or more, pendulous. *Albumen* cartilaginous, rarely none.

TRIBULUS, *Linnaeus*.

*Stamens* 10. *Fruits* dry, composed of 5-12 cocci, usually winged or spiny. Herbs with pinnate leaves.

T. CISTOIDES, L.

Flowers 1-2 inches in diameter, the peduncles as long as or longer than the leaves.

T. LANUGINOSUS, L.

Flowers  $\frac{1}{2}$ - $\frac{3}{4}$  inch in diameter, the peduncles shorter than the leaves.

#### Order CORIARIEÆ.

*Flowers* regular. *Petals* 5, small, fleshy. *Stamens* 10. *Ovary* 5-lobed, of 5 one-ovuled carpels. *Styles* 5. *Fruit* apocarpous. *Albumen* scanty or none. Shrubs. *Leaves* simple, opposite, exstipulate.

CORIARIA, *Linnaeus*.

*Perianth* 5-6-sepalled, imbricate. *Staminodes* 5-6, sepal-like. *Stamens* 10-12, exserted. *Filaments* filiform. *Anthers* large, 2-celled. *Ovary* consisting of 5-6 carpels adnate to a central torus, with a solitary pendulous ovule in each.

C. NEPALENSIS, Wall.

Khakyen Hills.

Branches 4-cornered, all parts glabrous. Leaves opposite, 3-nerved at the base, thin, coriaceous.

The affinities of this genus are obscure. Endlicher makes it the type of an Order, whilst Kurz ranges it in *Phytoluceæ*, from which it differs in the *petals*, pendulous *ovules*, fleshy *albumen*, and straight thick *embryo*. The leaves and fruits of species of this genus contain a poisonous crystallizable narcotic principle, *Coriariine*, which is dangerous, as the leaves are sometimes used (it is said) to adulterate Senna. The seeds of *C. sarmentosa* of New Zealand and *C. Nepalensis* are very poisonous, but the juicy fruit is edible. *C. myrtifolia* and the Chinese *C. ruscifolia* are rich in tannin, and yield a black dye, much used by shoemakers.

#### Order LINEÆ.

*Flowers* regular, hermaphrodite. *Sepals* 5, rarely 4, free, or basally connate, imbricate. *Petals* as many, often fugaceous, often twisted imbricate. *Stamens* 4-5, alternating with as many staminodes. *Hypogynous glands* 5, usually adnate to the staminal ring or obsolete. *Fruit* usually a capsule, rarely a drupe. Herbs or shrubs, rarely trees.

EULINIEÆ.

*Petals* twisted. *Perfect stamens* as many as *petals*. *Capsule* opening septicidally. Herbs or small shrubs.

REINWARDTIA, Dum.

*Calyx* glabrous. *Styles* 3 or 4. *Capsule* 3-4-celled.

R. INDICA, Dum.

Chittagong. "Karen country" (Karen-ni?).

R. trigyna, Planch.

Linum repens, Don.

ERYTHROXYLLIÆ.

*Petals* usually imbricate, rarely twisted, with a basal scale inside. *Perfect stamens* twice as many as *petals*. *Fruit* a drupa. *Shrubs* or *trees*.

ERYTHROXYLON, Linnaeus.

§ *Styles* free from the base (*Erythroxylon*).

E. KENTHIANUM, Wall.

Martaban Hills up to 7000 feet.

Leaves lanceolate, shortly acuminate-glaucous beneath. *Pedicels*  $\frac{1}{2}$  inch long.

§ *Styles* united for about  $\frac{1}{2}$  of their length (*Sathia*).

E. (SETHIA) INDICUM, DC.

Pegu (fide Mason).

E. monogynum, Roxb.

Leaves obovate or oblong, blunt. *Pedicels* usually 3 lines long, rarely longer.

E. CUNEATUM, Miq.

Tenasserim.

E. Burmanicum, Griff.

Leaves broadly obovate or oblong, retuse. *Pedicels* short.

Series III. THALAMIFLORÆ.

*Sepals* usually distinct and separate, free from the ovary.<sup>1</sup> *Petals* 1-, 2-, or many-seriate, hypogynous. *Stamens* hypogynous, rarely inserted on a short or long torus, or on a disk. *Ovary* superior.

MALVALES.

*Flowers* rather irregular. *Sepals* 5, rarely 2 or 4, free or connate, valvate or imbricate. *Petals* as many, or more. *Stamens* usually many and monadelphous. *Ovary* 3- to many-celled, rarely of one carpel. *Ovules* on the inner angles of the cells. *Shrubs*, rarely *trees*. *Leaves* alternate, usually stipulate, simple or compound.

Order TILIACEÆ.

*Flowers* regular, hermaphrodite or unisexual. *Sepals* 3-5, free or united, valvate. *Stamens* numerous, rarely few and definite, usually arising from a prolonged or dilated torus, free, or rarely quinque-adelphous. *Anthers* 2-celled. *Ovary* free, 2-10-celled, each cell with few, often pendulous, or numerous ovules often placed in 2 or more series. *Trees*, *shrubs*, or *herbs*, with alternate, rarely opposite, simple or lobed leaves. *Flowers* usually cymose.

A. Anthers opening by slits.

BROWNLOWIÆ.

*Sepals* united into a bell-shaped 3-5-cleft calyx. *Anthers* short, usually globular or didymous, the cells ultimately confluent at the top.

<sup>1</sup> Exceptions: Connate *sepal's* occur in a few orders. The calyx is adnate to the ovary, or to a fleshy torus embracing the ovary, in *Pæonia*, *Calycanthaceæ*, and in some *Anonaceæ*, *Nymphaceæ*, *Portulacæ*, *Capparidæ*, *Buxinæ*, *Polygalæ*, *Camelæacæ*, *Vochysiaceæ*, *Tiliacæ*, and *Upterocarpaceæ*. Petaloid *sepal's* occur in apetalous *Ranunculaceæ*, in *Berberidæ*, *Tiliaceæ*, and others. The *stamens* are manifestly perigynous in a few *Dilleniaceæ*, *Papaveraceæ*, *Capparidæ*, *Monimææ*, *Resedaceæ*, *Violaceæ*, *Caryophyllæ*, *Portulacæ*, *Malvacæ*, and *Succulacæ*.

\* *The 5 inner stamens reduced to staminodes.*

BROWNLOWIA, Roxburgh.

*Carpels* distinct, globular, 2-valved, 1-seeded. Albumen none. Trees with stellate or scaly pubescence and simple leaves.

\* *Leaves deeply peltate.*

B. PELTATA, Bth. S.T. Tenasserim.

Leaves oblong or rotundate. Calyx velvety.

\*\* *Leaves not peltate.*

B. ELATA, Roxb. Chittagong to Tenasserim.

Leaves cordate-oblong. Calyx velvety.

B. LANCEOLATA, Bth. Tidal forests of Arakan and Tenasserim.

Leaves lanceolate. Calyx scaly.

PENTACE, Hasskarl.

*Fruits* 3-5-winged, indehiscent, by abortion 1-seeded.

P. BURMANICA, Kz. E.T. Tropical forests of Pegu Range and Martaban.

Kurz gives Thyt-kā or Kathyt-kā as the name of this tree, and describes the wood as heavy. Now 'Thyk'-kā weighs 37 lbs. only to the cubic foot, and is not a heavy wood, whilst 'Kathyt' (= ? *kathit-kā*) is one of the lightest woods known, being 23 lbs. only.

BERRYA, Roxburgh.

\* \* *Anthers all anther-bearing.*

*Capsule* 3-4-valved, with twice as many wings. *Styles* 1-4, filiform.

B. AMONILLA, Roxb. Mixed forests of Pegu and Martaban.  
var. *mollis*, Wall.

Hpet-wun.

The wood is reddish-brown, and something like a rather coarse-grained mahogany. It weighs 56 lbs., and is excellent for all purposes, and planes and dresses well.

GREWIEÆ.

*Sepals* distinct. *Petals* with a basal seale more or less adnate, inserted round the base of a more or less raised torus bearing at the top the stamens. *Anthers* short, the cells parallel and distinct.

\* *Fruit* dry, winged.

COLUMBIA, Persoon.

*Fruit* 3-5-celled, separating into as many 2-winged cocci. Trees or shrubs, with simple often oblique leaves. Flowers small, clustered in terminal panicles.

C. (GREWIA) FLORIBUNDA, Wall. S. Ava, Taong-doung. Toukyagat, East of Young-ngoo.

Leaves cordate-oblong. Fruits  $\frac{3}{4}$ -1 inch across.

C. MERGUENSIS, Planch. Mergui.

Leaves lanceolate. Fruits  $1\frac{1}{2}$  inch across.

\* \* *Fruit* more or less drupaceous, not winged.

° *Fruit* unarmed, tomentose to glabrous.

GREWIA, Linnæus.

*Drupe*s more or less lobed or globular. Trees or shrubs with simple 1-9-nerved leaves. *Flowers* rather small, axillary and few, in cymes, or in terminal panicles.

Sub-genus *Microcos*.

*Stigma* shortly-toothed. *Flowers* forming terminal panicles, involucred in bud.

\* *Endocarp of drupes fibrous-woody.*

*G. CALOPHYLLA*, Kz. *E.T.* Tropical forests of South Andamans. Kamorta.

Leaves entire, sub-coriaceous, glabrous. Ovary and torus velvety-tomentose.

\*\* *Endocarp of drupes crustaceous or bony.*

*G. MICROCOS*, L.

From Chittagong to Tenasserim.

*G. ulmifolia*, Roxb.

Myat-ya.

Leaves thin chartaceous, glabrous or beneath puberulous, not sinuate. Ovary and torus glabrous. Wood 51 lbs. (Kurz). This is probably the wood known to me as *mi-ai-ā*, 45 lbs. (well-seasoned), a very pale dirty-reddish colour, a second-class wood for common uses. The name, however, probably applies to several species.

*G. SINUATA*, Wall. *S.*

Swamp forests of Pegu and Tenasserim.

Like the last, but flowers and leaves much smaller, and the latter sinuate-lobed, probably only a marshy race of the last.

Sub-genus *GREWIA*.

*Stigmas* dilated and fringed, radiating. *Flowers* in axillary or leaf-opposed cymes or clusters.

○ *Cymes or clusters axillary.*

× *Leaves at base 3-nerved, rarely with an additional lateral one.*

† *Drupes deeply 2-4-lobed from the top, by abortion sometimes 1-lobed.*

*G. SCABRIDA*, Wall. *E.S.*

Tenasserim.

Cymes and sepals shortly rusty-tomentose. Leaves on both surfaces very scabrous from minute stellate hairs. Drupes deeply 4-lobed.

*G. LEVIGATA*, Vhl. *E.T.*

var. *α* Mixed forests of Pegu and

*G. didyma*, Roxb.

Tenasserim. var. *β* in Arakan.

Cymes sprinkled with stiff hairs, glabrescent. Sepals greyish or tawny-velvety. Leaves glabrous, or sprinkled with simple short hairs, rarely puberulous beneath. Drupes didymous.

var. *α glabra*. Leaves glabrous, or tufted-hairy in the nerve-axils beneath.

var. *β pubescens*. Leaves beneath minutely puberulous or densely downy.

†† *Drupes entire or only slightly and obtusely lobed at the top.*

*G. EXCELSA*, Vhl. *S.*

Chittagong (*vide* Masters).

*G. salviifolia*, Roxb.

Leaves beneath and young parts greyish velvety. Drupes globular, grey-pubescent.

*G. HIRSUTA*, Vhl.

Mixed forests all over Burma.

*G. pilosa*, Roxb.

Kyet-ta-yaw (Kurz).

Leaves at base 3- or 4-nerved. Cymes rather long-peduncled. Drupes obsoletely 4-lobed, red, sparingly hirsute.

var. *α genuina*. Leaves green, 3-nerved, sprinkled with short stiff hairs.

var. *β viminea*, Wall. Leaves longer and narrower, very long acuminate.

var. *γ helicterifolia*, Wall. Leaves acuminate, at base 3- or almost 4-nerved, thinly hirsute or tomentose above, beneath clothed with a whitish velvety tomentum.

*G. HUMILIS*, Wall. *S.* Streams of Pegu and Ava. var. *a* Ava, Segain Hills ;  
var. *β* in savannahs, especially along the borders  
of swamp forests of the Irrawaddy.

More tomentose. Drupes obsolete 2-lobed, red, sparingly hirsute.

var. *a Wallichii*. Tomentum more villous, leaves acute.

var. *β retusifolia*, Kurz. Tomentum velvety. Leaves deeply retuse and broader.

The drupes are normally 4-lobed, but by abortion usually 2- rarely 1- or 3-lobed.  
The species is hardly more than an extreme form of *G. hirsuta*, Vhl.

*G. MICROSTEMMA*, Wall. *S.* Ava and Prome Hills.

Leaves at base 3- or 4-nerved, scabrous. Flowers in short dense sessile clusters.  
Stamens 16.

× × Leaves usually broad, at base 5-7-nerved, the upper ones often only 3-nerved  
or 3- and 5-nerved ones mixed.

† Peduncles slender, much longer than the petioles.

*G. ELASTICA*, Royle. *T.* Mixed forests of Chittagong, Pegu,  
*G. vestita*, Wall. and Martaban.

Pyn-ta-yer (Kurz).

Leaves obliquely lanceolate, while young, greyish or whitish tomentose beneath.

*G. TILLEFOLIA*, Vhl. *T.* Ava.

*G. ASIATICA*, L. *T.* Ava (stunted variety).

Leaves broadly obovate or almost rotundate, on both sides sprinkled with stellate  
hairs, or pubescent beneath, often scabrous.

†† Peduncles very short or almost reduced, and the flowers appearing clustered.

*G. ABUTILIFOLIA*, Juss. *S.* var. *a* Pegu. var. *β* not rare in the mixed forests  
Hsen-mēh-no-pyin (Kurz). forests of the Pegu Yomā. var. *γ* frequent in  
the low and Eng forests of Pegu, and Martaban.

Leaves very variable in shape, tomentose to pubescent. Drupes from the top  
deeply 4- or only by abortion fewer-lobed.

var. *γ sclerophylloides*. A low shrub, 3-4 feet high, more or less branched,  
the younger parts densely rusty-coloured villous. Leaves very variable in shape on  
the same branch, the lower ones usually ovate-oblong, up to nearly one foot long, the  
upper and uppermost ones gradually smaller and narrower, from ovate to lanceolate,  
doubly and sometimes bristly serrate, acuminate, scabrous or thinly pubescent above,  
beneath more or less stellate-pubescent or almost tomentose. Bracteoles linear-  
lanceolate, acuminate, pubescent externally, longer or as long as the flower-buds.  
Petals a line long, the lamina acuminate, pubescent outside. Drupes deeply 4-lobed,  
often remaining sparingly hirsute during ripeness. A laterite form.

A very variable plant, of which I entertained some hope of being able to separate  
var. *γ* (which is also a common Assam plant) specifically. It resembles in size of  
flowers *G. sclerophylla*, but the deeply 4-lobed drupes at once separate it (Kurz).

*G. SCLEROPHYLLA*, Wall. Ava and Chittagong (*vide* Masters).  
*G. scabrophylla*, Roxb.

Leaves very scabrous and harsh. Drupes the size of a cherry, almost globular.

The fruits of several species of *Grewia* are pleasant, and make a favourite sherbet,  
especially the cultivated *G. Asiatica*. The leaves also yield fodder for cattle, as  
*G. Asiatica*, *G. elastica* and *G. oppositifolia*, and some an ordinary timber.

° ° Fruits prickly.

TRIUMFETTA, *Linnaeus*.

Drupe usually small, globular, indehiscent or separating into cocci.

*Capsules indehiscent, globular, echinate, the cells usually 1-seeded (Lappula).*

*T. ROTUNDIFOLIA*, Lamk.

Ava.

Leaves rotundate, not lobed, blunt, beneath greyish-tomentose like the sepals.

*T. RHOMBOIDEA*, Jacq.

A common weed in cultivated lands and leaf-shedding forests all over Burma. Kamorta.

*T. angulata*, Lamk.

*T. Bartramia*, Roxb.

*T. cana*, Bl.

Chittagong (*fide* Masters).

Leaves rotundate, acuminate, often lobed. The sepals stellate-hairy.

*Capsules when ripe separating into 3-4 cocci, densely covered by long bristles, the cells usually 2-seeded (Bartramia).*

*T. ANNA*, L.

Mixed forests of Ava and Pegu.

Leaves slightly hirsute. Capsules and bristles glabrous.

*T. PILOSA*, Roth.

var.  $\beta$  common all over Burma, in the mixed forests and clearings.

var.  $\beta$  *oblonga*, Wall. ; *T. tomentosa*, Mast. ; *T. octandra*, Griff. The bristles of the carpels somewhat shorter and straight or nearly so.

Masters identifies var.  $\beta$  of this species with *T. tomentosa*, Boj. The Mauritian plant, which for a long time was cultivated in H.B.C., but is now apparently lost, has a velvety tomentum and small globular fruits not larger than those of *T. rhomboidea*, while Masters describes them as being as large as a cherry.

*DICLIDOCARPUS*, *Asa Gray*.

*D. (TRICHOSPERMUM) JAVANICUM*, Blume.

Tropical forests of Kamorta.

*Bicagrevia Nicobarica*, Kz.

#### TILIÆÆ.

*Sepals distinct. Petals without a scale at base, inserted directly round the stamens.*

\* *Capsule opening loculicidally, almost pod-like or globular, many-seeded.*

*CORCHORUS*, *Linnaeus*.

*Stamens* all anther-bearing. *Capsules* pod-like or globular, striate or muricate.

§ *Capsules globular or nearly so, more or less muricate.*

\* *C. CAPSULARIS*, L.

Cultivated for its fibre all over Burma.

Lower pairs of serratures of leaves produced into five bristles. Capsules 10-sulcate, truncate. The fibre is the 'Jute' of commerce.

§ *Capsules more or less elongate or linear, cylindrical or angular, but not winged.*

\* *Capsules 1 to 2 inches long or longer. Stamens very numerous.*

Lower pair of serratures of leaves produced into long bristles.

\* *C. OLITORIUS*, L.

Wild and cultivated for its fibre in Ava and Pegu.

*C. decemangularis*, Roxb.

Capsules 2 inches long, 5-celled and 5-ribbed, longitudinally pitted, the partitions within very distinct.

Leaves without basal bristles, usually small and blunt.

*C. TRILOCLARIS*, L.

Burma (*fide* Mason).

Capsules 2 inches long, sparingly and minutely tubercled, glabrous, beaked.

*C. URTICEFOLIUS*, W.A.

Ava.

As preceding, but capsules only about 1 inch long, thinly pilose.

*C. TRIDENS*, L.

Prome.

*C. trilocularis*, Burm.

Capsules 1-1½ inch long, almost terete, not wrinkled, 3-4-celled, 3-4-toothed at apex, without partitions inside.

\* \* Capsules about ½ inch long. Stamens 5 to 10.

*C. FASCICULARIS*, Lamk.

Plains between the Ilec and Irrawaddy.

Capsules almost terete, tomentose, 3-celled, without partitions inside.

§ Capsules elongate, thick, truncate, 6-angled, the alternate angles winged.

*C. ACUTANGULUS*, Lamk.

Deciduous forests up to 3000 feet.

*C. fuscus*, Roxb.

Stamens 15 to 20. Leaves without bristles. Capsules ¾-1 inch long, terminating in 3 simple or 2-cleft spreading points.

All the species of *Corchorus* yield a useful fibre, collectively known in the market as 'jute,' and in great demand for the manufacture of the coarse sacking known as 'Gamy,' or 'Tât.' The leaves boiled afford a common vegetable. The plant grows wild in Burma, and might be probably cultivated with profit for its fibre, for which the demand is very great, and the selling price about 4 rupees a maund.

**B.** Anthers opening by apical pores.

#### *SLOANIEÆ.*

Anthers linear. Staminal disk flat or cushion-like, the sepals and petals inserted directly round the stamens.

#### *ECHINOCARPUS*, Blume.

Sepals 4, imbricate, in 2 series. Petals 4, gashed, almost imbricate. Disk thick and broad. Capsule woody, 4-valved, echinate, setose, or velvety.

*E. SIGUN*, Bl. T.

Tenasserim Hills (Thoung-yeen).

*E. murex*, Bth.

Leaves entire, tufted-hairy in the nerve-axils beneath. Prickles of fruit strong, usually thickened at base.

*E. STERCULIACEUS*, Bth. T.

Upper Tenasserim between 3000 and 5000 feet.

Leaves crenate-serrate or toothed, at least when young puberulous beneath, the prickles longer, all thin and subulate.

#### *ELEOCARPIÆ.*

Anthers linear. Petals inserted round the base of a raised torus from the top of which the stamens spring.

#### *ELEOCARPUS*, Linnaeus.

Sepals 4-5. Petals induplicate-valvate, laciniate or rarely entire. Drupes fleshy.

Sub-genus *MONOCERAS*.

Anthers aristate. Flowers large, the petals fringed or rarely entire.

\* Petals entire, with a few short teeth at apex or simply fringed, not cut or cleft. Petioles continuous, not geniculate-incrassate.

° Inflorescence and sepals outside almost glabrous.

*E. PETIOLATUS*, Jack. E.T.

Tenasserim.

*E. integra*, Wall.

*E. oralis*, Miq.

All parts glabrous.

° ° Inflorescence and sepals outside silky-pubescent.

*E. (MONOCERAS) TRICANTHERA*, Griff.

Mergui.

*E. Griffithi*, Kz. E.T.

Glabrous. Petals entire, acuminate. Pedicels ⅔-¾ inch long.

*E. VARUNA*, Ham. *E.T.*

Chittagong.

Glabrous. Petals deeply but simply fringed. Pedicels 3-4 lines long. Differs from *E. prunifolius*, Wall., by the silvery silk-hairy inflorescence and larger flowers.

\* \* *Petals 2-3-cleft, the lobes jagged or fringed. Anthers glabrous or puberulous.*

° *Petiole geniculate-thickened at apex.*

† *Inflorescence with long-persistent leafy bracts.*

*E. BRACTEATUS*, Kz. *E.T.*

Tropical forests of Tenasserim.

All parts, also sepals and inflorescence, glabrous.

†† *Bracts of inflorescence small, very deciduous.*

× *Racemes and sepals glabrous or nearly so.*

*E. SIMPLEX*, Kz. (MS.).

Tenasserim.

Evidently nearly allied to *E. aristatus*, Roxb., but differing in the shape of the leaves and the glabrous racemes. The flowers conform to those of the preceding species. Griffith's specimens from E. Bengal differ only by a puberulous inflorescence, and may also belong here.

× × *Racemes and sepals more or less tomentoso or pubescent.*

*E. GRANDIFOLIUS*, Kz.

Tropical forests of Pegu and Tenasserim.

Leaves 1-1½ foot long, cuneate-acuminate at base, acute. Anthers shorter than the bristle. Drupes puberulous, the putamen slightly compressed.

*E. RUGOSUS*, Roxb. *E.T.*

Tropical forests of Pegu and Martaban.

Leaves ½-1 foot long, rounded at the narrowed base. Leaves glabrous or nearly so. Putamen terete.

° ° *Petiole continuous, not geniculate-thickened at apex.*

*E. (MONOCERAS) GRANDIFLORUS*, Hook.

Toukyagat district.

*Monoceras lanceolatum*, Hassk.

Glabrous. Putamen long recurved-aculeate.

*E. LITTORALIS*, T. and B.

Tenasserim.

Putamen lacunose-tubercled. Leaves blunt, very thick coriaceous, glabrous.

What I have from the Botanical Gardens, Buitenzorg, under the name of *Monoceras obtusum*, Hassk., belongs to *E. rugosus*. The Tenasserim plant (with which Griffith's No. 700 is identical) has very thick and obtuse leaves, and is, in my opinion, a distinct species. I have, therefore, retained the MS. name of Teysm. and Binnend. for the plant.

Sub-genus *ELEOCARPUS*.

*Anthers blunt, or one valve sharply produced. Flowers small. Petals glabrous.*

† *Putamen slightly rimose, or obsolete wrinkled. Calyx and pedicels glabrous.*

*E. FLORIBUNDUS*, Bl. *E.T.*

Tropical forests from Chittagong to

*E. serratus*, Roxb.

Tenasserim. Kamorta.

Leaves glabrous, blistered-speckled and opaque. Petioles long, thickened at the summit. Anthers bearded. The species is easily recognized in a dried state by its peculiar blistered opaque leaves.

*E. LANCEFOLIUS*, Roxb.

Tenasserim (*sic* Masters).

Leaves glabrous, opaque, acuminate. Petiole not geniculate-thickened.

*E. HYGROPHILUS*, Kz.

Swamp forests of Pegu and Tenasserim.

Leaves glabrous, blunt or rounded at apex. Petioles short but slender, not thickened. Anthers naked. Drupes unknown.

I looked for some time upon this species as a variety of *E. photinæfolius*, but the habitat as well as the structure of the leaves are inconsistent with such a view. It is nearest to *E. lanceafolius*, Roxb., but differs by obtuse or rounded leaves and beardless anthers (Kurz).

†† *Putamen wrinkled or tubercled. Calyx and pedicels puberulous.*

× *Petioles not geniculate-thickened at apex.*

*E. GANITRUS*, Roxb.

Chittagong.

*Ganitrus sphericus*, Gaertn.

*E. cyanocarpus*, Mart.

Leaves and petioles glabrous. Style long, exserted. The longer anther-cell acute. Drupes globular.

*E. LACUNOSUS*, Wall. *E.T.*

Tropical forests of Pegu and Tenasserim.

Bu-ta-let (Kurz).

Leaves beneath along the nerves and the short petioles densely puberulous. Style short. Anther-cells equal, blunt. Drupes oblong.

× × *Petioles thickened at summit.*

*E. WALLICHII*, H. f. *E.T.*

Ava, Pegu Range, and Tenasserim.

*E. longifolius*, Wall.

Leaves beneath and the rather short petioles densely puberulous.

*E. ROBUSTUS*, Roxb. *E.T.*

Chittagong (Masters), Tenasserim, and

*E. Helferi*, Kurz.

the Andamans.

Leaves and the long petioles glabrous. Drupes oblong.

*E. STIPULARIS*, Bl.

Tropical forests of Pegu and Tenasserim.

All parts densely and shortly pubescent. Drupe globular.

*E. cuneatus*, Wight, is noted by Masters as growing in Chittagong, Burma, and Tenasserim. I do not know the species. Possibly the Burmese localities refer to *E. lacunosus*, Wall. (Kurz).

*E. LEPTOSTACHYA*, Wall.

Tenasserim (Helf. teste Mast.).

Masters states that the species is very like *E. robustus*, but that the anthers are bearded, while in *E. robustus* itself he tells us that the anthers are both bearded and beardless.

*E. LUCIDUS*, Mast non Roxb.

Chittagong (Griff. teste Mast.).

Masters identifies his specimens with Roxburgh's plant, which the late Dr. Anderson had already recognized as *Euphorbiaceus*, and which is *Cleidion Javanicum*, Bl. I doubt the correctness of the habitat given, for the reason that Griffith had never visited Chittagong.

I have not seen *E. oblongus*, Gaertn., from Maulmain (Kurz).

The ripe berries of several species of *Elaeocarpus* are edible, and those which possess a coarsely wrinkled stone (*E. ganitrus*) furnish the so-called Brahmini beads worn by Hindu religious mendicants. The wood of some species is said to be good; but little definite seems known of the timber yielded by the different species. According to Mason, the name of the Salween River (as it is called by Europeans), or Than-lwen, is derived from the name of a species of *Elaeocarpus* (*E. Wallichii*), which grows abundantly on its banks. Other species are called Tör-ma-ji, and Wā-hsō-ben, and Kurz adds Bu-ta-let.

#### Order MALVACEÆ.

*Flowers* regular, hermaphrodite or unisexual. *Bracteoles* 3 or more, free or combined, often forming a kind of calyx. *Sepals* 5, valvate, free or connate. *Petals* 5-twisted, imbricate. *Stamens* numerous, rarely definite, adnate to the base of the

petals. *Filaments* united into a tube or a column. *Anthers* oblong or reniform, ultimately 1-celled, the cells sinuous or twisted, bursting longitudinally. *Ovary* 2- or many-celled, with 1 or more ovules in each cell, attached to the inner angle, entire or lobed, or of 2-5 or more carpels, whorled round a central axis. Herbs or shrubs, rarely trees. *Flowers* axillary or terminal, variously arranged.

**A.** Carpels whorled in a single row, not united into a capsule.

## MALVIEÆ.

*Staminal column bearing the filaments at the summit. Style-branches as many as cells to the ovary. Mature carpels separating more or less from the axis.*

\* *Ovules solitary, ascending.*

× *Stigmas linear.*

ALTHEA, *Linnaeus.*

*Bracteoles* 6-9, united at base. *Fruit-axis* not longer than the carpels.

\* *A. ROSEA*, Cav.

Prome. Khakyen Hills in gardens.

*A. Coromandeliana*, Cav.

*A. flexuosa*, Sims.

Holli-hock.

The word 'holli-hock' is a curious instance of how the names of plants get transmogrified. Hock is from the root of *Alera* (the mallow), thus *Alc-anc-hauc* = Hawk or Hock. HOLLI is a corruption of *Cauli*, from *Caulis*, a stalk (whence cauliflower), and signifies *the mallow on a tall stalk!* (Prior, *Popular Names of British Plants*).

MALVA, *Linnaeus.*

*Bracteoles* 3, distinct. *Carpels* not beaked.

*M. VERTICILLATA*, L.

Khakyen Hills.

*M. Neilgherrensis*, Wight.

The mallows and holli-hocks possess demulcent and laxative properties, and marsh-mallow lozenges are still an esteemed remedy for bronchial irritation. They were regarded as very wholesome herbs by the Romans :

"Aut herba lapathi prata amantis, et gravi  
Malvæ salubres corpori."

Horace, *Epod.* ii. line 57.

× × *Stigmas capitate or clavate.*

MALVASTRUM, *A. Gray.*

*Bracteoles* 1 to 3, distinct, or none. *Carpels* usually beaked.

*M. RUDERALE*, Miq.

Rubbishy spots at Chittagong and Rangoon.

*M. tricuspidatum*, A. Gray.

\*\* *Ovules solitary suspended.*

SIDA, *Linnaeus.*

*Carpels* converging with their points or beaked. *Bracteoles* none, or very rarely 1 or 2 and bristle-like. Pycn-dor-gna-len (generic).

\* *Leaves* from lanceolate to oblong or obovate-oblong, on short 2 to 4 lines long petioles.

*S. CARPINIFOLIA*, L.

Rubbishy spots all over Burma. The Nicobars.

*S. acuta*, Bur.

Recently introduced into the Andamans.

*S. lanceolata*, Roxb.

*Carpels* usually 5, leaves more or less green on both sides. Peduncles short, not or at the very base jointed.

*S. RHOMBIFOLIA*, L.

Common in leaf-shedding forests and in cultivation all over Burma. var.  $\delta$  Tenasserim.

Carpels usually 10, seldom fewer, leaves minutely greyish tomentose beneath. Peduncles usually elongate, jointed at about their middle.

var.  $\alpha$  *Linneana*.

var.  $\beta$  *Canariensis*, Griseb.; *rhomboidea*, Roxb.; *rhombifolia*, Mast.

var.  $\gamma$  *retusa*, Griseb.

var.  $\epsilon$  *acuta*. Erect, branched. Leaves oblong-lanceolate, acuminate, toothed.

Carpels 6-7, stellate pubescent, with 4 long awns.

var.  $\epsilon$  *alnifolia*, *Chinensis*, *microphylla*, Roxb.; *Philippica*, DC.

This plant would yield an excellent flaxy fibre, and is well deserving cultivation. It has yellow flowers, grows in the rains, and when planted for fibre, the seeds should be very thickly sown on good soil.

\*\* *Leaves cordate or nearly so, on 6 to 15 lines long, usually slender, petioles.*

° *Carpels terminating in 2 long awns.*

*S. CORYLIFOLIA*, Wall.

Ava. Segain.

Erect, glabrous or nearly so.

*S. CORDIFOLIA*, L.

Deciduous forests in Arakan and Pegu.

*S. decagyna*, Schum. and Thw.

Erect, densely tomentose.

° ° *Carpels blunt or shortly 2-lobed.*

*S. GLUTINOSA*, Roxb.

Khakyen Hills, Pegu and Tenasserim.

*S. Mysurensis*, W. A.

Erect. Hairs glandular or viscid. Flowers solitary or several, on short and rather thick glandular peduncles.

*S. HUMILIS*, Willd.

Rubbishy spots in Ava and Pegu.

Spreading or almost erect, weak. Hairs spreading, not glandular. Flowers solitary, on long filiform jointed simply hairy peduncles.

\*\*\* *Orules 2 or more, ascending or pendulous, or both.*

*ABUTILON*, Gaertner.

*Bracteoles* none. *Carpels* 5-20, without spurious partitions.

*Carpels* more than 10, usually about 20.

*A. INDICUM*, L.

Along roads and round villages in Ava and Pegu.

*Sida populifolia*, Roxb.

*Sida Asiatica*, L.

Tha-ma-jök.

Tomentum close and dense, without spreading hairs. Capsule truncate, the carpel points very short.

*A. GRAVEOLENS*, Roxb.

Uncultivated spots in Pegu.

Tomentum dense, intermixed with long spreading hairs. Capsule at the top contracted and angular, the carpels not pointed.

\*\* *Carpels fewer than 10, usually 5 or 7.*

*A. POLYANDRUM*, Roxb.

Pegu.

Tomentum of short glandular hairs, mixed with long, simple, spreading ones.

"The Burmese plant differs chiefly in the more glandular pubescence and in having the carpels constantly by 7, not by 5" (Kurz).

The different species of *Abutilon* yield by maceration a good fibre, fit both for ropes and probably also paper. A decoction of the plant is emollient, and possessed of the same properties as the marsh-mallows of Europe.

## URENIEÆ.

*Staminal column truncate or 5-toothed at apex, bearing the anthers or filaments on the outside. Style-branches twice as many as ovary-cells. Carpels 1-seeded.*

URENA, *Linnaeus*.

*Bracteoles 5, connate at base. Carpels opposite the petals, muricate.*

\* *Capsules longer than the sepals, glochidiolate and bristly tomentose.*

U. LOBATA, L.

Common, in uncultivated places, and in leaf-shedding forests from Chittagong and Ava down to Tenasserim up to 3000 ft. elevation. The Nicobars.

Kat-sae-nai or Wet-kyae-pa-nai (generic).

\*\* *Carpels included in the calyx, smooth or net-reined.*

*Petals 1½ to nearly 2 inches long, forming a large funnel-shaped corolla.*

U. RIGIDA, Wall.

Open forests of Pegu, Martaban, and Tenasserim.

Leaves almost rotundate, very scabrous on both surfaces. Flowers forming dense leafy terminal heads.

U. SPECIOSA, Wall.

Mixed forests of Ava and Pegu.

Leaves underneath softly tomentose, scabrous above, the lower ones usually lobed. Flowers in loose spreading terminal racemes.

°° *Petals 4 lines long, forming a rotate corolla. Involucre longer than the calyx.*

PAVONIA, *Cavanilles*.

*Bracteoles 5 or more, usually free, herbaceous or bristle-like. Carpels opposite the sepals, variously armed or smooth.*

## B. Fruit a capsule, dehiscent or rarely indehiscent.

\* *Bracteoles 5-6. Carpels indehiscent.*

P. (LEBRETONIA) PROCUMBENS, Wall.

Ava.

*P. glechonifolia*, A. Rich.

Flowers yellow. Carpels muricate.

\* *Bracteoles 10 or more. Carpels dehiscent.*

P. ZEYLANICA, Willd.

Banks of the Irrawaddy near Ava.

Flowers pink. Carpels unarmed, the margins slightly but sharply produced.

"All the Burmese specimens seen by me (including *P. rosea*, Wall., Cat. 1887, with hairy carpels) belong to the above species, none to *P. odorata*, Willd., for which Masters gives Burma as a habitat" (Kurz).

## HIBISCIEÆ.

*Staminal column truncate or 5-toothed at summit, bearing the anthers or filaments outside or also on the summit itself. Style-branches or stigmas as many as ovary-cells.*

*Style branched at the summit, the branches spreading or radiating. Seeds reniform.*

KYDIA, *Rochburgh*.

Flowers polygamous. *Bracteoles 3-4*, leafy, connate at base, enlarging and spreading under the fruit. *Sepals 5*, connate below the midrib. *Petals* as many,

adnate to the staminal tube. *Staminal-tube* divided about the middle into 5 divisions, each bearing 3 reniform anthers, imperfect in female flowers. *Ovary* 2-3-celled, with 2 ascending ovules in each cell. *Styles* 3, cleft with as many peltate stigmas, imperfect in male flowers. Trees with palmatinerved leaves. *Flowers* panicle. *Bracteoles* 4-6, enlarging in fruit. *Capsules* 2- or 3-valved.

K. CALYCINA, Roxb.

Mixed forests of Ava and Pegu.

K. *fraterna*, Roxb.

Dwā-bōk.

"There really may be two different species in India, the one with smaller smooth seeds, the other with larger furrowed seeds. The indument of the Burmese plants is much more floccose, the involucre-leaflets broader. Seeds, unripe, appear smooth and smaller." Wood white, straight-grained, good for house-building (Kurz).

#### DECASCHISTIA, Wight and Arnott.

*Bracteoles* 10. *Ovary* 10-celled, with a solitary ovule in each.

D. PARVIFLORA, Kz.

Siamese Province of Kanburi and probably Tenasserim.

Leaves beneath shortly but densely whitish tomentose. Involucre much shorter than the calyx, puberulous. Petals about  $\frac{1}{2}$  inch long.

D. CRASSIUSCULA, Kurz.

Prome.

All parts thickly tomentose. Involucre nearly as long as the calyx, densely tomentose. Petals nearly 2 inches long.

"Very near *D. crotonifolia*, but differs in its sessile flowers, broader and decurrent leaves, and very short petioles" (Kurz, J.A.S.B. ii. 1873, p. 227).

Masters describes but does not name another large-flowered (flowers pink, 4 inches in diameter) species from Rangoon (Kurz).

#### HIBISCUS, Linnæus.

*Flowers* hermaphrodite. *Bracteoles* free or more or less connate, several, rarely reduced to 5 or fewer. *Calyx* 5-lobed, or toothed or spathaceous. *Petals* 5, connate at base with the staminal tube. *Staminal tube* truncate, or 5-toothed at the summit. *Filaments* many. *Anthers* 1-celled. *Ovary* 5-celled, with 3 or more ovules in each cell. *Styles* 5, connate at base. *Capsule* loculicidally 5 or rarely spuriously 10-celled, velvety, dehiscent. Herbs, shrubs or trees with more or less palmate lobes or entire leaves. *Flowers* often showy, in axillary inflorescences.

A. Leaflets of involucre free, sometimes adnate to the calyx, but not connate with one another, or altogether wanting.

Sub genus SOLANDRA.

*Involucre* wanting. Herbs with small flowers.

H SOLANDRA, L'Her.

Ava. Taong-doung. Segain.

Flowers white, on long slender pedicels, usually forming terminal racemes.

Sub-genus HIBISCUS.

*Calyx* regular, not spathaceous, 5-cleft, more or less persistent, surrounded by a more or less persistent involucre, the leaflets of which are either quite free or sometimes adnate to the calyx.

\* *Capsule* rounded, obtuse or truncate.

† *Capsules* truncate, winged.

H. VITIFOLIUS, L.

Rubbishy spots from Chittagong and

H. *truncatus*, Roxb.

Ava to Pegu.

Velvety-pubescent. Calyx and involucre tomentose. Flowers large, yellow with a dark-purple eye.

\*\*\* *Capsules rounded or obtuse, not winged.*

*H. MICRANTHUS*, L.

Ava. Paghān-myo.

*H. rigidus*, L.

Capsules glabrous. Flowers white, hardly an inch in diameter, the petals reflexed. Scabrous herb.

\* *H. MUTABILIS*, L.

Cultivated in gardens.

Capsules hirsute. All parts, also calyx and involucre, densely scurvy tomentose. Involucre-leaflets 10. Flowers large, white, then rose-coloured. A large shrub.

*H. VENTRIS*, Bl.

Upper Tenasserim.

As preceding, but all parts softly tomentose. Involucre and calyx densely pubescent. Involucre-leaflets in Burm. spec. 7, linear (in Malayan 5, ovate-lanceolate).

\*\* *Capsules acuminate or acute, not winged.*

× *Calycine lobes 1-3-nerred, without thickened margins.*

† *Leaves densely and softly tomentose.*

*H. PANDURIFORMIS*, Burm.

Ava. Prome.

*H. tubulosus*, Cav.

All parts, also calyx and involucre, densely tomentose. Pedicels shorter than the peduncles. Seeds pubescent.

†† *Leaves glabrous or roughish puberulous.*

△ *Annual herbs. Flowers yellow with dark-purple eye.*

*H. PROCERUS*, Wall.

Ava.

Seeds tubercled. Leaves glabrous. Stem and petioles prickly.

*H. DIVERSIFOLIUS*, Jacq.

Ava.

Seeds smooth. All parts and more especially the calyx and involucre very tubercled-hispid.

*H. LUNARIFOLIUS*, Willd.

Ava. Segain and Taong-doung.

*H. pruriens*, Roxb.

*H. racemosus*, Lindl.

Seeds smooth. Young parts densely and shortly hispid. Involucre-leaflets puberulous or almost glabrous.

△△ *Shrubs. Flowers from purple to rose-coloured and white. Leaves glabrous, longer than the petioles.*

\* *H. SYRIACUS*, L.

Cultivated by Karens in Martaban.

*H. Storckii*, Seem.

Pedicels shorter than the petioles.

*H. ROSA-SINENSIS*, L.

Much cultivated in native gardens.

The Shoe flower. Pedicels elongate, longer than the petioles. The Chinese use the flowers to dye leather black.

×× *Calycine lobes with a prominent midrib and (especially when in fruit) with thickened, usually indurated borders.*

○ *Involucre-leaflets bearing on the back an oblong or linear appendage.*

△ *Appendage of involucre-leaflets leafy, oblong. Flowers pale sulphur with crimson eye.*

*H. FURCATUS*, Roxb.

Ava and Banks of the Koladyne in

*H. aculeatus*, Roxb. (*sic* Masters).

Arakan.

Khoung-yān.

Flowers about 2 lines in diameter, shortly peduncled. Stipules lanceolate. Stems stiff-hairy and usually prickly.

*H. SURRATTENSIS*, L.

*H. heterophyllus*, Griff.

All over Burma, in the leaf-shedding forests, and deserted toungyas, etc.

Flowers about an inch in diameter, on long slender peduncles. Stipules large, leafy, semilunar. Stems prickly.

*H. aculeatus*, Roxb., differs chiefly by the much smaller stipules, which, however, pass into those of *H. Surrattensis*.

△△ *Appendage of involucre-leaflets linear, rarely wanting.*

\* *H. RADIATUS*, Cav.

Much cultivated all over Burma from Chittagong and Ava down to Tenasserim, and often like wild in deserted toungyas.

var. *α*. Corolla white or pale-sulphur with a purple eye.

var. *β* *Lindleyi* (*H. Lindleyi*, Wall.).

Flowers white or pale-sulphur with a purple eye, or purple, the calyx-lobes without a gland on the midrib.

○○ *Involucre-leaflets entire, without any appendage.*

\* *H. CANNABINUS*, L.

Cultivated in Pegu and Martaban.

Calyx dry, horny in fruit, the lobes prickly ciliate, with a large gland on the midrib. Seeds glabrous.

\* *H. SABDARIEFFA*, L.

Much cultivated all over Burma from Chittagong and Ava down to Pegu, sometimes as wild in deserted toungyas.

Them-bān-khyen-boung. Roselle.

Calyx fleshy, red, the lobes without prickles, usually a little hairy, but soon glabrescent. Seeds shortly hispid. This species is cultivated for its red fleshy acid calices, which are admirable if chewed raw for quenching thirst, or stewed with sugar. The jelly prepared from the calices is not inferior to the best red currant, and the best substitute for it.

Sub-genus ABELMOSCHUS.

*Calyx* spathaceous, 5- rarely 3-toothed, deciduous, surrounded by a 5-20-leaved free, often very deciduous involucre. *Seeds* glabrous.

× *Involucre-leaflets short and small, deciduous already before opening of the flowers.*

\* *H. FICULNEUS*, L.

Cultivated rarely in Pegu in native gardens.

*H. prostratus*, Roxb.

*H. strictus*, Roxb.

Flowers rather small, uniform white.

×× *Involucre-leaflets narrow linear, often numerous and long. Flowers large, yellow with purple eye.*

○ *Capsules short, 5-angled.*

† *Involucre-leaflets about 10-12.*

*H. SAGITTIFOLIUS*, Kz.

Ava. Pegu.

Capsules glabrous. Flowers white, hardly an inch in diameter, the petals reflexed. Scabrous herb.

*H. ABELMOSCHUS*, L.

Arakan, Pegu, Ava and Tenasserim, Kamorta.

*Abelmoschus moschatus*, Moench.

Ba-lu-wā-gyi.

All parts spreadingly setose. Peduncles as long as or shorter than the capsule, strong. Flowers 2-3 inches in diameter.

The specific name of *moschatus* was bestowed on this plant from the musky aromatic odour of its brown seeds, which are named by the Arabs 'Hub-ul-Mashk,' and are used to perfume powders and unguents. The species abounds in mucilage, which is used to clarify sugar.

† † *Involucre-leaflets* 15-20.

H. CANCELLATUS, L.

Dry forests of Ava and Promo.

*Abelmoschus crinitus*, Wall.

Stems hirsute. Leaves lobed, tomentose and sprinkled with stiff hairs. Involucre-leaflets persistent.

° ° *Capsule elongate-conical, 7-angular.*

\* H. ESCULENTUS, L.

Cultivated in Burma (*vide* Mason).

*H. longifolius*, Willd.

Ba-lu-wā.

Involucre-leaflets 13. All parts slightly hairy.

This species is cultivated for its pods, which are boiled and eaten as a vegetable. The young pods are adapted for pickling, and the fully ripe seeds, when roasted, are an excellent substitute for coffee, and can be added in lieu of barley to soup.

× × × *Involucre-leaflets broad and leafy, usually large, 4-6. Flowers yellow with purple eye. Stems setose.*

° *Involucre-leaflets* 4.

\* H. MANIHOT, L.

Rarely cultivated in Pegu.

*H. pentaphyllus*, Roxb.

Leaves almost glabrous. Involucre-leaflets glabrous, tomentose bordered.

H. HOSTILIS, Wall.

Mixed forests of Ava and the Pegu Range.

Leaves beneath sprinkled with 3-forked short hairs. Involucre-leaflets appressed pubescent and setose-ciliate.

° ° *Involucre-leaflets* 6.

H. PUNGENS, Roxb.

Northern parts of Pegu Range from 1200 to 2000 feet.

Leaves hirsute. Involucre-leaflets with long stiff hairs.

**B.** Leaflets of the involucre united up to the middle or at least at the base, sometimes forming a cup-shaped involucre.

\* *Trees or erect shrubs. Seeds glabrous. Flowers large, yellow with purple eye.*

\* H. HASTATUS, L.

Rarely cultivated in gardens.

Leaves deeply 3-lobed.

H. TILIACEUS, L.

Common within the tidal area from Chittagong to

*H. tortuosus*, Roxb.

Tenasserim, the Andamans and Nicobars.

Then-ben or Thim-bān.

Leaves not divided, entire or crenulate.

\*\* *Seeds woolly or pubescent.*

† *Woody climbers.*

H. SCANDENS, Roxb. W. C.

Tropical forests of Martaban.

Velvety tomentose, leaves glabrescent above. Involucre-leaflets 4-7, velvety.

| † *Trees.*

H. MACROPHYLLUS, Roxb. E T.

Chittagong to Tenasserim.

*H. vulpinus*, Rwdt.

*H. spathaceus*, Bl.

*H. setosus*, Roxb.

Yē-wun.

Tawny setose. Leaves entire, tawny tomentose. Involucre-leaflets 10, hirsute.

This is an extremely useful genus of plants. The calices, pods, and leaves of many species are edible and wholesome, and almost all species yield a long and strong fibre, excellent for ropes or for making paper. When grown for fibre, the plants should be cut in flower and at once steeped; but this process should be more carefully carried out than is usually done, as steeping vegetable fibre in a tropical climate greatly impairs its strength and causes discoloration. The mucilaginous juice of many species is used in refining sugar, by Asiatics who object to the use of blood for that purpose. The flowers of *H. Rosa-sinensis* yield a juice which dyes leather black.

THESPEIA, *Correa da Serra*.

*Bracteoles* 5-8 or fewer, rarely wanting, deciduous. *Calyx* truncate, minutely 5-toothed or parted. *Corolla* convolute. *Staminal tube* 5-toothed at apex. *Ovary* 5-4-celled, with few ovules in each cell. *Style* furrowed, club-shaped, entire, or 5-toothed. Trees or shrubs, with entire or shortly-lobed leaves. *Flowers* large, yellow.

T. (HIBISCUS) POPULNEA. T. Common in the beach and tidal forests from  
*Hibiscus populneoides*, Roxb. Chittagong to Tenasserim and the Andamans.  
*T. macrophylla*, Bl. Ava, Bhamo and Sabado. The Nicobars.

All younger parts and unripe capsules covered with rusty-coloured scales. Leaves glabrous. The occurrence of this salt-loving tree in Ava is unique, and requires explanation. Brine springs are numerous in Prome and Ava, and may possibly account for such an exceptional re-appearance of a shore-plant in the interior of Burma. Wood brown, strong, durable (Kurz).

T. LAMPAS, Dalz. Mixed forests all over Burma.  
*H. tetralocularis*, Roxb.  
*Azauza Zollingeri*, Alef.

All younger parts, and usually the leaves beneath, shortly stellate tomentose. Unripe capsules densely hirsute. A meagre shrub.

GOSSYPIUM, *Linnaeus*.

*Bracteoles* 3, leafy, cordate. *Calyx* truncate, or shortly 5-cleft. *Staminal column* bearing numerous filaments outside. *Ovary* 5-celled, with several ovules in each cell. *Style* club-shaped, furrowed, with decurrent stigmas. *Seeds* woolly or glabrous. Herbs, shrubs, or small trees, with lobed, rarely entire, leaves. *Flowers* large, yellow or purple. *Calyx* and *capsule* usually black-dotted.

\* G. HERBACEUM, L. var.  $\alpha$  and  $\beta$  much cultivated all over Burma, and often  
Wā. seen as wild in deserted toungyas and neglected lands.

Annual. Seeds free, clothed with firmly adhering silky down.

var.  $\alpha$  *herbaceum*, L.; *G. hirsutum*, Roxb.; *G. Barbadosense*, Wight. Lobes of leaves acuminate.

var.  $\beta$  *hirsutum*, L.; *G. obtusifolium*, Roxb.; *G. herbaceum*, Wight. Leaves with usually blunt lobes, the upper ones often undivided, with or without a gland on the midrib beneath. Involucre-leaflets entire or serrate. Capsules when ripe green. Cotton white.

Dr. Mason writes of the cotton grown in Burma: "By far the finest-looking native cotton I have seen in India is that cultivated by the Red Karens. The plants grow more than twice the height of those seen in Toung-ngoo, close by. It may be attributed to two causes. Much less rain falls on the table-land inhabited by the Red Karens, than in Toung-ngoo, and it is entirely a limestone soil, which Mr. Piddington said was the next best soil for the plant.

"Mr. Blundell introduced the plant which produces the Pernambuco, Peruvian, Bahia or South Sea Island cotton, and Major Macfarquhar raised such a fine article at Tavoy from it, that the Committee of the Agricultural and Horticultural Society of Calcutta were unwilling to believe it the production of that species. They reported:

'The sample sent by Major Macfarquhar appears to be of a quality resembling the *Sea Island*, but finer and more silky, and the fibre not so strong, its value is not so easy to determine, but the Committee are of opinion that it would sell for a high price. The Pernambuco cotton, which it is believed is the same as the *South Sea Island* cotton, is an inferior staple to that of the N. American *Sea Island*, and they have a sample of cotton submitted which in point of *fineness* surpasses the genuine *Sea Island* cotton of N. America.

" 'This improvement on the general staple of Pernambuco cotton might be reconciled had it been produced *at a distance from the Sea*, since it has been ascertained, that this description of cotton deteriorates by proximity to the sea; whence your Committee are disposed to think that Major Macfarquhar has been led into error in calling it *South Sea Island* instead of *Sea Island*.'

"Admitting that Major Macfarquhar was in error, which it is believed he was not, the report proves that an article, 'finer and more silky' than the best American cotton has been raised in these Provinces. The principal difficulty to the introduction of this species into general cultivation was, as Mr. Blundell told me, that the trees did not produce abundantly.

"Sea Island cotton has been raised in the Tenasserim Provinces by amateur cultivators, but I have never seen any report on the article obtained. 'Bourbon cotton of Indian growth,' says Wight, 'has sold in the London markets for the highest prices going;' and, as the Bourbon plant is the original *Sea Island* acclimatized to the East, the cultivator would have a stronger probability of success by obtaining his seed from Bourbon, than from America.' Much attention should also be given to the selection of a proper soil. Analysis has shown that all the lands on which cotton is grown in India differ widely in their constituent parts from the best cotton lands of America. The subject is still in its infancy, more extensive analysis being required; 'but it seems *at present*,' observes Mr. Piddington, 'that the abundance and fineness of good cottons depend on the quantity of carbon in the soil, *and the solubility of that carbon*.' If therefore you can obtain a soil approaching the American soils, that is, containing peaty matter, lignite, and colouring cold water, this will no doubt be the best; because it contains carbon, and probably hydrogen combined with it, suitable for the food of the plant. And the next best soil is one containing carbonate of lime."

\* G. BARBADENSE, L.

Rare in gardens in Pegu.

Nu-wā.

Shrubby perennial. Seeds black, free or cohering, devoid of adhering pubescence.

#### BOMBACIÆ.

*Staminal column divided at summit, or rarely to the base, into numerous filaments or 5 to 8 staminal bundles, very rarely entire nearly to the summit. Anthers free or variously cohering. Stigmas free or connate.*

\* *Leaves digitate. Bracteoles distinct or none.*

#### BOMBAX, Linnæus.

*Calyx* cup-shaped, truncate or irregularly 3-5-lobed. *Staminal column* divided into numerous filaments. *Ovary* 5-celled, with several ovules in each cell. *Style* club-shaped or shortly 5-lobed at top. *Capsule* woody or coriaceous, loculicidally 5-valved, the cells copiously downy inside. *Seeds* obovoid or globose, enveloped in the silky down. *Albumen* thin. Leaf-shedding trees, with digitate leaves. *Flowers* large scarlet or white fleshy.

B. MALABARICUM, DC.

From Chittagong to Tenasserim, up to 3000 feet.

Let-pān or Di-du.

Leaflets on a 10 to 12 lines long petiolule. Staminal bundles consisting of 15 to 20 strong and thick filaments. Young trees have the bark armed with numerous conical thorns of a sharp and formidable character.

B. INSIGNE, Wall.

Ava. Pegu Range. Andamans.

Leaflets decurrent on the short 2 to 3 lines long petiolule. Staminal bundles consisting of 50 or more long filiform filaments.

Kurz applies the terms *Let-pan* and *Di-du* to one tree. The Burmese, if I mistake not, regard them as male and female. The 'cotton trees' are noble trees, with grandly buttressed stems, but the wood is soft and worthless. When a man dies, one of these trees, if handy, is felled, a log is cut out of the length, which is speedily converted into a solid coffin, the softness of the wood lending itself to that end. The fleshy calices of the flowers are cooked and eaten, and the silky down of the seed-capsules is collected to stuff pillows with. As the fibre is smooth, it will not felt or even twist into yarn like cotton; so that its utility is limited to stuffing pillows. The trees attain their largest size in river plains, where one of these giant trees, 80 to 100 feet high, with its brightly-coloured flowers, enlivened by the presence and motions of numerous birds, seeking for nectar and insects in the calices, forms a striking and interesting object.

ERIODENDRON, *De Candolle*.

*Calyx* and *ovary* as in *Bombax*. *Staminal bundles* 5, inserted at base, each bearing 2-3 linear anthers.

E. (BOMBAX) PENTANDRUM, L.

Rare (one tree only seen) in the coast forests of South Andaman. Here and there cultivated in Pegu and Tenasserim.

*E. anfractuosum*, DC.

One of those trees that are stated to be very frequent in the Indian jungles, but I myself have never succeeded in seeing it in a truly wild state, although the loftiness of the tree and the decussate ternation of its branches would render it recognizable from a long distance (Kurz).

\* *Leaves* simple, *pinninerved*, beneath more or less *lepidote*. *Fruits* *muricate*.

DURIUM, *Linnaeus*.

*Calyx* bell-shaped. *Petals* 5. *Branches* of the staminal bundles bearing several linear anthers with sinuous anther-cells.

\* D. ZIBETHINUS, L. *E.T.*

Wild in Tenasserim, south of 14° N.L.

Du-yin. The Durian.

"The Burmese specimens in Dr. Brandis' herbarium, although destitute of corolla, do not differ from the Malayan durian, and the calyx is the same in size as well as in shape" (Kurz).

The 'durian' is perhaps more passionately esteemed by those who are in the habit of consuming it than any fruit in the world. When the hard prickly coat begins to gape at the seams, the fruit is in perfection, and the nuts within are seen enveloped in a rich mellow paste, somewhat comparable to a mixture of equal parts of almond paste, clotted cream, and mashed garlic, the odour being rapidly intensified as the fruit ripens more and more. The nuts are also edible when roasted like chestnuts. The specific name *zibethinus* is said to have been given it from the fondness of the civet-cat for it, or perhaps from the abominable odour of the over-ripe fruit. An unexplained circumstance regarding the 'Durian' is that this name occurs among the fruits mentioned as found at Delhi by either Purchas or one of the early English travellers. What is this 'Durian'? Was it a mistake of the traveller, or was the name in Jehangir's time applied to some Indian fruit? It is absurd to suppose the Durian was ever introduced or fruited in Northern India.

"Helfer writes in his second report on the resources of Tenasserim: 'This tree does not grow so far north as Maulmain, some few trees excepted, which are grown as a rarity on the island of Beloo. Its sphere begins at Tavoy; large plantations occur to the E. of Mount Burney, and very fine specimens in the valley of Taunbiaun. Lower down on the Tenasserim, the trees begin to grow almost spontaneously, and in lat. 14° it forms large forests.'

The Order *Malvaceæ* is a highly useful one to man. It yields one of the most delicious fruits known, but which is unfortunately very restricted in its geographical range (*Durian*). The *Mibiscus sabbariffa* (indigenous to tropical Africa) is, on the other hand, a very widely diffused plant, yielding a delicious table vegetable, whilst nearly every species of the genus yield a long and fairly strong fibre adapted for the manufacture of rope or sacking; and the cotton plant, whereon one of the main industries of England depends, is another member of this Order.

#### Order STERCULIACEÆ.

*Flowers* regular, hermaphrodite or unisexual. *Sepals* 5, more or less (rarely wholly) connate. *Petals* 5 or none. *Stamens* usually united into a ring, cup, or tube, many, or rarely few, and free. *Anthers* 2-celled in heads, or in a single ring at the apex, or dispersed on the outside of the staminal column, with or without intervening staminodes. Herbs, shrubs, or trees, with alternate simple or palmately-lobed, or digitate leaves. *Stipules* present.

#### STERCULIÆÆ.

*Flowers* unisexual or polygamous. *Petals* none. *Anthers* 5-15, sessile, surrounding the stalked ovary or in males the top of a shorter or longer column, or shortly polyadelphous. *Mature carpels* distinct, sessile or stalked.

\* *Anthers* irregularly clustered, numerous. *Fruit* dehiscent.

#### STERCULIA, Linnaeus.

*Ovules* 2 or more in each cell. *Carpels* follicular.

† *Seeds* without wings, 2 or more along the suture of the coriaceous carpels, never inserted at the base.

\* *Leaves* digitate.

*S. FETIDA*, L. *T.*

Mixed forests of Pegu Range.

Lek-khok or Lek-khō.

Leaves glabrous. Calyx rather large, the lobes spreading.

This is probably the species which so unpleasantly obtrudes itself on the traveller's notice, who incautiously halts near one in flower. The odour exhaled by the tree in question resembles the sickening smell of the mucus secreted by the bowels in acute dysentery, and once recognized, can never be forgotten. This identity of odour between a normal vegetable secretion and an abnormal animal one, the result of disease, is not a little curious.

*S. VERSICOLOR*, Wall.

Ava on limestone hills near Segain.

Shor-hpyu (Kurz).

Leaves canescent tomentose beneath. Calyx small, the lobes conniving, short.

\*\* *Leaves* palmately lobed or cut. *Leaf-shedding* trees.

*S. CRENS*, Roxb.

Pegu and Tenasserim.

Carpels densely covered with stiff fragile hairs. Flowers small.

*S. VILLOSA*, Roxb.

Pegu. Tenasserim and Andamans.

Shor-ni.

Carpels shortly tomentose from stellate hairs.

*S. ORNATA*, Wall.

Pegu Range. Tenasserim.

Shor-wā.

Carpels densely covered with stiff short hairs, glabrescent. Flowers nearly  $\frac{3}{4}$  inch in diameter.

\*\*\* *Leaves all entire. Small evergreen trees or meagre shrubs.*

° *Leaves quite glabrous.*

× *Calyx-lobes not spreading, almost erect or more usually conniving with their tips.*

S. LONGIFOLIA, Vent. *E.T.*

Tenasserim (?).

*S. striatiflora*, Mast.

Calyx shortly tubular, striate, the lobes the length of the tube.

× × *Calyx almost rotate.*

S. COCCINEA, Roxb. *E.S.*

Pegu Range. Tenasserim.

Calyx-lobes from a broader base, linear, very long, and somewhat twisted.

° ° *Leaves more or less tomentose or puberulous, at least beneath.*

× *Flowers more than  $\frac{1}{2}$  inch long, in simple brown tomentose racemes.*

S. ROXBURGHII, Wall. *E.T.*

Chittagong.

All parts glabrous.

S. RUBIGINOSA, Vent. *E.S.*

Burma (*vide* Masters).

Leaves beneath and petioles softly rusty pubescent.

× × *Flowers in panicles.*

S. ANGUSTIFOLIA, Roxb.

Tenasserim.

*S. mollis*, Wall.

Andamans and Nicobars.

Leaves tomentose. Calyx-lobes free and spreading. Flowers long-pedicelled.

var. *a angustifolia*. Leaves on petioles 8-10 lines long, lanceolate.

var. *β mollis*. Leaves obovate-oblong, on petioles 4-5 lines long, shortly acuminate, rounded at the narrowed base. Tomentum almost velvety.

S. PARVIFLORA, Roxb. *E.T.*

Ava and Sylhet.

Leaves beneath minutely stellate-puberulous. Calyx-lobes short and connivent. Flowers shortly pedicelled. (See Kurz, J.A.S.B., 1876, part ii., p. 120.)

† † *Calyx tubular. Seeds without wings. Carpel: chartaceous and expanded leaf-like, bearing 1 or 2 seeds along the marginal sutures at about  $\frac{1}{2}$  of their length.*

S. COLORATA, Roxb. *T.*

From Chittagong to Tenasserim and the Andamans.

Wet-shor. Hog's slide.

Leaves more or less lobed, occasionally almost entire, glabrous or puberulous beneath. Calyx about 8-9 lines long.

S. FULGENS, Wall. *T.*

Ava. Taong-doung. Tenasserim.

Leaves very large, much lobed, pubescent beneath. Calyx about 1-1½ inch long.

† † † *Calyx more or less campanulate. Seeds without wings, solitary, laterally adnate to the base of the boat-shaped chartaceous or membranous follicles. Scaphium (including Pterocymbium and Carpophyllum).*

\* *Follicles produced below at about the middle into an additional bluntish sac-like lobe.*

S. CAMPANULATA, Wall. *T.*

Tropical forests of Pegu Range, Martaban, and the Nicobars.

Leaves more or less tomentose or puberulous beneath. Calyx campanulate, green.

\*\* *Follicles not produced into an additional lobe.*

S. SCAPHIGERA, Wall. *T.*

Tropical forests of Pegu and Tenasserim.

*Scaphium Wallichii*, Schott and Endl.

*Carpophyllum macropodum*, Miq.

Leaves coriaceous, glabrous, glossy. Calyx almost rotate, yellowish.

† † † *Seeds numerous, winged along their upper end, inclosed in a woody large follicle (Pterygota).*

*S. ALATA*, Roxb. *T.* From Chittagong to Tenasserim and the Andamans.  
'Booth's cocoa-nut' (Mason).

Leaves entire, glabrous, 5-nerved at base. Follicles as large as the fist.

The genus *Stereulia* is not a particularly useful one. Several species produce a gum, having some of the appearance of tragacanth, and the seeds are edible, and much relished, when roasted, by the Burmese. The bark of some species yields a good fibre, but the timber is worthless. In addition to the above, Kurz records two other species, which he appears not to have seen.

*S. LINGUIFOLIA*, Mart.

Tavoy (Parish).

*S. ENSIFOLIA*, Mart.

Mergui (Griffith).

And *S. HYPOSTICTA*, Miq., from Kamorta.

\*\* *Anthers 5, in a ring. Carpels indehiscent.*

#### HERITIERA, Aiton.

*Flowers* unisexual. *Calyx* 4-7- (usually 5-)cleft. *Petals* none. *Staminal* column slender, bearing a ring of 5 anthers. *Anther-cells* parallel. *Ovary-carpels* usually 5, nearly distinct, with a single ovule in each. *Style* short, with 5 rather thick stigmas. *Fruit-carpels* woody, indehiscent, keeled, or almost winged on the back. *Albumen* none. *Trees*, with simple leaves, silvery-sealy beneath. *Flowers* small on axillary panicles.

\* *Carpels glossy or at least smooth, brown. Leaves shortly petioled.*

*H. LITTORALIS*, Dry. *E.T.* Tidal forests and sea shores from Chittagong to  
*Balanopteris tothila*, Gaertn. Tenasserim, the Andamans, and Nicobars.

Pyn-leh-ka-nā-zo.

Leaves usually cordate or rounded at base. Carpels strong-crustaceous, obliquely ovoid, with a sharp keel pointed at the summit.

*H. MINOR*, Lam. *E.T.*

Same distribution as the last.

*H. fuses*, Buch.

Pyn-leh-ka-nā-zo.

Leaves narrowed at base. Carpels fibrous-woody under the thin bladdery epicarp, obliquely and broadly depressed, the keel at the summit broad and almost wing-like.

Wood dark reddish-brown, strong, tough, and durable, 66 lbs. to the cubic foot. Kurz gives the breaking weight of this wood at 1132 lbs., the mean of Teak being given by Kurz at 240 lbs. only. It is one of the toughest and strongest woods known, and yet but little employed save for firewood. In Calcutta, however, it is used for carriage shafts from its great toughness and strength.

\*\* *Carpels sea-green or grey, rough and corky-tubercled. Leaves long-petioled. Carpels obliquely ovoid, keel indistinct, at the extremity produced into a thick narrow wing-like appendage.*

*H. MACROPHYLLA*, Wall. *E.T.*

Upper Tenasserim, near Trokla.

#### HELICTERIEÆ.

*Flowers* hermaphrodite. *Petals* deciduous. *Anthers* 5-15, sessile or on short filaments, situated on the margin of the cup-like dilated summit of the column and usually alternating with staminodes.

#### HELICTERES, Linnaeus.

*Anther-cells* divaricate or confluent into one. *Fruit* a capsule, sometimes twisted. *Seeds* not winged.

† *Carpels spirally twisted. Leaves unequally serrate (Spirocarpæ).*

H. ISORA, L. S.

Burma (*vide* Mason).

Thu-ngeh-chē (Kurz).

Calyx about  $\frac{1}{2}$  inch long, or longer.

†† *Carpels straight or nearly so (Oudemansia, Miq.).*

\* *Calyx about  $\frac{1}{2}$  inch long or longer. Leaves unequally serrate or toothed (Orthocarpæ).*

H. VISCIDA, Bl. S.

Ava. Taong-donng.

Calyx laxly stellate-woolly and viscid.

H. (OUDEMANSIA) HIRSUTA, Miq. S.

Tenasserim.

Calyx shortly scurvy tomentose.

\*\* *Calyx only 2 or 3 lines long.*

° *Carpels firmly cohering, forming a densely villous-echinate apiculate or obtuse capsule. Leaves entire or obtusely serrate, shortly whitish-tomentose beneath.*

H. OBTUSA, Wall. S.

Tenasserim. Kamorta.

Stems tawny tomentose. Leaves sprinkled above with stellate hairs, blunt or acute.

°° *Carpels loosely cohering, with the points all free, shortly hairy echinate. Leaves never whitish pubescent beneath, serrate.*

H. GLABRUSCULA, Wall. S.

Mixed forests of Arakan, Pegu and Martaban.

*H. plebeia*, Kz.

Flowers in short axillary racemes.

H. ELONGATA, Wall. S.

Ava.

Flowers in elongated slender racemes, much longer than the pubescent leaves.

#### PTEROSPERMUM, Schreber.

*Anther-cells parallel. Capsule woody, terete or 5-angular. Seeds winged.*

\* *Capsules distinctly 5-cornered. Leaves large and broad.*

° *Stipules and bracteoles pinnatifid.*

P. ACERIFOLIUM, Willd. E.T.

From Chittagong to Tenasserim and the Andamans.

Toung-hpet-wun.

Calyx-lobes 3-4 inches long. Style towards the base villous.

°° *Stipules. Bracteoles entire.*

P. ACEROIDES, Wall. E.T.

Tropical forests in Tenasserim and the Andamans.

Calyx-lobes  $1\frac{1}{2}$ -2 inches long. Style glabrous.

"*Pt. diversifolium*, Bl., appears to be an intermediate form between *Pt. acerifolium* and *Pt. aceroides*, having the flowers and styles of the former but smaller, and the bracteoles of the latter." The wood of both this and the last species is brown, heavy, and takes a good polish (Kurz).

\*\* *Capsules terete or nearly so.*

° *Leaves semi-sagittate at base. Stipules pinnatifid.*

P. SEMISAGITTATUM, Roxb. T. From Chittagong and Ava down to Tenasserim.

Nak-yay-pen or Naj-y-ay (Kurz).

Flowers 3 inches long or longer. Bracteoles large, divided into several many-cleft and jaggy lobes, forming an involucre.

°° *Leaves never semi-sagittate, usually small, entire or shortly lobed. Stipules small, entire or 2-3-cleft. Flowers not above 2 inches long.*

† *Pediceles much longer than the petioles.*

P. LANCEFOLIUM, Roxb. *E.T.* Chittagong. Tavoy (?).

Leaves greyish or whitish tomentose beneath, acuminate. Stipules and bracteoles 2-3- rarely 5-cleft. Capsules greyish velvety. Wood strong, close-grained.

†† *Pediceles short, about the length of the petioles, or rarely a little long-r.*

P. CINNAMOMEUM, Kz. *E.T.* Martaban and Tenasserim.

Leaves entire, acuminate, beneath rusty-coloured (rarely greyish), tomentose. Stipules and bracteoles linear subulate, with a cucullate basal appendage. Capsules brown, scurvy-tomentose, glabrescent. Wood brown, close-grained, perishable (Kurz).

P. JAVANICUM, Jungh. *E.T.* Tenasserim.

*P. Blumeanum*, Korth.

Leaves usually small. Stipules and bracteoles entire, lanceolate. Some trees of this genus yield a hard and good timber, but of no great importance.

ERIOLENIÆ.

*Flowers hermaphrodite. Petals deciduous. Anthers numerous on the outside of the tubular or conical column from the middle to the top. Staminodes none.*

ERIOLENA, *De Candolle.*

*Calyx 5-cleft, valvate. Petals 5, deciduous, with dilated tomentose claws. Staminal column short, bearing on the outside numerous linear-oblong anthers, the anther-cells parallel. Capsule woody, 5-valved. Seeds winged above. Albumen thin. Trees with simple, often lobed leaves. Flowers usually yellow and showy, solitary, or on axillary panicles.*

E. CANDOLLEI, Wall. Ava. Pegu. Martaban.

Dwā-ni.

Heartwood red, tough and elastic, 44 lbs. to the cubic foot.

DOMBEYIÆ.

*Flowers hermaphrodite. Petals persistent, flat. Anthers 10 to 20, rarely 5, united into a short cup at or near the top of the column, the cells parallel. Staminodes 5 or none.*

× *Anthers 15, rarely 10.*

PENTAPETES, *Linnaeus.*

*Bracteoles caducous. Sepals herbaceous. Ovary-cells with several ovules. Style simple.*

P. PHŒNICEA, L. Along rice fields in Ava and Pegu.

*Eriorhaphé punicea*, Miq.

× × *Anthers 5.*

MELHANIA, *Forskahl.*

*Bracteoles 3, persistent. Stamens united into a cup, with 5 elongate staminodes.*

HERMANNIÆ.

*Flowers hermaphrodite. Petals marcescent, flat. Stamens 5, shortly united or rarely tubular at base only. Staminodes usually none.*

× *Ovary 5-celled.*

MELOCHIA, *Linnaeus.*

*Capsules almost globular. Seeds wingless. Herbs or under shrubs.*

M. CORCHORIFOLIA, L. In forests and cultivation all over Burma.

VISENIA, *Houttuyn.*

*Capsules* deeply 5-lobed. *Seeds* winged at their extremities. Trees.

V. INDICA, Houtt.

Tropical forests of Pegu and Tenasserim (rare).

V. umbellata, Bl.

Kamorta and Nankowry.

*Riedelia velutina*, DC.

× × *Ovary* 1-celled.

WALTHERIA, *Linnaeus.*

*Calyx* campanulate. *Staminodes* none.

W. AMERICANA, L.

Ava. Segain. Prome.

W. Indica, L.

## BUETTNERIEE.

*Flowers* hermaphrodite. *Petals* concave at base, usually appendaged at top. *Anthors* 5-15, rarely numerous, introrse, the filaments united into a shorter or longer tube, solitary or in groups alternating with the staminodes.

° *Anthors* by 2-4 alternating with a staminode.

GUAZUMA, *Plumier.*

*Petals* clawed, with a linear 2-cleft blade. *Fruit* globular, woody tubereled.

\* G. TOMENTOSA, H. B.

An American tree, sometimes seen planted as an avenue-tree.

LEPTONYCHIA, *Turczaninow.*

*Petals* concave, not clawed. *Filaments* long, only at base connate, alternating by 2 with short staminodes, a series of subulate staminodes at the back.

L. GLABRA, Turcz. E.S.

Tenasserim.

Outer staminodes 15, the inner staminodes ciliate. *Capsule* 1-celled, rugose.

L. (GREWIA) HETEROCALITA, Roxb. E.S.

Tropical forests of South Andamans.

*Binnendykia trichostylis*, Kz.

*L. moacirroides* and *Grewia acuminata*, Bedd.

Outer staminodes 10, the inner not ciliate. *Ovary* and *eapsule* 3-5-celled and lobed, the latter minutely tubereled.

° ° *Anthors* singly alternating with the staminodes.

BUETTNERIA, *Linnaeus.*

*Petals* cucullate at the clawed base. *Staminodes* short and blunt. *Capsules* woody, variously armed.

× *Leaves* cordate-oblong, entire.

B. ASPERA, Colebr. S.S.

Pegu. Tenasserim. Andamans.

*Capsules* large, greyish velvety, covered with strong woody prickles.

B. FENINATA, Wall.

Pegu.

*Leaves* elliptical ovate.

× × *Leaves* more or less lobed or angular. *Capsules* the size of a cherry.

B. PILOSA, Roxb. S.S.

Tropical forests all over Burma.

Tat-tayāk-nweh.

More or less roughish stellate-tomentose. *Capsules* densely covered with brown setose flexible bristles.

B. ANDAMANENSIS, Kz. S.S.

Upper Tenasserim and South Andamaus.

Glabrous or almost so. Capsules covered with long stiff smooth bristles.

B. CRENULATA, MacClelland.

Pegu. Tenasserim.

ABROMA, *Linnaeus*.

A. ANGUSTA, L.

Nankowry.

The Order of *Sterculiaceæ* is notable for the abundance of mucilage which most of its members contain, and the fibre of most is strong and good for cordage. The wood is usually valueless, but *Heritiera* and *Pterospermum* are exceptions, the former affording one of the toughest woods in the East. The Cacao bean, from which Chocolate is made, belongs to this Order.

### GUTTIFERALES.

*Flowers* regular. *Sepals* and *Petals* each usually 4 or 5, imbricate in bud. *Stamens* usually many. *Ovary* 3- or many-celled, rarely 2-celled or of 1 carpel. *Placentas* on the inner angles of the cells.

### Order DIPTEROCARPEÆ.

*Flowers* hermaphrodite, regular. *Calyx-tube* free from the ovary or adnate, bell-shaped and enlarging or small and unchanged, the limb 5-parted or cleft, imbricate (rarely almost valvate), all or a few of the lobes enlarged and wing-like, rarely unaltered under the fruit. *Petals* 5, twisted, imbricate, free or basally connate. *Stamens* numerous, rarely definite, hypogynous or perigynous. *Anthers* 2-celled, the connective often produced, bristly or blunt. *Ovary* usually superior, 3-celled (rarely 2- or 1-celled), with usually paired anatropous ovules in each cell. *Fruit* a usually 1- or rarely 2-seeded nut, inclosed or supported by the calyx or rarely inferior, the calyx-wings some or all enlarged, wing-like. *Albumen* none, or rarely fleshy and ruminate. Trees or shrubs, with alternate simple leaves. *Flowers* usually in racemes or panicles. All the species abound in balsamic products, as camphor and wood oil.

### Sub-order ANCISTROCLADEÆ.

*Ovary* 2-celled, with a single erect ovule. *Fruit* adnate to the enlarged calyx.

ANCISTROCLADUS, *Wallich*.

All the 5 calyx-lobes more or less enlarged. Scandent shrubs.

A. GRIFFITHII, Planch.

Swamps and muddy river banks  
from Pegu to Tenasserim.

Pan-ben-nwch (Kurz).

All the 5 lobes of the fruiting calyx equally enlarged, short and coriaceous, stellately spreading, leaves chartaceous.

A. WALLICHII, Planch.

Tropical forests of Chittagong,  
Pegu, Tenasserim, Andamans.

A. *extensus* and A. *stelligerus*, Wall.

Lobes of fruiting calyx unequal, chartaceous, 1-1½ inch long. Leaves thicker.

### Sub-order DIPTEROCARPEÆ.

*Ovary* 3- rarely 1-celled, with 2 pendulous ovules in each cell. Trees, rarely erect shrubs.

\* *Ovary* inferior or nearly so, or with a broad base adnate to the calyx-tube. Nuts therefore for ½ to ¾ of their length adnate to the enlarged calyx-tube.

ANISOPTERA, *Korthal*.

Connective terminating in bristle or acute gland, 2 of the 5 calyx-lobes enlarging into long wings.

Sub-genus SYNAPTEA.

*Stamens* only 15-18, the connective terminated in an acute gland. *Style* filiform.  
*Nuts* only to about  $\frac{1}{2}$  of their length adnate to the calyx-tube.

A. ODORATA, Griff. T. Tenasserim.

*Vatica grandiflora*, Dyer.

Young shoots covered by a mealy or scurvy tomentum.

Sub-genus ANISOPTERA.

*Stamens* numerous, the connective produced into a bristle, style thick and ovoid.  
*Nuts* inferior or nearly so.

A. GLABRA, Kz. E.T. Pegu Range and hills East of Tonng-ngoo.

Thyt-kadō (Kurz).

Apparently quite glabrous.

A. OBLONGA, Dyer. Mergui.

Differs from the preceding in the unequally prominent nerves of the calyx-wings.

A. SCAPHULA, Roxb. T. Chittagong.

Connective terminated by a short point, mucronate. Leaves oblong, blunt.

\*\* *Ovary* free, superior. *Nuts* free, either inclosed in the enlarged calyx-tube or exposed and the calyx-tube hardly enlarged.

° *Calyx-tube* in fruit very enlarged, completely inclosing the nut.

DIPTEROCARPUS, Gaertner.

*Calyx* 5-lobed, with a turbinate or urceolate free tube. *Petals* somewhat cohering at base, spreading. *Stamens* numerous, free or nearly so, the connective produced into a cuspidate point. *Ovary* free, 3-celled. *Style* filiform. *Nut* woolly, 1- rarely 2-seeded, free, and inclosed in the enlarged calyx-tube. The *calyx-lobes* enlarged, 3 of them remaining short, the 2 others growing out into long wings. *Leaves* entire, or coarsely repand-crenate. Lofty trees.

\* *Calyx-tube* in fruit more or less globular, ovoid or turbinate, without any ribs or longitudinal wings on its belly.

° *Calyx-tube* in fruit towards the top produced into 5 compressed knobs, each situated between 2 lobes.

D. TUBERCULATUS, Roxb. Chittagong to Tenasserim.

Eng.

Leaves glabrous or puberulous beneath. Stipules puberulous.

Tree often with a clean stem 50 feet high and 10 feet in girth. The tree yields no wood oil, but a clear yellow resin. Wood brown, 55 lbs. to the cubic foot, works well and is lasting for indoor work where protected from the sun and rain.

Dr. Mason writes: "This is a tree of the wood oil tree tribe, remarkably characteristic of a sandy soil. It abounds on the sandy plains near the sea shore at Mong-magon, and is equally common on a similar soil in the interior. It produces a valuable timber which is sawn and sold extensively in Toung-ngoo. The Burmese call it *en*." Mason adds that Wallich referred the "*en*" to *D. grandiflora*, MacClelland to *alatus*, and Kurz now identifies it with *tuberculatus*. The deduction seems to me to be that the Burmese word *En* or *Eng* is applied indifferently to more species than one, and hence probably the difference of opinion touching the value of *Eng* timber, one writer having in view one tree of the name, and other writers quite a different tree.

° ° *Calyx-tube* in fruit perfectly terete.

× *Leaves* glubrous and glossy.

D. LEVIS, Ham.

Arakan. Pegu. Tenasserim.

*D. turbinatus*, Roxb.

*D. grandiflora*, Griff.

Kanyin-ni.

Stipules velvety. Fruiting calyx smooth and more or less pruinous.

A magnificent tree with often a clear stem of 120 feet and a girth up to 25 feet. Yields a large quantity of superior wood oil and some brown resin. Wood very inferior, decaying in a little more than a year if exposed to the weather, but lasting longer indoors.

*D. HASSELTII*, Bl.

Andamans and Tenasserim.

Stipules glabrous. Fruiting calyx sprinkled with minute stellate hairs.

× × *Leaves beneath or on both surfaces variously hairy.*

*G. TURBINATUS*, Gaertn.

From Chittagong to Tenasserim.

Leaves acuminate, beneath along with the petioles pubescent. A magnificent tree fully as tall as *D. laris*, but with a slightly less girth. Yields a wood oil. Wood pale brown, 55 lbs. to the cubic foot, quality similar to *D. tuberculatus*.

*D. OBTUSIFOLIUS*, Teysm.

Prome and Martaban.

All softer parts greyish pubescent, the leaves blunt. Size of *D. tuberculatus* and quality of wood similar.

*D. PILOSUS*, Roxb. *E.T.*

Tropical forests of Arakan, Martaban, and Tenasserim.

Leaves acuminate, often large. Petioles, young branchlets and stipules strigose from short tawny brush-like fascicled hairs.

\* \* *Calyx-tube in fruit longitudinally marked by 5 ribs or as many wings.*

† *Wings of fruiting calyx-tube broad (about half as broad as the belly or broader).*

*D. ALATUS*, Roxb.

Kanyin-hpyu.

Calyx greyish-tomentose, when in fruit sparingly stellate-puberulous. Petioles long. Leaves greyish pubescent. A magnificent tree with a clear stem of 100 feet, and 15 feet in girth.

*D. GRIFFITHII*, Miq.

Tropical forests of the Andamans and Tenasserim.

Calyx pruinous, quite glabrous. Petioles only 2-2½ inches long.

A deciduous tree, the same size as the last. Wood yellowish-grey.

† † *Wings of the fruiting calyx-tube narrow or reduced to ribs.*

° *Leaves blunt.*

*D. INCANUS*, Roxb.

Chittagong.

All softer parts greyish-villous. A doubtful species, very near to *D. alatus*.

° ° *Leaves acuminate.*

*D. COSTATUS*, Gaertn.

Chittagong, Martaban, Tenasserim.

*D. gonopterus*, Turcz.

Branchlets tomentose, the belly of the calyx narrowly 5-winged and sparingly hairy.

*D. VESTITUS*, Wall.

Tavoy.

If not identical with *D. turbinatus*, apparently differing by the calyx-lobes all short broadly deltoid (not 2 elongate).

*D. SCABER*, Ham.

Southern Tipperah.

*D. ANGUSTIFOLIUS*, W.A.

Chittagong.

*D. costatus*, Roxb. (non Gaertn.).

Yields wood oil abundantly (Voigt).

This genus yields resin, wood oil and timber. The oil (known as 'Garjun' oil in India) is nearly equal to Copaiba in the treatment of disease, for which it is a

cheap substitute. Dose, M x-xv thrice daily. Some utterly preposterous Custom rules did once (if they do not still) stand in the way of the importation of these oils into England. The timber of these trees is of varying excellence, some being poor, whilst others yield a fairly good wood for indoor work, but they are unsuited to bear exposure to the elements. Speaking of the 'Kanyin,' *D. laris* and *grandiflora*, Dr. Mason says: "The common wood oil tree produces a very useful timber, which is sawn into boards at Tavoy and Mergui, and used in house building. Where not exposed to the wet, they answer as well as teak, and are sold at half the price; but they are not impervious to white ants. The best charcoal is made from this tree and the next. The Burmese distinguish two species, *ni* and *phyu*, or red and white. The most common species from which the torches are made is called red in the Tenasserim Provinces, and Martaban."

#### PARASHOREA, Kurz.

*Calyx-tube* very short, not enlarging. *Stamens* 12-15, the connective mucronulate. *Ovary* free, 3-celled. *Style* filiform. *Calyx-tube* in fruit not enlarged, the 5 lobes valvate, and almost equally wing-like. *Nut* 1-seeded, free and not in the least inclosed by the spreading calyx-lobes. Lofly trees, with shining leaves. *Flowers* small, whitish, racemose, in dense panicles. The generic character lies in the *astivation of the calyx and entirely exposed nut*.

P. STELLATA, Dyer. E.T. Tropical forests of Pegu Range and Martaban.  
Koung-hmu (Kurz).

#### SHOREA, Roxburgh.

*Calyx-tube* very short. *Stamens* 35-100, the cells unequal, and often a little pilose at the tips, the connective terminating in a bristle or penicellate sharp point. *Ovary* free, 3-celled. *Fruiting calyx* not enlarged, the wing-like 5 lobes erect, very imbricate, and with their broad twisted bases closely embracing the nut. Trees with entire leaves. *Flowers* small, racemose, in panicles.

\* *Inflorescence tomentose or velvety-pubescent.*

× *Leaves chartaceous, when full-grown glabrous or nearly so.*

S. OBTUSA, Wall. From Ava to Tenasserim.  
Thit-yā.

Shorter calyx-lobes in fruit acuminate. *Stamens* 20-25.

The wood of the Thit-ya (or Thiyah) is strong and valuable, though coarse and somewhat hard to work. It precisely resembles its near ally the 'Sāl' of India (*S. robusta*, Roxb.), and weighs 67 lbs. to the cubic foot. Kurz (following Brandis) says 57; but this is far too low for a good specimen, and Balfour (Timber Trees, p. 247) says 75, which is far too high for a seasoned sample. The tree also furnishes a white resin.

S. ROBUSTA, Roxb. Ava.

Shorter calyx-lobes in fruit blunt. *Stamens* about 50.

S. HELPERI, Dyer. Tenasserim.

Incompletely known. Leaves apparently persistent.

× × *Leaves very coriaceous, appressed silvery beneath.*

\*\* *Inflorescence quite glabrous.*

S. (HOPEA) FLOREBUNDA, Wall. Tenasserim.

Calyx quite glabrous.

#### PENTACME, De Candolle.

*Calyx* imbricate, the tube very short. *Petals* infracted from their middle and closely twisted round the sexual organs, forming a closed hemispherical corolla, perforated only at the top. *Stamens* 15. *Anthers* 1-celled, the cells almost equal,

saccate at base, tapering into subulate points, the connective also terminated by a rigid bristle. *Ovary* free. *Style* filiform. *Nut* inclosed in the imbricate bases of the calyx-lobes. Large trees, with entire leaves. *Fruit* as in *Shorea*.

P. SIAMENSIS, Miq.

Ava. Prome and Tenasserim.

Enjin. Enjin.

Kurz says this tree furnishes a red resin, and describes the wood as "dark brown," tough and durable, and weighing 55 lbs. This is an error, as the seasoned wood is a very pale brown, hard, strong, tough and durable, but not easy to work, and weighs 61 lbs. to the cubic foot. It is one of the best woods in the country, but not very plentiful—and one consequently which should be planted.

Dr. Mason, under the head of *Shorea robusta*, says, "The Burmese books say that Gaudama died in a grove of Engyen-trees, and the Pali name is *thāla* or *sāla*, the Sanscrit *sāl*, the name of the *Shorea robusta*. Much of the petrified wood found in the Irrawaddy, the natives say, belongs to this tree, and the Burmese books state that Gaudama was born under one of them, though others say he was born under the *Jonesia*." Dr. Mason, however, discriminated the points wherein the Burmese tree differs from the true *robusta*, as he adds: "The tree, though not very abundant, is found in both the Tenasserim Provinces and Pegu, but the inflorescence differs from Roxburgh's description of *Shorea robusta*." The Enjin is a sacred tree with Buddhists, and not used in consequence by Burmans, save perhaps in sacred buildings. Dr. Mason also mentions a tree which does not seem to have been identified by Kurz: "Lard Shorea. On the mountains in the interior is a species of shorea which produces an oil of the consistence of lard, and has been hence named by the Karens 'the hog's lard tree.'" Can this be a species of *Bassia*? I see no reason why the valuable *Bassia latifolia* should not flourish, if introduced, in Upper Pegu, and it is an experiment worth a trial, in localities where the *Phyllanthus emblica* (Shah-lpyu) flourishes, as it would prove a valuable addition to the food supply of the people.

#### HOREA, Roxburgh.

*Calyx-tube* very short, the lobes imbricate. *Stamens* 15. *Anther-valves* nearly equal, the connective terminating in a short point, or prolonged into a long bristle. *Ovary* free, 3-celled. *Calyx-tube* in fruit not enlarged, 2 of the 5 lobes wing-like, enlarged, the 3 outer ones remaining very short. *Nut* embraced by the calyx-lobes. Trees, with entire leaves and racemose flowers, forming axillary peduncles.

\* *Connective terminated by a short point.*

H. ODORATA, Roxb. E.T.

Chittagong to Tenasserim.

Thyn-gān.

Calyx greyish-tomentose. Bluntish leaves acuminate.

Wood brown, "heavy," and close-grained, 64 lbs. to the cubic foot according to Balfour. Kurz (following Brandis?) gives 46 lbs., but this could hardly be called "heavy," and three specimens of Thyn-gān in my possession give respectively 48, 49, and 60 lbs.

\*\* *Connective terminated by a bristle longer than the anther-cells.*

H. GRATISSIMA, Wall.

Tenasserim.

Calyx greyish-tomentose. Flowers somewhat larger.

H. OBLONGIFOLIA, Dyer.

Southern Tenasserim.

All parts glabrous. Calyx-lobes ovate, acute, glabrescent. Anthers orbicular, with an appendage 4 times their length.

H. GRIFFITHII, Kz.

Tenasserim.

Calyx almost glabrous. Flowers very small.

The 'Horeas' or Thyn-gāns all yield excellent timber, and the Burmese discriminate several species. I have specimens of Thyn-gān net shwē do 60 lbs., Thyn-gān net

(*H. odorata*) 49 lbs., Thyn-gān-wā 48 lbs., and Thyn-gān-hypn. They are tough, strong, and durable woods, but the unseasoned timber I have noticed to be liable to be "wormed" or attacked by Coleopterous insects, and the trees would therefore benefit by being water seasoned for a time. For canoes they stand first of any timbers in Burma.

Vatica, *Linnaeus*.

*Calyx-tube* very short, adnate to the torus, the lobes imbricate. *Stamens* 15, the connective produced in a sharp point, shorter than the unequal anther-cells. *Ovary* inserted with a broad base, free, 3-celled. *Style* linear. *Capsules* free, coriaceous, irregularly deliscent, or dehiscing from the apex by 6 valves, 1-seeded. Glabrous trees, with entire leaves. *Flowers* fragrant, racemose, in panicles.

V. LANCEFOLIA, Bl.

Chittagong. Burma.

Younger parts mealy-puberulous, soon glabrescent. Capsule the size of a pigeon's egg supported by five, sub-equal, enlarged, calyx-lobes, shorter than the calyx.

V. TRIGYNA, Griff.

On top of Pator Hill near Mergui at 6000 feet.

Kurz says: "Griffith's description is a very complete and good one, but still I cannot guess the plant. The ovary-like style would indicate *Anisoptera*, but the ovary itself is stated to be superior and free."

Order TERNSTRÆMIACEÆ.

*Flowers* usually hermaphrodite. *Sepals* 5, rarely 4-7, free or slightly connate, imbricate. *Petals* 5, rarely more, free, or basally connate, imbricate or twisted. *Stamens* usually numerous, free, often adnate to the base of the petals. *Anthers* basifixed or versatile. *Fruit* a berry or capsule. *Albumen* none, or scanty, rarely copious. *Stipules* none.

TERNSTRÆMIACEÆ.

*Anthers* basifixed. *Fruit* indehiscent. *Seeds* usually few. *Albumen* fleshy, usually scanty. *Embryo* curved, the cotyledons shorter than the radicle and nearly as broad.

ANNESLEA, *Wallich*.

*Ovary* half-immersed in the torus. *Fruit* inferior.

A. FRAGRANS, Wall. E.T.

The Eng forests of Prome, Martaban and Tenasserim up to 2000 feet.

Leaves rather coriaceous, bluntnish, the nerves distinct. Peduncles slender.

A. MONTICOLA, Kz. E.T.

Hill forests of Martaban from 5000 to 7000 feet; also the Khakyen Hills.

Leaves thick coriaceous, acute, nerves obsolete. Possibly a dwarf race of the last.

TERNSTREMA, *Linnaeus*.

*Flowers* hermaphrodite or diœcious. *Sepals* and *Petals* 5, the latter basally connate. *Stamens* many. *Anthers* glabrous. *Ovary* 2-3-celled, with 2 or rarely more pendulous ovules in each cell. *Style* simple or none. *Stigma* lobed or almost entire. *Seeds* few, arillate. *Flowers* usually 2-bracted at base, axillary. Evergreen trees, with entire or crenate-serrate leaves.

T. JAPONICA, Thbg.

Martaban and Tenasserim from 3000 to 7200 feet.

*Cleyera gymnanthera*, W. A.

*Anthers* apiculate. *Calyx* smooth. Berries  $\frac{1}{2}$  inch thick.

T. PENANGIANA, Choix.

Tropical forests of Tenasserim, the Andamans, and Kamorta.

*Erythroxylon Wallichianum*, Griff.

*Anthers* blunt. *Calyx* wrinkled. Berry 1-1 $\frac{1}{2}$  inch thick.

SLADENIA, Kurz.

*Sepals* persistent, scarious, imbricate. *Petals* 5 (rarely 6), coriaceous. *Stamens* 10 or thereabouts. *Filaments* short, dilated. *Anthers* bifid at summit, emarginate at base, minutely hispid on the edges and at the base of back, the cells opening by an apical pore. *Ovary* 3-celled, with 2 pendulous ovules in each. *Flowers* small, in dichotomous cymes.

S. CELASTRIFOLIA, Kz.

Hills East of Blamo.

ADINANDRA, Jack.

*Sepals* and *Petals* 5 each, much imbricate, the latter basally connate. *Stamens* many, often 1-4-adelphous. *Anthers* pilose. *Ovary* 3-5-celled, containing numerous ovules in each cell. *Style* simple or shortly 3-5-cleft. *Berries* induriscent, with many small seeds.

A. VILLOSA, Chois. E.T.

Open forests in Pegu and Tenasserim.

Leaves glabrous above, pubescent below.

ECRYA, Thunbergh.

*Flowers* dioecious. *Petals* united at base. *Anthers* glabrous. *Ovules* many. *Fruit* superior.

\* *Leaves serrulate.*

× *Leaf-buds quite glabrous.*

E. JAPONICA, Thbg. E.T.

Martaban and Tenasserim, between

E. WIGHTIANA, Wight, non Wall.

4000 and 7000 feet.

E. GLABRA, VIRENS, and OBOVATA, Bl.

Toung-let-hpet.

Branchlets marked by decurrent prominent lines.

× × *Leaf-buds pubescent or hirsute. Branchlets terete.*

E. ACUMINATA, DC. E.T.

Martaban between 6000 and 7200 feet.

Slender pine-like tree. Leaves puberulous beneath, acuminate. Styles united.

E. SERRATA, Bl. E.T.

Tropical forests of Martaban up to 2000 feet.

E. LUCIDA, Wall.

Khakyen Hills. Rangoon.

Toung-let-hpet.

A bushy round-headed tree. Leaves membranous, glabrous, bluntly caudate. Styles free. Wood heavy, red-brown, brittle.

\*\* *Leaves entire or serrulate at apex only.*

E. SYMPLOCINA, E.S.

Martaban Hills at 7000 feet.

Young shoots appressed, pilose. Styles united.

SACRAUJIEÆ.

*Anthers* versatile. *Fruits* usually pulpy, rarely almost dehiscent. *Seeds* numerous, small. *Albumen* copious. *Embryo* straight, the radicle longer than the cotyledons.

SACRAUJA, Willdenow.

*Flowers* 5-merous, usually hermaphrodite. *Styles* 3-5.

\* *Calyx* densely setose or hispid. *Ovary* glabrous.

S. ARMATA, Kz. E.T.

Khakyen Hills and ? Martaban (J.A.S.B.

S. CEREA, Griff., apud Dyer.

ii, 1873, p. 59).

Flowers large, on short thick pedicels, clustered. Leaves spiny-serrate.

\* \* *Calyx smooth. Ovary glabrous.*

S. PUNDUANA, Wall. *E.T.*

Martaban Hills between 2000 and 3000 feet. Khakyen Hills.

Leaves pale or tawny mealy-puberulous beneath. Peduncles long and slender, scaly. Styles 5.

S. ROXBURGHII, Wall. *E.T.*

Chittagong and Hills East of Toung-ngoo, between 2000 and 6000 feet.

*Ternstroemia serrata*, Roxb.

Adult leaves glabrous, except the puberulous midrib. Peduncles short, scaly puberulous. Stamens about 50. Flowers lazuli-blue.

S. TRISTYLA, DC. *S.*

Tenasserim.

*Ternstroemia bilocularis*, Roxb.

As preceding, but leaves finely setose-serrate. Stamens about 20. Flowers said to be white. Included on the authority of Dyer. Specimens thus named in HBC. hardly differ from the preceding (Kurz).

S. MACROTRICHA, Kz.

Khakyen Hills.

All parts except upper side of leaves covered with long tawny or brown spreading hairs. Peduncles short but slender, rusty-hirsute.

#### GORDONIEÆ.

*Anthers versatile. Fruit indehiscent or loculicidal. Albumen scanty or none, rarely copious. Embryo curved or straight, the cotyledons large, the radicle short.*

× *Fruit a dehiscent capsule.*

SCHEMA, Rwdt.

*Sepals* 5, somewhat unequal. *Petals* 5, much imbricate. *Stamens* numerous, adnate to the petal base. *Capsule* woody, usually round, opening loculicidally in 4-6 valves, leaving a free central axis. *Seeds* flat, winged. *Radicle* inflexed, inferior. *Albumen* thin. Trees or shrubs, with entire or crenate leaves, and showy white flowers.

× *Peduncles usually very short and stout, usually not longer than the petioles.*

S. WALLICHII, DC. *T.*

Chittagong. Khakyen Hills.

*Gordonia integrifolia*, Roxb.

Peduncles short and straight (rarely long in Wall. Cat. 1455 fr. Nepal), usually lenticellate, rather strong, the nerves beneath prominent, the reticulation distinct. Leaves glabrous or slightly pubescent beneath. Wood compact, brown (Kurz).

S. MOLLIS, Dyer. *T.*

Ava Hills.

Peduncles 1 inch long, lenticellate. Leaves pubescent beneath. The nerves and net-venation prominent and distinct. A pubescent variety perhaps of the last (Kurz).

S. MONTICOLA, Kz.

Nāt-toung, Martaban over 6000 feet.

Peduncles thick, lenticellate. Leaves very coriaceous, glossy above, crenate, on both sides green, the net-venation indistinct, immersed.

Perhaps a stunted variety of *S. Noronha*, the leaves like those of *Pygeum lucidum* (Kurz).

S. NORONHÆ, Rwdt. *E.T.*

Martaban and Tenasserim between 1500 and 4000 feet.

*Gordonia integrifolia*, Roxb.

*G. floribunda*, Wall.

Pān-mā.

Peduncles short and straight, smooth. Flowers larger than in *S. crenata*. Leaves glaucescent beneath, often entire, the lateral nerves prominent, the net-venation obsolete. Wood light brown.

×× *Peduncles elongate, and often slender, much longer than the petioles, smooth.*

*S. CRENATA*, Korth. *E.T.*

Pegu. Tenasserim.

*S. oblata*, Roxb.

Peduncles slender, usually more or less curved. Leaves glaucous beneath, usually crenate-serrate, the nerves and net-venation beneath distinct.

Wood brown, easy to plane and work, 42 lbs. to the cubic foot (Theobald).

*S. BANCANA*, Miq.

Martaban and Tenasserim up to 3000 feet.

Peduncles strong, but still slender, 1-1½ inch long. Leaves very coriaceous, on both sides impressed-reticulate and almost rugulose, entire or crenate, the lateral nerves entirely or nearly impressed. Capsules smaller.

#### CAMELLIA, *Linnaeus*.

*Sepals* very unequal. Outer stamens monadelphous. *Seeds* few, large, not winged. *Radicle* superior.

\* *Stamens free, twice as many as the petals.*

*C. CAUDATA*, Wall. Along streams in the Martaban Hills at about 3500 feet.

Young parts and midrib of the membranous leaves pilose. Flowers nodding on a line-long scaly peduncle. Filaments villous.

\* *C. CHINENSIS*, L.

Cultivated.

*C. thea*, Lk.

All parts glabrous. Leaves coriaceous. Peduncles not scaly. Filaments glabrous.

*C. DRUPIFERA*, Lour.

Tenasserim.

*C. kissi*, Wall.

*C. simplicifolia*, Griff.

Glabrous. Leaves coriaceous. Flowers almost sessile, erect. Filaments glabrous.

×× *Fruit an indehiscent drupe.*

#### PYRENARIA, *Blume*.

*Sepals* unequal. *Seeds* large. *Cotyledons* folded or convolute. *Radicle* inferior.

× *Bracts large, leafy, dissimilar to the sepals.*

*P. DIOSPYRICARPA*, Kz. *E.T.*

Martaban Hills over 6000 feet.

Dry leaves yellowish, pubescent beneath.

\*\* *Bracts small, similar to but shorter than the sepals.*

*P. CAMELLEFLOKA*, Kz. *E.T.*

Hill forests of Martaban between 3000 and 5000 feet.

Dry leaves yellowish, glabrous. Petioles hardly 2 lines long, puberulous or glabrous. Fruits obovate, waxy yellow.

*P. SERRATA*, Bl. *E.T.*

Tenasserim.

*P. attenuata*, Seem.

Leaves glabrous, in a dried state liver-coloured. Petioles glabrous, 6-8 lines long. Fruits globular or elliptical, green.

#### Order GUTTIFERÆ.

*Flowers* regular, diocious, polygamous, or hermaphrodite. *Sepals* 2-6, imbricate. *Petals* as many, rarely more, imbricate, or almost twisted. *Male flowers*: *Stamens* usually indefinite, hypogynous. *Filaments* free, or united into bundles. *Anthers* various. *Female flowers*: *Staminodes* various. *Ovary* 1-2 or more celled, with one or more ovules in each cell. *Stigmas* as many as ovary-cells, or variously consolidated, sessile,

or on a longer or shorter style. *Fruit* usually an indehiscient berry, with a fleshy or pulpy mesocarp. *Seeds* large. *Albumen* none.

Trees or shrubs, often abounding in a yellow juice, with opposite, simple, often coriaceous leaves. *Stipules* none.

#### GARCINIEÆ.

*Stigma sessile, or on a very short and thick style, peltate or radiately lobed. Seeds often arillate.*

#### GARCINIA, *Linnaeus*.

*Flowers* dioecious or polygamous. *Sepals* 4, decussate or rarely 5-6, imbricate. *Petals* 4-5, imbricate. *Males*: *Stamens* numerous, free, or united in an entire or lobed fleshy mass, or 4-adelphous round a style-rudiment. *Anthers* 2, or rarely 4-celled. *Females* and *Hermaphrodites*: *Staminodes* various, free or connate. *Ovary* 2- or more celled, with a solitary ovule in each cell. *Stigma* sessile, or on a short style, entire, lobed or radiating. *Fruit* a 2- or several-celled berry, with a coriaceous rind. *Seeds* imbedded in the arillus-like pulp.

#### △ *Flowers* 4-merous.

× *Anthers* oblong or ovate, opening by longitudinal slits or pores.

\* *Stamens* of male flowers in 4 bundles under the rudimentary ovary. *Berries* 4- to 10-celled, the stigma radiating-lobed, smooth or nearly so.

\* *G. MANGOSTANA*, L. *E.T.*

Cultivated only in Tenasserim.

Men-gwôt. The Mangosteen.

Female flowers with staminodes round the ovary. *Berries* on a short peduncle. *Stigma* radiately-lobed and adnate.

*G. CORNEA*, L. *E.T.*

Tropical forests of the Southern Pegu Range, and Tenasserim. Kamorta. Nankowry.

Female flowers without staminodes. *Berries* sessile. *Stigma* large, peltate, slightly lobed, sessile.

*G. SPECIOSA*, Wall. *E.T.*

Tropical forests of Tenasserim and the Andamans. Katchall. Nankowry.

Flowers on rather long pedicels, nearly 2 inches in diameter. *Stigma* in male flowers large, peltate, entire.

\* \* *Stamens* in 4 polyandrous bundles in a ring round the rudimentary ovary. *Stigma* peltate, discoid, rough from wrinkles or radiating veins. *Ovary* 2-celled.

*G. ANOMALA*, Pl. and Trian. *E.T.*

Forests of Martaban and Toung-ngoo, from 4000 to 6000.

Peduncle rather long, bearing 2 or rarely 1 leafy bracts.

*G. MERGUIENSIS*, Wight. *E.T.*

Tenasserim.

Leaves long acuminate, the lateral nerves remote, and irregular. *Staminal* mass deeply 4-lobed.

*G. ROSTRATA*, Bth. and H. f. *E.T.*

Southern Tenasserim.

Leaves blunt caudate, the lateral nerves crowded, very faint and regularly parallel. *Peduncles* naked. *Flowers* in branchiate poor cymes or small panicles.

× × *Anthers* almost sessile on a column or 4-sided fleshy mass, seldom dividing into 4 somewhat distinct lobes. *Stamens* in female flowers in a single complete or interrupted ring. *Stigmas* tubercled or tubercled-wrinkled. *Ovary* 4-12-celled.

° *Stigma* in fruit raised on a short thick style.

*G. COWA*, Roxb. *E.T.*

Chittagong.

*G. Roxburghii*, Wight.

Berry convex at top, the style not on a separate nipple.

*G. KYDIA*, Roxb. *E.T.* Tropical forests from Chittagong to  
 Toung-tha-leh (Kurz). Tenasserim and the Andamans.  
 Berry terminated by a nipple-shaped protuberance. Anthers 4-celled.

°° *Stigma in fruit quite sessile.*

† *Male and female flowers solitary to ternary.*

*G. MICROSTIGMA*, Kz. *S.* Tropical forests of South Andaman.  
 Stigma minute, dot-like, smooth. Anthers 2-celled.

°°° *Stigma tubercled.*

*G. LANCEFOLIA*, Roxb. *E.T.* Chittagong Hills.

Leaves acuminate or cuspidate, leathery. Flowers sessile. Anthers 4-celled.

*G. SUCCIFOLIA*, Kz. *E.T.* Swampy forests near the Tsittoung and  
*G. loniceroides*, T. And. Irrawaddy Rivers.

Leaves blunt, succulent. Flowers pedicelled. Anthers 2-celled.

*G. PANICULATA*, Roxb. *T.* Chittagong.

Male flowers panicle, the females in terminal spikes.

××× *Anthers peltate, opening by a circular slit.*

*G. ELLIPTICA*, Wall. *E.T.* Tropical forests of Pegu, Martaban  
*G. heterandra*, Wall. and Tenasserim up to 3000 feet.

Tha-nāt-tor.

Leaves large, coriaceous. Female flowers almost sessile, the stigma small,  
 verrucose.

△△ *Flowers 5-merous.*

*G. (XANTHOCHYMUS) PICTORIUS*, Roxb. Tropical forests from Ava and Chit-  
*G. Roxburghii*, Kz. tagong to Tenasserim.

Mator or Mador.

Pedicels about an inch long. Petals expanded.

*G. (XANTHOCHYMUS) DULCIS*, Roxb. *E.T.* Tropical forests of the Andamans.

Pedicels 3-4 lines long. Petals almost closed, half the size.

Kurz adds from the Nicobars:

*G. (XANTHOCHYMUS) JELINEKII*, Kz. Tillan-choung.

This Order is remarkable as producing one of the finest fruits of the tropics, the Mangosteen, though the tree will only thrive in the extreme South of Tenasserim, being indigenous to the warm and moist climate of the Malayan Peninsula. The thick and somewhat fleshy case which protects the ball of snowy delicate pulp within is very astringent, and exudes yellow globules of a gamboge. All the trees, indeed, of this genus furnish a yellow gum, but it is only one or two species which yield a gum easily soluble in water. The best gamboge is produced by *G. elliptica*, but an inferior article is produced by *G. cornea*, *G. anomala*, *G. cowa*, *G. Kydia*, *G. succifolia*, *G. xanthochymus* and *G. (Hebrodendron) morella*. *Garcinia Cambogia*, Des. non Roxb., yields a pleasant fruit and a gamboge quite insoluble in water, and it is the complete solubility of the best gamboge that distinguishes it from inferior sorts, but it is probable that, when fully investigated, these insoluble gamboges will be found of service in the arts. In small doses Gamboge is a powerful hydragogue cathartic, especially valuable in dropsical affections, and it constitutes the active ingredient of Morrison's Pills.<sup>1</sup>

<sup>1</sup> It was an overdose of some quack pills Mr. Edmund Jones took that cost him his life, and deprived Raugon of one of the most enterprising leaders of her mercantile community.

Several species of *Garcinia* yield edible fruits, and the seeds of *G. purpurea* (and possibly some other species) yield a vegetable butter, called in India "Kokum butter." To obtain this the seeds are dried, pounded, and then boiled in water; the oil concreting on the surface when the water cools. The oil is bland and alimentary, and well adapted for forming ointments in a country where animal fats are objected to. The timber of the *Garcinias* is inferior, but Kurz says that *G. speciosa* yields a good and durable wood.

OCHROCARPUS, *Thouars.*

*Calyx* closed in bud, bursting into two valves.

O. (CALYSACCION) SIAMENSIS. *E.T.* Prome Hills. Rare in Martaban.  
Tar-hpi.

CALOPHYLLIÆ.

*Style* elongate, the stigma peltate or 4-cleft. *Seeds* without arillus.

CALOPHYLLUM, *Linnaeus.*

*Flowers* polygamous. *Sepals* and *petals* together 4-12, imbricate, in 2 or 3 series. *Stamens* numerous, free or nearly so. *Anthers* 2-celled. *Ovary* 1-celled, with a single erect ovule. *Style* rather long. *Stigma* peltate. *Drupe* indehiscient, crustaceous, 1-seeded. Trees with coriaceous parallel-veined leaves. *Flowers* white, fragrant, in cymes or panicles.

\* *Sepals* 4, often the 2 inner ones or all, petal-like. *Petals* none.

C. SPECTABILE, Willd. *E.T.* Tropical forests of Tenasserim and the  
*C. tetrapetalum*, Roxb. Andamans.

Pan-ta-kha or gā.

Flowers about 8 lines in diameter, in peduncled or almost sessile umbel-like cymes.

C. AMENUM, Wall. *E.T.* Tenasserim.

Flowers small, racemes short and strong, flowers few.

\*\* *Sepals* 4. *Petals* 4 to 8.

C. POLYANTHUM, Wall. *E.T.* Martaban Hills East of Toung-ngoo  
Leaves at both ends acuminate. at 3000 to 4000 feet.

C. INOPHYLLUM, L. *E.T.* Within the tideway, Pegu, Tenasserim, Andamans  
*C. bitangor*, Roxb. and Nicobars. Is often washed by the sea.

'Pōng-nyet.'

Leaves rounded or retuse at the apex.

Kurz is decidedly wrong in describing this wood as heavy (63 lbs.). Brandis gives 39 lbs., and my highest weight for the *seasoned* wood is 42 lbs. In the opinion of Drs. Gilson and Cleghorn, the valuable 'poon' spars are produced by *C. angustifolium*, or some allied species. Kurz (in his Sketch of the Nicobar Vegetation, J.A.S.B. 1876, Part ii. p. 119) says: "Mr. Jelinek remarks that the Nicobarese build their canoes of this tree," and adds in a note, "I doubt this, for the Nicobarese cut the trees for their canoes far in the interior, while *C. inophyllum* is a shore tree. The timber of their boats more resembles that of *Artocarpus*." Now there is in Burma a fine lofty tree growing on the hills, and to judge by its wood an *Inophyllum*, in good request for canoes, for which its light tough wood well fits it. The Burmese name is 'Tar-hpi' or 'Ta-ra-phi,' and the tree that I so understand averages under 40 lbs. to the cubic foot. The name, however, probably applies to other species, as Brandis gives its weight as 57 lbs. The wood of both 'Pōng-nyet' and 'Tar-hpi' is identical in appearance, but the former is a tree of squat stunted growth, whereas the 'Tar-hpi' runs up into magnificent trees with straight stems, fitted to yield the largest spars or canoes, and its wood is moreover the lighter of the two. *C. angustifolium*, Roxb., is

not included by Kurz in his list, whence I presume that species does not occur in Tenasserim.

Another enormous tree (*Artocarpus mollis*, Wall.) is also a favourite one for canoes, and this may be the species to which Kurz alludes; but that a lofty *Inophyllum* is also used, as Jelinek asserts, I quite believe, though he may have mistaken the species.

*C. WALLICHIANUM*, Planch. et Trian. Tropical forests of Kamorta.

KAYEA, Wallich.

*Ovary* 1-celled, with 1 ovules. *Style* single, with a 4-cleft stigma.

*K. (MESUA) NERVOSA*, Planch. et Trian. *E.T.* Tenasserim.

Flowers 1-3 in the leaf-axils, and terminal.

*K. FLORIBUNDA*, Wall. *E.T.* Tropical forests in hills East of Young-ngoo at 2500 feet.

Flowers in terminal panicles.

MESUA, Linnæus.

*Flowers* polygamous or hermaphrodite. *Sepals* and *petals* each 4, imbricate. *Stamens* numerous, free or connate at base. *Anthers* oblong, 2-celled, dehiscing vertically. *Ovary* 2 celled, with two erect ovules in each cell. *Style* long, with a peltate stigma. *Drupe* woody, 1 celled, 1-4-seeded. Trees with rigid coriaceous almost veinless leaves. *Flowers* large.

*M. FERREA*, L. *E.T.*

Tropical forests from Chittagong to

*M. speciosa*, Chois.

Tenasserim and the Andamans.

*M. pedunculata*, Wight.

Gân-gor. Ceylon iron-wood. Poached-egg tree.

A handsome ornamental tree, with fragrant flowers, one of the five flowers described as tipping the Hindu Cupid's darts. It is one of the hardest, most imperishable and valuable woods, averaging over 70 lbs. to the square foot. It is red when fresh, but seasons to a reddish-brown, and is hard and tough, but cross-grained and difficult to plane and dress. It is said to grow wild in Tenasserim. A specimen before me of 'Young-gänger,' from Tavoy, would seem, however, to belong to some other species, though Kurz only gives one species (uniting *ferrea* and *pedunculata*). It weighs 77 lbs. to the cubic foot, is a pale yellowish-brown, rather straight in the grain, very hard, and takes a beautiful polish. It is probably not *M. ferrea*, but some other species of *Mesua*, and a most valuable timber.

#### Order HYPERICINÆ.

*Flowers* regular, hermaphrodite. *Stamens* 5, imbricate. *Petals* 5, hypogynous, imbricate, often twisted. *Stamens* indefinite, hypogynous, free, or united into 3-5 (rarely 1) bundles. *Anthers* 2-celled, longitudinally dehiscing. *Ovary* 3-5-celled or rarely spuriously 1-celled. *Styles* free. *Stigmas* usually club-shaped or capitate. *Fruit* a septicidal or loculicidal capsule or an indehiscent berry. *Albumen* none. Herbs, shrubs (rarely trees), with opposite simple leaves. *Stipules* none.

#### HYPERICINÆ.

*Capsules* dehiscing septicidally. *Seeds* not winged.

#### HYPERICUM, Linnæus.

*Flowers* 5-merous.

\* *Shrubs* with large flowers. *Ovary* 5-celled. *Capsule* 5-valved.

*H. LESCHENARITH*, Chois.

Nât-toung, over 7000 feet.

*H. triflorum*, Bl.

*H. oblongifolium*, Hooker.

*H. Hookerianum*, W.A.

\* \* Herbs with small flowers. Ovary 3-celled. Capsules 3-valved.

H. ELODEOIDES, Chois.

Khakyen Hills.

Stems terete. Sepals glandular-ciliate.

\* \* \* Herbs. Ovary 1-celled. Flowers small.

H. JAPONICUM, Thbg.

Khakyen Hills. Yunzaleen at 2500 feet, and Tenasserim.

Stems 4-angular. Sepals entire.

\* H. (NORYSCA) CHINENSE, Voigt (M.).

#### CRATOXYLIEÆ.

Capsules dehiscing loculicidally or sometimes both and septicidally. Seeds winged.

#### CRATOXYLON, Blume.

Sepals and petals 5. Stamens triadelphous, the staminal bundles often alternating with as many hypogynous glands. Ovary 3-celled, with 4 or more ovules in each cell. Capsule 3-valved, opening loculicidally. Seeds winged at upper end.

Trees or shrubs with simple dotted leaves. Flowers in axillary cymes or terminal panicles, rarely solitary.

Sub-genus TRIDESMIS, Spach.

Petals furnished at base with a scale.

C. (TRIDESMIS) FORMOSUM, Korth. T.

Tropical forests of South Andaman.

All parts glabrous, petals white, entire.

C. PRUNIFLORA, Wall. T.

Ava. Martaban. Tenasserim.

C. prunifolium (Calami lapsu, monente auctore).

Pedicels, sepals, and beneath leaves pubescent. Petals lilac-fringed. Wood heavy, but perishable, soon "wormed" (Kurz).

Sub-genus ANCISTROLOBUS, Spach.

Petals without a basal scale.

\* Flowers in axillary poor cymes or solitary.

C. POLYANTHUM, Korth. T.

Tenasserim. Andamans.

Leaves thin chartaceous, acute or blunt. Hypogynous glands present or absent. Wood heavy, brown, fibrous, close-grained (Kurz).

× × Flowers in terminal panicles.

C. NERIIFOLIUM, Kz. T.

Mixed forests from Chittagong to Tenasserim.

Bai-byā.

Leaves linear-oblong, usually almost sagittate-produced at base, chartaceous.

Wood heavy, brown, softish.

C. ARBORESCENS, Bl. E.S.

Tenasserim.

Leaves more or less obovate-oblong, coriaceous.

Dr. Mason adds:

\*BRATHYS JAPONIA, Wight.

#### Order ELATINEÆ.

Sepals 2-5. Petals 2-5, hypogynous, imbricate. Stamens as many as or double the number of the petals, hypogynous. Ovary 3-5-celled. Ovules anatropous.

#### BERGIEÆ.

Ovary-cells with several ovules. Albumen none. Perianth complete. Fruit a capsule.

BERGIA, *Linnaeus*.

*Sepals* acute. *Flowers* 5-merous. *Capsule* sub-crustaceous, septicidal or septifragal.

B. VERTICILLATA, Willd.

Ava. Pegu.

B. aquatica, Roxb.

Glabrous. *Flowers* white, sessile.

B. AMMANIOIDES, Roxb.

Pegu and Tenasserim, common in rice fields.

Pubescent or hirsute. *Flowers* rose-coloured, shortly pedicelled.

## CARYOPHYLLALES.

*Flowers* regular. *Sepals* 2 to 5, rarely 6. *Petals* usually as many. *Stamens* as many or twice as many, rarely more, or fewer. *Ovary* 1-celled, or imperfectly 2- to 5-celled. *Placenta* central, free, rarely parietal. *Embryo* usually curved and in a floury albumen.<sup>1</sup>

## Order PORTULACEÆ.

*Flowers* hermaphrodite. *Corolla* none, or petals sometimes coherent at the base, very fugacious. *Stamens* hypogynous or perigynous, equal, and alternate with the calyx-lobes, or double, triple or multiple in number. *Ovary* usually free, rarely inferior, 1-8-celled. *Fruit* indehiscent, or a pyxidium, or a loculicidal capsule. *Embryo* peripheric, arched or annular, surrounding a floury albumen.

## SESUVIÆ.

*Ovary* half-inferior, with the petals and stamens perigynous.

P. OLERACEA, L.

All Burma, on cultivated lands and waste places. Kamorta and Katchall.

Mya-byit. Common Purslane.

Fruits glabrous. *Flowers* clustered by 3-5.

P. QUADRIFIDA, L.

Ava, and Pegu in waste places.

P. meridiana, L.

Joints pilose. *Flowers* solitary.

## CALANDRINIEÆ.

\* PORTULACARIA AFRA, Jacq.

TALINUM, *Adanson*.

*Ovary* free. *Sepals* usually deciduous. *Seeds* caruncled.

T. CUNEIFOLIUM, Willd.

On Pagodas at Pagan-myo.

## Order TAMARISCINEÆ.

*Flowers* regular, usually hermaphrodite. *Sepals* 5, free, imbricate. *Petals* as many, free, or slightly connate at base. *Stamens* 4-10, free, inserted in a small annular hypogynous disk or united at base. *Anthers* 2-celled, longitudinally dehiscent. *Seeds* with a sessile or stalked tuft of hairs. *Albumen* none. Shrubs or trees with minute scale-like leaves and small flowers.

TAMARIX, *Linnaeus*.

T. DIOICA, Roxb.

Ava.

Leaves appressed to the terete almost simple branchlets and branches. *Flowers* sessile, rose-coloured, in dense short spikes.

T. GALLICA, L.

Tidal savannahs of Pegu.

T. Indica, Willd.

<sup>1</sup> Exception: *Petals* connate in some *Portulacæ* and *Tamariscineæ*.

Leaves somewhat spreading on the very short thin and branched branchlets. Flowers pedicelled, white, in loose slender terminal or variously lateral racemes.

The wood of the *Tamarix* makes good fuel, and *Tamarix* galls are highly astringent, and consequently used both in dyeing and medicine.

#### Order CARYOPHYLLEÆ.

*Sepals* free or united. *Petals* 4-5, hypogynous or sub-perigynous, sometimes none. *Stamens* usually twice as many as petals. Annual or perennial herbs with opposite leaves.

##### SILENIEÆ.

*Calyx* gamosepalous, 4- to 5-lobed. *Petals* and *stamens* hypogynous, often raised on a stalk-like torus. *Styles* distinct from the base. *Stipules* none.

##### Gypsophila, Linnaeus.

*Calyx* turbinate-tubular or bell-shaped, broadly and almost wingedly 5-nerved. Capsule deeply 4-valved. *Styles* usually 2.

\* G. (SAPONARIA) VACCARIA, L.  
*Saponaria perfoliata*, Roxb.

South Andaman (introduced).

##### ALSINIEÆ.

*Sepals* free. *Stamens* inserted on an annular disk, rarely perigynous. *Styles* free.

##### BRACHYSTEMMA, Don.

*Petals* entire. *Capsules* depressed, 1-seeded. *Styles* 2. *Stipules* none.

B. CALYCINUM, Don.

Khakyen Hills.

##### POLYCARPIÆ.

*Sepals* free. *Stamens* inserted on an annular disk. *Styles* united. *Stipules* scarious.

##### DRYMARIA, Willdenow.

*Petals* lobed. *Sepals* not keeled. *Style* very short.

D. CORDATA, Willd.

Bhamo, Martaban at 2000 to 2500 feet.

*Cerastium cordifolium*, Roxb.

##### POLYCARPON, Linnaeus.

*Sepals* keeled. *Petals* entire. *Style* short.

P. (PHARNACEUM) DEPRESSUM, L.

Chittagong. Arakan. Pegu. Tenasserim.

*P. Laflingia*, Bth. and H. f.

*Laflingia Indica*, Retz.

##### POLYCARPÆA, Loureiro.

*Sepals* not keeled, scarious. *Petals* entire or notched. *Style* elongate.

P. CORYMBOSA, Lank.

Ava, on limestone at Segain and

*P. marginata*, Prsl.

Paghā-myō. Prome. Maulmain.

#### POLYGALALES.

*Sepals* and *Petals* 5 each, rarely 4 or 3. *Stamens* as many, or twice as many as the petals. *Ovary* 2-celled, rarely 1- or more-celled. *Albumen* fleshy, rarely none. *Leaves* exstipulate. Herbs or shrubs.

#### Order POLYGALÆÆ.

*Flowers* irregular, hermaphrodite. *Sepals* 5, unequal, the 2 inner ones often petal-like, imbricate. *Petals* 5 or 3, distinct, unequal, the lower ones usually keel-shaped. *Stamens* 8 (rarely 4 or 5), hypogynous. *Filaments* usually united into a

sheath. *Anthems* opening by terminal pores or rarely by slits. *Ovary* free, 1-3-celled, with one or more anatropous ovules in each cell. *Fruit* usually a 2-celled capsule, rarely 1-celled and indehiscent. *Flowers* 3-bracted, in racemes, panicles or spikes.

## POLYGALIEE.

*Seeds* albuminous. *Petals* more or less united into a gamo petalous corolla.

POLYGALA, *Linnaeus*.

*Stamens* 8, united. The two inner sepals wing-like.

Sub-genus BLEPHARIDUM.

The 2 inner sepals (wings) persistent, petaloid or herbaceous.

\* *Wings* herbaceous or green, sepal-like, with a narrow hyaline margin or not, acute.

† *Herbs* or perennials, rarely parasites.

P. GLOMERATA, LORF. Common in Toung-yas in Martaban up to 4000 feet.

Erect, stout, 1 to 2 feet high. Bracts fallen before flowering. Flowers small, white with purple tips. Capsule ciliate.

P. TELEPHIOIDES, Willd. Rare in the Eng forests of the Western  
Slopes of the Pegu Range and Kamorta.

Small, a few inches high. Flowers and bracts as in preceding. Capsule glabrous, not ciliate. Flowers whitish, but the keel and crest of a beautiful lazuli blue.

P. CHINENSIS, L. Pegu.

P. arvensis, Willd.

Small. Flowers yellow or orange-yellow, with dull orange tips. Bracts persistent during flowering.

\*\* *Wings* petal-like and coloured, blunt and often mucronate.

† *Stems* terete.

P. ERIOPTEA, DC. Ava and Prome Hills.

Wings about a line long, puberulous. Capsules oblong, puberulous, not margined.

P. CROTALARIOIDES, Ham. Dry forests in Prome.

Wings 3 lines long, puberulous. Capsules orbicular, with narrow ciliate margin.

† *Stems* sharply angular.

P. LEFTALEA, DC. Open forests of Ava, Prome, Pegu, and Kamorta.

Erect, glabrous. Leaves linear. Flowers small, in terminal and lateral racemes.

Sub-genus SEMEIOCARDIUM, Zoll.

*Calyx* deciduous. *Keel* not crested. *Seeds* albuminous. *Flowers* small.

P. GLAUDESCENS, Wall. Ava. Prome. Tenasserim.

P. furcata, Royle.

Capsules not nerved, almost rotundate, not winged.

P. CARDIACARPA, Kz. Tenasserim.

Capsules strongly nerved, oblong, the membranous borders produced wing-like at the summit.

Sub-genus CHAMIBUXUS, Tournef.

*Calyx* deciduous. *Keel* crested. *Albumen* none. *Flowers* rather large. Shrubs.

P. KARENSEUM, Kz. Martaban Hills, 1000 to 6000 feet.

Flowers pale-lilac. Keel-crest 2-lobed, the lobes many cleft. Capsules membranous. Strophiole minute.

P. ARILLATA, Ham.

Ava.

Flowers yellow. Keel-crest 2-lobed, the lobes many-cleft. Capsule coriaceous. Strophiole very large.

SALOMONIA, *Loureiro*.

*Stamens* 4 or 5. *Sepals* almost equal, petal-like. *Stems* leafy. Not parasitic.

× *Scandent shrubs*.° *Leaves on short petioles, cordate or ovate*.

S. CANTONIENSIS, Lour.

Pegu. Tenasserim.

Glabrous. Leaves acute. Capsules crested.

S. LONGICILIATA, Kz.

Pegu Range, between Pansuay and Myodwin.

Blunt leaves and stems along the wings fringed. Capsules crested.

°° *Leaves sessile*.

S. OBLONGIFOLIA, DC.

Tenasserim.

*S. obovata*, Wight.*S. angulata*, Griff.

Glabrous or nearly so, leaves oblong to oblong-lanceolate.

Sub-genus EPIRHIZANTHES, Bl. Parasitic, leafless or scaly.

S. (EPIRHIZANTHES) CYLINDRICA, Bl.

Tenasserim, on bamboo-trunks between decayed wood.

*S. aphylla*, Griff.*S. parasitica*, Griff.SECURIDACA, *Linnaeus*.

*Stamens* 8, united. *Fruit* a 1-celled indehiscient samara.

S. INAPFENDICULATA, Hassk.

Chittagong. Arakan. Tenasserim.

*S. Tavoyana*, Wall.*S. scandens*, Ham.*S. paniculata*, Roxb.

XANTHOPHYLLIEE.

*Petals and stamens* free. *Fruit* globular, indehiscient. *Albumen* none.

XANTHOPHYLLUM, *Roxburgh*.

*Sepals* sometimes unequal. *Petals* 5, free, declinate, the keel-petal boat-shaped. *Stamens* 8, free, or partially adnate to the petals. *Disk* hypogynous, annular. *Ovary* 1-celled, or imperfectly 2-celled, with 2 or more ovules variously attached. *Style* elongate. *Fruit* globular, with a thick rind, often 1-seeded. *Albumen* none. Trees or shrubs, with alternate simple leaves. *Flowers* in racemes or panicles.

\* *Ovary sessile (i.e. the stalk not exerted from the annular disk)*.° *Panicle remotely supra-axillary (and terminal)*.X. VIRENS, Roxb. *E.T.*

Tropical forests of Chittagong and Pegu Range.

Leaves glaucous and rather opaque beneath. Panicles diffuse, glabrous. Calyx and slender pedicels glabrous. Ovary minutely pubescent, the stigma broadly 2-lobed.

°° *Panicles or racemes truly axillary (and terminal)*.× *Ovary and style villous. (Leaves glaucescent beneath.)*

X. EGLANDULOSUM, Griff.

Tenasserim.

*X. Griffithii*, H. f. and Th.

Panicles tawny puberulous. Pedicels thick, 1½-2 lines long, puberulous.

X. GLAUCUM, Wall. E.T.

Swampy forests of Pegu, Martaban,  
and Tenasserim.

Thyt-hpyu.

Racemes slender, in lax tomentose panicles. Pedicels slender.

× × Ovary glabrous, the style slender pubescent.

H. FLAVESCENS, Roxb. E.T.

Swampy forests of Chittagong and Tenasserim.

Thyt-hpyu (Kurz).

Panicle diffuse, greyish velvety. Fruit glabrous. Leaves glossy, drying yellowish like *Symplocos*. *X. flavescens*, as revised in Hf. Ind. Fl., is a mixture of species, but it is impossible to clear up the synonymy so long as the numbers of distributed collections are not given. *X. angustifolium*, Wight, Ill. 50, t. 23, with simple or almost simple sub-axillary racemes and a villous stalked ovary, is certainly not identical with Roxburgh's plant; besides, it is a small tree or rather shrub, while the latter is a timber-tree (Kurz).

\* \* Ovary shortly stalked.

X. AFFINE, Benn. E.T.

Tenasserim.

Leaves rather large. Racemes simple or in short robust axillary panicles, greyish velvety. Ovary glabrous, with a very thick villous style.

## Order PITTOSPOREÆ.

*Flowers* usually hermaphrodite. *Sepals* 5, imbricate. *Petals* 5, hypogynous, imbricate. *Torus* small. *Stamens* 5, opposite the sepals. *Anthers* versatile. *Ovary* 1-celled, with 2-5 parietal placentas, or 2-5-celled by the projection of the placentas, with many parietal or axile anatropous ovules. *Style* simple. *Fruit* capsular or indehiscent, usually many-seeded. *Albumen* copious. *Stipules* none. *Flowers* terminal, or axillary. Trees or shrubs, with alternate or almost whorled simple leaves.

PITTOSPORUM, Banks.

*Capsule* woody, 1-celled, 2- or rarely 3-valved. *Seeds* arillate, or imbedded in pulp.

P. FERRUGINEUM, Ait. T.

Tenasserim. Kamorta.

## PARIETALES.

*Stamens* many or definite. *Carpels* connate into a 1-celled ovary, with parietal placentas, rarely spuriously 2- or more-celled by the prolongation of the placentas.<sup>1</sup>

\* Embryo large, in fleshy albumen.

## Order BIXINEÆ.

*Flowers* regular, hermaphrodite or unisexual. *Sepals* 4-5, rarely 2-6, imbricate, free and connate, and bursting irregularly, often deciduous. *Petals* 4-5, or wanting, imbricate, or twisted in the bud, deciduous. *Stamens* usually hypogynous. *Anthers* 2-celled, discharging by pores or slits. *Ovary* 1- rarely several-celled, with parietal amphitropous or anatropous ovules. *Fruit* dry or fleshy, indehiscent, or opening by valves bearing the seeds in the middle. *Seeds* usually few, sometimes with an arillus, or the testa pulpy. *Albumen* copious, fleshy. Trees or shrubs, with alternate, usually simple, sometimes palmatilobed leaves.

## BIXIEÆ.

*Petals* broad, twisted in bud, without a scale or basal appendage. *Anthers* opening by pores or short slits.

<sup>1</sup> Exceptions: *Carpels* free in a few *Papaveraceæ* and *Rosaceæ*. *Ovary* regularly 3- or more-celled in some *Sarraceniaceæ*, *Papaveraceæ*, *Cyparidiæ*, and *Bixineæ*.

COCHLOSPERMUM, *Kuntz.*

*Capsule* 3-valved. *Seeds* cochleate, pilose or woolly. *Leaves* palmately-lobed.

C. (BOMBAX) GOSSYPIUM, L. *T.* Deciduous forests of Prome.

Wood worthless. Tree yields a clear white gum.

Bixa, *Linnaeus.*

*Capsule* 2-valved. *Seeds* straight, glabrous, with a pulpy testa. *Leaves* simple.

\* B. ORELLANA, L. *E.T.* Cultivated all over Burma. Like  
Thi-dyn. wild in Katchall and Kamorta.

Sapwood red, heartwood pale-coloured. The orange-red pulpy testa of the seeds furnish the *arnotto* dye or 'terra orellana.' The seeds are steeped in water and well stirred at intervals till the coloured paste enveloping them is dissolved. The thick fluid which results is then strained and boiled, during which process the colouring matter rises to the top, is skimmed off, and boiled down in another vessel till of a sufficient consistency to be made into balls of two or three pounds weight. It is chiefly used to colour cheese and chocolate.

## FLACOURTIEÆ.

*Petals* none, or if present only small, imbricate in bud, without scales. *Anthers* opening by valves.

\* *Petals* present.

SCOLOPIA, *Schreber.*

*Flowers* hermaphrodite. *Petals* 4-6. *Stamens* indefinite. *Seeds* funicled, testa hard.

S. ROXBURGHII, Clos. *E.T.* Tenasserim.

*Ludia spinosa*, Roxb.

Drupe almost globular, the size of a small pea. Leaves opaque above. The older branches armed with long, strong, straight and compound spines.

S. LEUCIDA, Wall. *E.T.* Tenasserim.

Drupe obovoid, the size of a small cherry. Leaves shining on both sides.

× × *Petals* none.

FLACOURTIA, *Commerson.*

*Flowers* diœcious. *Sepals* 4-5, scale-like, imbricate in males. *Stamens* numerous. *Ovary* 2-5-celled. *Styles* 2-5, free, connate at base. *Berry* containing 2 to many hard pyrenes. Trees or shrubs, often spiny, with simple leaves and small racemose flowers.

\* *Stigma* simple, subulate (not thickened at apex).

F. SUMATRANA, Planch. Tenasserim.

Berries the size of a peppercorn. Pyrenes smooth, convex on back.

*Ludia fetida*, Roxb., doubtfully referred by Hook. f. to this species is  
*Homalium fetidum*, Bth. (Kurz).

\*\* *Styles* short or almost wanting, thickened and truncate at the apex or more or less bluntish 2-lobed.

° *Pyrenes* compressed and quite flat.

F. CATAPHRACTA, Roxb. *T.* Mixed forests of Pegu and Martaban.

Nē-yu-weh (Kurz).

Branchlets and leaves glabrous or nearly so. Stem armed with compound spines. Berries the size of a cherry, containing 5 to 7 pairs of large tubercularly wrinkled seeds.

The wood is rather heavy, brown, and close-grained (Kurz).

*F. INERMIS*, Roxb. *T.* Martaban.

Resembles the last, but is unarmed.

*Pyrenes obovoid-3-angular with rounded back.*

× *Leaves acuminate.*

*F. MOLLIS*, H. f. and Th. *T.* Tenasserim.

Unarmed. Branchlets and leaves tawny pubescent. Flowers in very short tawny racemes.

× × *Leaves blunt or nearly so. Berries the size of a pea.*

*F. SAPIDA*, Roxb. *T.* Deciduous forests of Prome and Ava.

Nē-yu-weh (Kurz).

Leaves coriaceous, 3 to 5 inches long.

*F. SEPIARIA*, Roxb. *S.* Chittagong.

*F. obcordata*, Roxb.

Leaves small (1-1½ inch long), membranous. Armed with numerous long spines.

*F. ROTUNDIFOLIA*, Clos. *T.* Andamans.

Unarmed, or only with a few short axillary spines.

The fruit of *F. cataphracta*, *F. inermis* and *F. sapida*, and others is eaten cooked, being very sour. The young leaves and shoots are also edible, and an infusion of the bark of *Cataphracta* is a gentle astringent used to check looseness. The wood is hard and close-grained, but too small for general use.

#### XYLOSMA, Forster.

*Flowers* dioecious. *Sepals* 4-5, scale-like, imbricate in bud. *Petals* none. *Stamens* numerous, the anthers versatile, short. *Ovary* on an annular disk, 1-celled, with 2 or rarely 3-6 parietal placentas, bearing 2 or a few ovules. *Style* simple, or more or less divided. *Stigmas* dilated, or rarely peltate. *Berry* 2-8-seeded. *Flowers* small, clustered.

*X. LONGIFOLIUM* (?). Frequent on the swampy forests of the Irrawaddy.

Kurz not having seen the flowers or fruit is in doubt as to the species.

#### PINGIEÆ.

*Flowers* dioecious. *Petals* with an adnate scale or basal appendage.

\* *Calyx* at first entire, afterwards splitting variously.

#### GYNOCARDIA, R. Brown.

*Flowers* dioecious. *Calyx* cup-shaped, 5-toothed or rupturing into 3-5 segments. *Petals* 5. *Males*: *Stamens* numerous. *Anthers* basifixed. *Females*: *Staminodes* 10-15. *Placentas* 5, bearing numerous ovules. *Berry* large, globular, with hard rind. Trees, with simple leaves, and large fascicled flowers.

*G. ODORATA*, Roxb. *E.T.* Tropical forests of Chittagong, Rangoon, Martaban, and Tenasserim.

A large tree, with fruit the size of an orange, filled with numerous seeds imbedded in pulp. These seeds washed and dried are known in the bazaar as "Chaulmoogra," and when beaten up into a paste with a little ghee are a favourite application in obstinate cutaneous diseases. The expressed oil is also used as an application to leprous sores, and both oil and seeds are administered internally in five grains or five drop doses for the same complaint and for tape-worm. For rheumatism, stiff joints, and sprains, Mr. Christy recommends the oil should be well rubbed, with the ends of the fingers, into the parts affected. At bed-time a capsule of 5 drops may be taken, and the second night two capsules, or a capsule at mid-day; but the oil must never be

taken on an empty stomach, or it will produce nausea.<sup>1</sup> The relief in most cases is speedy and permanent. For neuralgia and toothache the oil should be mixed with camphor and chloroform, and rubbed over the part affected, and a plug of cotton-wool saturated in the mixture placed in the tooth or ear, as may be required. When taken internally, the oil improves the appetite, and should be used with a generous diet. Pure *Chaulmugra* oil is also an excellent application for mange, cancer, and open sores, both on men and animals.<sup>2</sup> The active principle of the oil has been separated as *Gynocordic acid*. The timber is said to be of good quality, but the tree is less common in Burma than in Silhet.

#### RUPARIA, Blume.

*Flowers* dioecious. *Calyx* globular, rupturing into 3-4 segments. *Petals* 4-5. *Males*: *Stamens* 4-5. *Filaments* united into a tubular column. *Females*: *Staminodes* 4-5, subulate or pedicellate. *Placentas* 1-3, bearing 2 or more ovules. *Berry* 1-2-seeded, corticate, large. Trees, with simple leaves and small racemose flowers.

R. CÆSIA, Bl. E.T.

South Andaman and Kamorta.

× × *Sepals* already distinct in bud.

#### HYDNOCARPUS, Gaertner.

*Flowers* unisexual. *Sepals* 4-5, imbricate. *Petals* 5-9. *Males*: *Stamens* definite or indefinite. *Anthers* basifixed. *Females*: *Staminodes* 5 or more. *Placentas* 3-6. *Stigmas* as many, sessile or nearly so, dilated. *Berry* large, globular, with a hard rind. Trees, with simple or serrate leaves, and small racemose flowers.

H. HETEROPHYLLUS, Bl. E.T.

Tropical forests of Pegu Range, Martaban and Tenasserim.

*Taractogenos Blumei*, Hassk.

Ka-lor-hso.

*Sepals* 4.

A. CASTANEUS, H. f. and Th. T.

King's Island, Mergui Archipelago.

*Sepals* 5.

The fruit of *Hydnocarpus* is the size of an orange, and is used for poisoning fish. The seeds afford an oil, which is used for dressing ulcers and in cutaneous diseases.

#### Order VIOLACEÆ.

*Flowers* usually irregular. *Sepals* 5. *Stamens* 5. *Anthers* usually curved, connective usually dilated above the cells. *Fruit* usually a capsule. *Embryo* straight. *Leaves* opposite or alternate, stipulate.

#### VIOLIÆ.

*Corolla* irregular, the lower petal much larger. *Herbs* or *perennials*.

#### VIOLA, Linnæus.

*Sepals* produced at base. Lower petal spurred or saccate.

× *Stigma* 3-lobed, terminal.

V. PRIMULIFOLIA, L.

Khakyen Hills. Pensee.

V. Walkerii, Wight.

V. Patrinii, DC.

V. DIFFUSA, Ging.

Khakyen Hills. Pensee.

Stoloniferous. Stipules toothed.

<sup>1</sup> New Commercial Plants, No. 3, Thomas Christy and Co., London.

<sup>2</sup> It can be procured from Christy and Co., 155, Fenchurch Street, at 1s. an ounce, and the capsules in shilling boxes of 12 in each.

× × *Stigma very oblique or quite lateral.*

V. SERPENS, Wall. Khakyen Hills.

Stoloniferous. Stipules toothed or fimbriate.

V. THOMSONI, Oudem. Martaban and Tenasserim at 3000 to 6000 feet.

The roots of *Viola* contain an active principle, *Violina*, possessing emetic powers. Excellent 'issue peas' can be made of the roots.

JONIDIUM, *Fontenat.*

*Sepals* not produced at base. *Petals* clawed, the lower ones gibbous or saccate at base.

J. (VIOLA) SUFFRUTICOSUM, L. Rangoon.

ALSODEIEÆ.

*Corolla regular or nearly so. Shrubs or trees.*

ALSODEIA, *Thouars.*

*Petals* 5, free. Connective produced beyond the anther. *Capsule* loculicidal.

Sub-genus DIORYCTANDRA, Hassk.

*Stamens* exserted, anthers cohering in a cone.

A. (VARECA) HETEROCALITA, Roxb. Tropical forests of the Andamans.

A. ROXBURGHII, Wall.

Leaves small. Capsules very small, almost sessile.

Sub-genus ALSODEIA.

*Stamens* included. *Anthers* free.

× *Ovary and style glabrous.*

° *Flowers in long racemes.*

A. LONGIRACEMOSA, Kz. Tropical forests of Martaban up to 1500 feet.

A. racemosa, H. f. et Th. (non Mart.)

Racemes and calyx puberulous.

°° *Flowers fascicled.*

A. BENGALENSIS, Wall. Tropical forests of Pegu Range and Martaban. Andamans. The Nicobars.

Pedicels and calyx glabrous.

× × *Ovary and style pubescent or tomentose.*

A. GRIFFITHII, H. f. et Th. Near the Serpentine mines in the Hookum Valley. Ava.

Leaves rather large, glabrous or nearly so.

A. MOLLIS, H. f. et Th. Mergui. Tenasserim.

Leaves pubescent. Capsule densely pubescent.

\* \* *Embryo large, curved, except in Moringaceæ. Albumen none.*

Order RESEDACEÆ.

*Calyx* 4-8-partite. *Petals* generally hypogynous, 4-8 (rarely 2-6). *Stamens* 3-10, inserted within a fleshy disk. *Carpels* usually united into a 1-celled ovary. *Fruit* a capsule or berry.

\* RESEDA ODORATA. Cultivated.

Mignonette.

Griffith says this plant is indigenous to Afghanistan.

## Order MORINGACEÆ.

*Sepals and Petals* 5. *Stamens* 8-10, perigynous. *Capsule* elongate, 3-valved. *Leaves* alternate, compound. *Trees*.

MORINGA, *Jussieu*.

\* *M. PTERYGOSPERMA*, Gaertn.

Cultivated all over Burma.

*Hyperanthera moringa*, Vhl.

Da-tha-lwōn.

This tree is called by Europeans the Horse-radish-tree, as its roots when scraped up are an excellent substitute for the real horse-radish. It is however cultivated for the use of its pods, which are eaten in curries and stews; and from its seeds the oil of Ben is expressed, which does not turn rancid, and from its not coagulating from cold, is used by watchmakers as a lubricant. (Seeds called drum-sticks by Europeans.)

## Order CRUCIFERÆ.

*Sepals and Petals* 4 each. *Stamens* 6, 4 longer. *Capsule* usually spuriously 2-celled or 2- to multi-locellate. *Leaves* alternate. *Herbs*, or rarely shrubs.

\* *Pods* elongate or short, dehiscing along their whole length, not jointed, rarely indehiscent at the summit. *Septa* and *valves* equally broad and parallel.

° *Cotyledons* accumbent.

NASTURTIUM, *Linnaeus*.

*Pods* turgid or not. *Seeds* small, in 2 rows. *Flowers* usually yellow.

*N. INDICUM*, L.

From Chittagong to Tenasserim on muddy banks

*N. Madagascariense*, Wit.

and rubbishy places near villages.

*Sinapis divaricata*, Roxb.

*Pods* rather thick, 2 to 5 times longer than the pedicels.

*N. DIFFUSUM*, DC.

Ava.

*Sinapis montana*, Wall.

*S. pusilla*, Roxb.

CARDAMINE, *Linnaeus*.

*Pods* narrow, elongate linear, the valves flat and elastic. *Seeds* in 2 rows. *Flowers* usually white.

*C. HIRSA*, L.

Ava. Bhamo. Martaban.

var.  $\beta$  *sylvatica*, H. f. et Th.

°° *Cotyledons* longitudinally conduplicate.

BRASSICA, *Linnaeus*.

*Pods* elongate. *Stigma* truncate or 2-lobed. *Seeds* in a single row.

\* *B. CAMPESTRIS*, L.

Arakan. Ava. Bhamo.

*B. rapa* and *napus*, L.

*Sinapis dichotoma*, *glauca* and *brassicata*, Roxb.

Mung-lā-u-waing or Mung-nyen.

*Stem-leaves* at base clasping the stem with their auricles.

*B. JUNCEA*, L.

Ava. Bhamo. All over Pegu.

*Sinapis ramosa*, Roxb.

*S. patens*, Roxb.

*S. cuneifolia*, Roxb.

*Stem-leaves* petioled, not clasping the stem. *Flowers* yellow.

\* *B. oleracea*, L.

Cultivated.

Tham-bor-mung-lā.

Stem-leaves basally broad and sessile, but not clasping the stem. Petals white or yellowish white, with violet veins.

*B. campestris* embraces the various sorts of 'turnips,' and *B. oleracea* the different varieties of 'cabbage.' The seeds of all species yield a useful oil.

Mason remarks, "I have seen a species of mustard on the banks of the Tenasserim several days' journey from any human habitation, and which the Karens regarded as growing spontaneously, but it did not appear to differ from the species in common culture on the coast, and the seeds had probably been dropped there by the passing traveller."

\*\* *Pods short, dehiscing along their whole length, not articulate, the valves flat, at right angles to the septum.*

LEPIDIUM, *Linnaeus*.

*Pods oblong, notched, 2- rarely 4-seeded. Flowers white.*

\* *L. sativum*, L.

Cultivated only.

Sa-mung-ni. Garden cress.

\*\*\* *Pods elongate, indehiscant, not jointed, but contracted and pithy within between the seeds. Cotyledons incumbent.*

RAPHANUS, *Linnaeus*.

*Flowers pale lilac or white with coloured veins.*

\* *R. sativus*, L.

Cultivated and wild (?).

Mung-lā. The Radish.

The vegetables of this family, the cabbage for example, are valuable for their anti-scorbutic properties, and the seeds for the oil they yield. Black mustard yields a volatile pungent oil, familiar to all who have mixed mustard. The oil does not, however, exist ready made, as may be known by the dry mustard powder not exhaling it till wetted. Cold water dissolves the albuminous principle (*myrosine*) in the seed, thereby enabling it to combine with the *myronic* acid, the product being the volatile acrid principle whose fumes rise so copiously from the mustard as it is being mixed. Hence mustard should be always made with cold water, which is a more effective solvent of albumen than hot. Mustard flour to the extent of two or three teaspoonfuls in water forms an excellent emetic, especially in narcotic poisoning, effectually clearing the stomach, without producing depression. A mustard poultice is a well-known application, but rather messy, and a far more elegant preparation is sinapine tissue, which is simply a fine paper charged with the vesicating principle of the seed, and far more cleanly and pleasant to use than the crude article.

To this Order also belongs the plant 'Woad' (*Isatis tinctoria*), which furnished our remote ancestors with a blue pigment with which to ornament their bodies. Another curious plant is the Rose of Jericho<sup>1</sup> (*Anastatica Hierochuntica*), which when ripe contracts into a rounded cushion, formed of the pods and branches curled in on each other. This cushion is curiously susceptible to hygrometric action, and if placed in water the pods and branches unfold and expand under the influence of the moisture absorbed. Women in labour sometimes place this plant in water, in the fanciful hope that simultaneously with its expansion their own delivery may be accomplished.

<sup>1</sup> This name is also applied, according to Hooker, to the capsules of *Mesembryanthemum* and *Sclaginella lepidophylla*.

## Order CAPPARIDEE.

*Flowers* usually hermaphrodite. *Sepals* 4, free or connate; valvate or imbricate, rarely open in the bud. *Petals* as many, rarely 2 or none, hypogynous or seated on the disk, imbricate or open in bud. *Stamens* 4 or more, hypogynous or perigynous, or at the base of, or on, a long or short gynophore. *Disk* none, or tumid, or lining the calyx. *Ovary-tube* stalked or sessile, 1-4-celled, with numerous amphi-, or campylotropous ovules on the 2-4 parietal placentas. *Style* short, or none. *Fruit* a capsule or berry. Seeds angular or uniform. *Albumen* none. Herbs, shrubs or trees, often armed with spiny stipules.

## CLEOMIEÆ.

*Fruit* capsular, 1-celled, usually pod-like, rarely short or didymous. *Capsules* 4-8- or many-seeded. *Herbs*.

× *Torus* short, the stamens inserted immediately within the sepals and petals.

CLEOME, *Linnaeus*.

*Torus* often produced into an appendage. *Stamens* 4-6 or more, some of them often without anthers.

C. CHELIDONII, L.

Prome road, between Pongday and the Myit-ma-khā stream.

Plants thinly appressed, hispid. Petals white or pale rosy. This plant is probably introduced.

C. VISCOSA, L.

A weed from Chittagong and Ava to Tenasserim. The Nicobars.

*Polanisia icosandra*, W.A.

× × *Torus* elongated, bearing the stamens at the top under the ovary.

GYNANDROPSIS, *De Candolle*.

*Stamens* 6, all perfect. *Filaments* long.

G. (CLEOME) PENTAPHYLLA, L.

A weed from Chittagong and Ava, to Tenasserim. The Nicobars.

## CAPPARIEÆ.

*Fruit* berry-like or drupaceous. *Shrubs* or *trees*.

\* *Sepals* united at the base into a funnel- or bell-shaped tube, or forming a spathaceous calyx.

NIEBUHRIA, *De Candolle*.

*Sepals* united at base into a funnel or bell-shaped tube. *Petals* none. *Leaves* 1-3-foliate.

N. VARIABILIS, Kz. S.

Ava.

Younger parts puberulous, rough. Leaflets coriaceous.

N. SIAMENSIS, Kz. E.S.

Siamese Province of Radbooree.

Glabrous. Leaflets thin, chartaceous.

\* *Sepals* free or only at the very base connate. *Petals* 4.

CAPPARIS, *Linnaeus*.

*Sepals* usually 4, rarely 5, in 2 rows, the foremost one usually larger and galeate. *Stamens* usually indefinite, inserted on the short torus, the filaments free, filiform. *Berry* more or less stalked, globular to elongate. *Seeds* 1 or several, immersed in pulp, uniform. Shrubs or trees often scandent.

\* *Pedicels* arising from above the axils of the leaves in a line one above the other (supra-axillary); or rarely axillary and solitary.

*Gynophore and ovary glabrous or nearly so.*

† *Ovary almost sessile, the gynophore being only  $\frac{1}{2}$  to 1 line long.*

*C. ROYDSLEFOLIA*, Kz. *E.S.S.* Siamese Province of Kanburee.

Glabrous. Leaves large, chartaceous. Pedicels 2-3 lines long, the upper flowers forming terminal racemes (by the reduction of leaves).

†† *Ovary on a long slender gynophore.*

× *All parts glabrous.*

*C. MICRACANTHA*, DC. *W. C.* Pegu. Tenasserim.

Leaves as in preceding, chartaceous, much veined, with a callous point at the usually retuse apex.

*C. MEMBRANIFOLIA*, Kz. *S.S.* Tropical forests of Pegu Range and Martaban.

Leaves acuminate. Unarmed. Pedicels and sepals outside glabrous. Stamens numerous, petals pilose.

*C. OXYPHYLLA*, Wall. (non Miq.). Swampy forests along the Irrawaddy  
*C. disticha*, Kz. *S.* Prome. Pegu and Martaban.

Thorny. Pedicels glabrous. Sepals woolly along the borders. Stamens 8, filaments white, anthers blue.

*C. MULTIFLORA*, H. f. and Th. *W. C.* Ava Hills, towards Assam.

Unarmed. Pedicels slightly pubescent and numerous, in a line one above the other. Stamens 8. Filaments glabrous.

*C. VIMINEA*, H. f. and Th. Tenasserim (*vide* H. f. and Th.).

Unarmed or nearly so. Sepals with tomentose margins.

×× *Young shoots and sepals rusty or greyish tomentose or pubescent.*

*C. HORRIDA*, L. *SS.* Mixed forests of Prome, Pegu, and  
*C. Zeylanica*, Roxb. Martaban.

Nā-mā-ni-tanyet.

Leaves chartaceous, ovate, green, while young tawny or rusty pilose beneath, flowers usually several together.

*C. CRASSIFOLIA*, Kz. *SS.* Mixed forests of Prome.

Leaves green, oboval, while young thinly appressed pubescent, soon quite glabrous and coriaceous. Petioles  $\frac{1}{2}$ - $\frac{3}{4}$  inch long. Flowers several.

*C. POLYMORPHA*, Kz. *S.S.* Frequent in the Eng Forests of Prome.

Leaves glaucous, rhomboid-ovate to rhomboid-linear, acute, while young minutely greyish puberulous beneath. Petioles only  $\frac{1}{4}$  to  $\frac{1}{2}$  inch long. Berries verrucose. Flowers solitary.

Kurz remarks of these last three species: "*C. horrida, crassifolia et polymorpha*, species inter se valde affines, habitu longe distant, et sepius in eodem solo sociatum cresunt."—*J.A.S.B.* 11. 1873, p. 227.

*Gynophore and ovary densely tomentose.*

*C. FLAVICANS*, Wall. Ava.

A shrub with the habit of *Cadaba Indica*, armed with short spreading thorns. All younger parts and leaves tomentose or pubescent. Pedicels and sepals densely tomentose.

\*\* *Pedicels in umbels or corymbs in the axils of the leaves or on shortened axillary branchlets, sometimes collected into terminal or lateral panicles.*

× *Calyx and pedicels densely tomentose. Ovary glabrous.*

C. SIAMENSIS, Kz. C.S. Siamese Provinces of Radboorce.

Branches glabrous. Leaves thick, membranous, and of a texture like *Olar*, glabrous and faintly pubescent below on the nervation.

C. GRANDIS, L. T. Deciduous forests of Prome.

*C. bisperma*, Roxb.

*C. auricans*, Kz. MS.

Hkor-kwā.

All parts tomentose or shortly and densely yellowish pubescent, the hairs not papillose. Peduncle naked. Wood white, close-grained, heavy and durable, good for turning (Kurz).

C. ORBICULATA, Wall. S. Ava.

Apparently as preceding, upper side of leaves papillose. Peduncle 1-leaved at tip.

C. TRINERVA, H. f. and Th. Tenasserim. Tavoy (Parish).

Branches brown-tomentose. Leaves glabrous, 3-plinerved.

× × *Calyx and pedicels glabrous. Berry 1-seeded.*

° *Gynophore very short (in fruit not above ½ inch), umbels or corymb peduncled.*

C. GLAUCA, Wall. S. Ava.

Branchlets pubescent. Leaves thick coriaceous, glaucous, retuse or blunt. Umbels axillary, berries 1-2-seeded.

C. HASSELTIANA, Miq. S.S. Tropical forests of South Andamans.

*C. ambigua*, Kz.

Glabrous. Leaves purplish beneath, acuminate. Umbels in terminal panicles, berries 1-seeded.

° ° *Gynophore long and slender.*

† *Umbels or corymbs peduncled.*

C. OLIGANDRA, Griff. W.C.

*C. floribunda*, Wight.

Glabrous. Leaves green, retuse. Flowers ½ inch in diameter, the umbels arranged in terminal panicles. Berries several-seeded.

C. VERSICOLOR, Griff. Tenasserim.

Glabrous. Petiole puberulous. Flowers 2 inches in diameter.

† † *Umbels sessile or nearly so.*

C. SEPIARIA, L. Pegu. Andamans.

Leaves green, retuse. Corymbs usually terminal on the branchlets, many-flowered.

CRATEVA, *Linnaeus.*

*Calyx* 4-partite, the lobes imbricate and deciduous. *Petals* 4, long-clawed. *Stamens* 8-20, inserted on the border of the torus. *Ovary* shortly stalked, 1-2-celled, with as many placentas, bearing numerous ovules in 2 series. *Stigma* discoid. *Berry* with a hard rind. *Seeds* reniform. Trees or shrubs with digitately 3-5-foliate leaves, and flowers usually corymbose.

× *Ovary and berry 2-celled.*

C. LOPHOSPERMA, Kz. Tenasserim(?).

Seeds compressed-reniform, spinulosely tubercled on the back.

C. NARVALA, Ham. Tenasserim.

Seeds angular, flat, yellowish, very hard.

× × Ovary and berry 1-celled. Seed reniform or helioid, black, smooth.

C. ROXBURGHII, Br. T. D. forests of Prome and Upper Tenasserim.

C. religiosa, H. f. and Th.

C. trifoliata, Roxb.

Ka-dāt.

Berry globular, 1-celled, roughish, the size of a bullet or wood-apple.

C. HYGROPHILA, Kz. S. Swampy forests along the Irrawaddy.

Yē-kha-dāt (Kurz).

C. MACROCARPA, Kz., is also recorded from Katchall.

#### ROYDSIA, Roxburgh.

*Sepals* 6, imbricate, or almost valvate. *Petals* none. *Stamens* inserted on the short torus. *Ovary* shortly stalked, 3-celled, with numerous ovules on the 2 placentas. *Drupe* shortly stalked, with a fragile rind, containing a 1-seeded putamen. *Testa* membranous. Scandent shrubs, with simple leaves and small racemose flowers.

R. OBTUSIFOLIA, H. f. et Th. E.S.S. Marshy forests along the Irrawaddy,

Ngā-lipyu (Kurz). Tsittoung, and in Tenasserim.

R. PARVIFLORA, Griff. S.S. Ava.

+++ Embryo minute, in the base of a fleshy albumen.

#### Order PAPAVERACEE.

*Flowers* regular. *Stamens* many, free. *Ovary* 1-celled. *Placentas* parietal. Herbs, rarely shrubs. *Leaves* alternate, juice milky.

#### PAPAVR, Linnaeus.

*Capsules* opening by short valves or pores. *Stigmas* 4 or more, radiating on a sessile disk.

\* P. SOMNIFERUM, L.

Opium, one of the most valuable drugs of the Pharmacopœia, is the concrete juice of the unripe capsules. The most valuable of the alkaloids contained in it, *Morphia*, is found in greatest quantity in Turkey opium, whilst Indian opium is richer than other sorts in *Narcotine*. It would require many pages to enter on the various diseases this drug is capable of being used with advantage in, but it may be remarked that *Narcotine* was esteemed by Dr. O'Shaughnessy as second only to quinine in the treatment of intermittent fever, and superior to it in some cases when complicated with dysentery.

A great deal has been written on the harrowing state to which the use of this drug reduces its victim, which is doubtless as deplorable as that of the confirmed drunkard, but the special iniquity attaching to the Indian Government as a producer of opium is by no means equally clear. In the East, opium takes the place of beer and spirits, and in either case the revenue is raised from an article unquestionably deleterious to too many of those who consume it; but, whereas opium merely injures the individual who consumes it, reducing him to the condition of a more or less of harmless imbecile, beer and spirits, when immoderately indulged in, too often convert their victims into furious and dangerous beasts, and fill our gaols with homicides and our hospitals with the victims of their alcoholic phrensy. Truly the diatribes one hears of the opium trade afford an excellent modern instance of the Pharisee with a beam in his own eye turning oculist to his less-afflicted neighbour, though no one can question the incalculable benefit which would accrue to the human race from the disuse of both intoxicating drugs and intoxicating drinks. Some people have supposed that a preparation of opium was the "Nepenthe" of Homer, but it seems more probably to have been some preparation of hemp, or possibly neither of these drugs. The seeds of the poppy are eaten when boiled, and by expression yield a bland edible oil, quite devoid of any narcotic quality.

ARGEMONE, *Linnaeus*.

*Capsules* opening by short valves. *Stigmas* 4-5, radiating from the top of a depressed style.

\* A. MEXICANA, L.

Domesticated in Ava. Sporadic in Pegu.

## RANALES.

*Stamens* very rarely definite. *Carpels* free, or immersed in the torus, very rarely connate. *Microphyte* usually inferior. *Embryo* minute in a fleshy albumen.

+ *Sepals* or *petals* 2- or 3-seriate.

## Order NYMPHLEEE.

*Flowers* hermaphrodite. *Sepals* 3-5. *Petals* 3 to many, 1- or many-seriate. *Stamens* many, hypogynous, or attached to the torus. *Carpels* free or connate, or immersed in a fleshy obconic torus. Aquatic herbs. *Leaves* usually floating. *Flowers* solitary, on scapes.

## Sub-order NYMPHLEEE.

*Sepals* 4-6. *Petals* and *stamens* numerous. *Carpels* confluent with one another or with the disk into one ovary. *Ovules* many. *Seeds* albuminous.

NYMPHLEA, *Necker*.

*Sepals*, *petals*, and *stamens* half superior, inserted on the disk, the latter confluent with the carpels. Not armed.

N. LOTUS, L.

Chittagong. Pegu. Tenasserim.

Kya-phyu (Mason).

Anthers without appendage.

N. STELLATA, Willd.

Chittagong. Pegu and Arakan.

N. cyanea, Roxb.

Kya-nyo (Mason). The blue water-lily.

\* N. RUBRA, Roxb. (*fide* Mason).

Kya-ni.

A species of *Nymphaea* occurs in the Nicobars, *fide* Didrichsen.

BARCLAYA, *Wallich*.

*Sepals* inferior. *Petals* superior. *Carpels* immersed in the torus. Not armed.

B. LONGIFOLIA, Wall.

Pegu. Tenasserim, as far as Mergui,  
in running streams.

B. oblonga (Mason).

Kya-ghoung-loung (Mason).

EURYALE, *Salisbury*.

*Sepals*, *petals*, and *stamens* superior. *Carpels* immersed in the torus. Armed with sharp thorns.

E. FEROX, Salisb.

Chittagong in swamps.

Annesleya spinosa, Roxb.

## Sub-order NELUMBONEE.

*Sepals* 4 or 5. *Petals* and *stamens* numerous, hypogynous. *Carpels* sunk in pits without order in the flat turbinate torus.

NELUMBO, *Adanson*.

N. NUCIFERA, Gaertn.

Pegu, in stagnant water.

*Nelumbium speciosum*, Willd.

Pa-dung-mā (Mason).

This is a handsome plant and useful as food. The seeds are eaten either raw or cooked, and the long tap root is boiled as a vegetable, and like others of its tribe is rich in starch. The plant is highly symbolical, and held in mystic reverence by Hindus, with whom, as with the Egyptians, it typifies the fecund powers of nature, and it is the throne of the gods, who are commonly represented as seated on it.

Order BERBERIDEE.

*Flowers* regular, hermaphrodite (save in *Lardizabaliceæ*). *Sepals* 6-1, in 2 whorls or 3, and petaloid. *Petals* in many, or twice as many, rarely wanting. *Stamens* 4-9, in 2 or 3 series, opposite the petals, hypogynous. *Auther-cells* opening by a longitudinal slit or by recurved valves. *Carpels* 1-3 (rarely more), with 2 or several (rarely 1) ovules in each. *Style* short. *Albumen* copious. Shrubs or small trees.

LARDIZABALIFÆ.

+ *Leaves* digitate. *Flowers* unisexual. *Stamens* monadelphous. *Carpels* 3. *Climbers*.

PARVATA BRUNONIANA, H. f., is stated to come from Mergui. As no specimens exist at Kew from there, Kurz omits it from his Flora of Burma.

BERBERIDEE.

++ *Flowers* hermaphrodite. *Carpel* solitary.

BERBERIS, *Linnaeus*.

*Sepals* 6, with 2 or 3 appressed bracts, imbricate, in 2 series. *Petals* as many, imbricate. *Stamens* 6, free. *Auther-cells* opening by valves. *Ovary* 1-celled, with a few basal ovules. *Fruit* a few-seeded berry. *Flowers* yellow, usually in racemes.

B. (MAHONIA) NEPALENSIS, DC. *E.S.* Tenasserim.

B. *Leschenaultii*, Wall.

The plants of this genus yield a bitter principle, 'Berberine,' a useful tonic in cases of indigestion and febrifuge. The watery extract, called in India 'Rusot,' is esteemed as a valuable febrifuge. The bark is astringent, and some species yield a yellow dye.

Order MENISPERMACEÆ.

*Flowers* dioecious. *Sepals* usually 6, rarely 1-4 or 9-12, usually free, in 2-4 series. *Petals* 6, rarely 1-5 or none, free or connate. *Males*: *Stamens* hypogynous. *Filaments* and *Authers* free or connate, the latter 2-celled. *Ovaries* rudimentary or none. *Females*: *Staminodes* 6 or none. *Ovaries* 3, rarely 1 or 6-12, with a solitary or rarely 2 ovules in each. *Style* terminal or lateral. *Ripe carpels* drupaceous, with an almost basal and excentric style-scar. *Seeds* usually curved or reniform, the endocarp often intruding. *Albumen* even, or ruminant or none. *Cotyledons* fleshy or leafy. Herbs or scandent shrubs. *Leaves* usually palmately nerved, alternate. *Stipules* none. *Flowers* minute.

TINOSPORIÆ.

*Carpels* 3, rarely 6. *Style-scar* almost terminal, rarely ventral or almost basal. *Seeds* menisoid or rarely oblong, albuminous. *Cotyledons* leafy, usually spreading laterally.

× *Petals* 6, shorter than the inner sepals. *Style-scar* almost terminal.

PARABANA, *Miers*.

*Sepals* 6. *Filaments* connate, the anthers in heads. *Seeds* menisoid.

P. SAGITTATA, Miers.

Tropical forests in Pegu Range,  
Martaban, Ava, and Chittagong.ASPIDOCARYA, *Hooker, f. and Thomson.*

*Sepals* 12. *Filaments* connate. The anthers sessile round the peltate end of the column. *Seeds* oblong.

A. UVIFERA, H. f. et Th.

Ava. Khakyen Hills. Prome.

TINOSFORA, *Miers.*

*Sepals* 6, in 2 series, the inner ones larger. *Petals* 6, smaller than the sepals. *Males*: *Stamens* 6, free. *Females*: *Staminodes* 6, club-shaped. *Ovaries* 3, the stigma forked. *Drupe*s 3-1, flat, with convex back, the style-scar almost terminal. *Putamen* tubercled, dorsally keeled, intruding. *Albumen* ruminant. *Cotyledons* leafy, spreading. Climbing shrubs, with woody or fleshy fibrous stems. *Flowers* in racemes or panicles.

× *Drupe*s the size of a pea, the putamen tubercled.

T. (MENISPERMUM) TOMENTOSA, Roxb. C. Ava.

Young parts, and the blunt leaves beneath, tomentose.

T. MALABARICA, Miers. S.S.

Chittagong.

Young parts, and the acuminate leaves beneath, pubescent.

T. (MENISPERMUM) VERRUCOSA, Roxb.

Arakan. Pegu.

*T. crispa*, Miers. C.

All parts glabrous.

× × *Putamen* smooth, white.

T. (MENISPERMUM) CORDIFOLIA, Willd. C. Chittagong. Ava. Andamans.

All parts glabrous, drupes the size of a pea.

T. (COCCELUS) NUDIFLORA, Griff. S.S.

Tropical forests of Pegu Range on East  
side. Martaban and Tenasserim.

Hsün-dōng-mā-nweh.

Young leaves and shoots tomentose. *Drupe*s the size of a cherry. Wood loosely fibrous, possibly good for cordage (Kurz).

× × *Petals* none.FIBRAUREA, *Loureiro.*

*Sepals* 9, the three outer ones small and bract-like. *Males*: *Stamens* 6. *Females*: *Staminodes* 6. *Ovaries* 3, with 2 ovules in each. *Stigma* minute, sessile. *Drupe*s 3, 1-seeded, the style-scar almost terminal. *Putamen* oblong, with convex back, the endocarp hardly intruded. *Albumen* horny. *Cotyledons* leafy. Woody climbers, with coriaceous 3-nerved leaves. *Flowers* in axillary panicles.

F. TINCTORIA, Lour.

Chittagong. Pegu Range. Tenasserim.

ANAMIRTA, *Colebrooke.*

*Sepals* 6, somewhat unequal. *Males*: *Filaments* united in a column bearing numerous sessile anthers, which are 4-lobed and 4-keeled after dehiscence. *Females*: *Staminodes* 9-10. *Carpels* 3, rarely 4-5, the stigmas almost capitate. *Drupe*s stalked, the style-scar almost basal. *Putamen* woody, the hollow endocarp process intruding into the base. *Seeds* globular, hollow. *Albumen* almost ruminant. *Cotyledons* narrow. Woody climbers with large leaves. *Flowers* in large pendulous panicles.

A. COCCULUS, L.

Tenasserim, Kamorta.

*A. paniculata*, Colebr.*Menispermum heterochitum*, Roxb.

This is the *Cocculus Indicus* with which rascally brewers adulterate their beer. The berries are very poisonous, and contain a powerful acro-narcotic principle, *Picrotoxin*. The berries are used to poison fish, and a weak decoction to destroy 'ticks' in sheep. A large importation of this dangerous drug takes place into Great Britain, which it is to be feared contributes to poison other animals than 'ticks.'

## COCULIEÆ.

*Flowers 3-merous. Ovaries usually 3. Style-scar almost basal, rarely almost terminal. Seeds horseshoe-shaped. Albumen copious. Embryo slender, the cotyledons linear or only slightly dilated.*

## TILIACORA, Colbrook.

*Sepals 6, the outer ones small, hardly imbricate in bud. Petals 6, minute. Males: Stamens 6, free. Females: Carpels 9-12, the styles short and subulate. Drupes stalked (the stalks connate at base), the style-scar near the base. Putamen sulcate. Seed hooked. Albumen oily, ruminate. Cotyledons fleshy, appressed. Mostly climbers with axillary panicles.*

T. RACEMOSA, Colbr.

Pegu.

*Menispermum polycarpum*, Roxb.

## LIMACIA, Loureiro.

*Sepals 6, the inner larger ones valvate or slightly imbricate in bud. Petals 6, shorter than the sepals, embracing the stamens. Males: Stamens 3-6 or 9, free. Females: Staminodes 6. Carpels 3, with short compressed style. Drupes obovate or reniform, the style-scar almost basal. Putamen 3-celled, the 2 lateral cells empty. Seed elongate, embracing the intruded endocarp. Albumen even. Cotyledons elongate, half-terete, appressed. Woody climbers, with paniced flowers.*

× *Sepals 8-12, the smaller ones imbricate.*

L. CUSPIDATA, H. f. W.E.C.

Tenasserim.

× × *Sepals 9, thick, valvate in bud.*

L. (MENISPERMUM) TRIANDRA, Roxb.

Prome. Tenasserim.

*L. Amherstiana*, Miers.

Stamens 3. Adult leaves glabrous.

L. (COCULUS) VILLOSA, Grif.

*L. velutina*, Miers. W.C.

Tenasserim.

Stamens 6. Branches and leaves beneath tomentose.

## COCULUS, De Candolle.

*Sepals 6, the inner larger. Petals 6, shorter than the sepals, entire or bifid. Males: Stamens 6, free, the anthers didymous, or 4-lobed or almost 4-celled. Females: Staminodes 6 or none. Carpels 3, the style linear, recurved or reflexed. Drupe obovate or globular, laterally compressed, the style-scar almost basal. Putamen tubercled on the back, horseshoe-shaped, often perforated at base. Seed curved. Albumen fleshy. Cotyledons linear, appressed. Usually climbing (rarely erect) shrubs or herbs, with paniced flowers.*

× *Styles simple.*

C. GLAUCESCENS, Bl. W.C.

Tropical forests of Pegu Range, East side. Martaban and Tenasserim.

*C. macrocarpus*, W. A.

Leaves glabrous on very long petioles.

C. (MENISPERMUM) HIRSUTUS, L.

In hedges at Ava. Prome. Pegu.

*C. villosus*, DC.*Menispermum myosotoides*, L.

Leaves more or less pubescent, especially below. Petioles short.

× × *Styles bifid.*

C. (MENISPERMUM) VILLOSUM, Roxb.

Chittagong and Ava to Tenasserim up to 3000 feet. The Nicobars.

*C. incanum*, Colebr.

*Pericampylus incanum*, Miers.

Many plants of this Family are used in medicine for the bitter principle they contain. A decoction of the fresh roots of *C. Linnæanus* is given for rheumatism, and is regarded as laxative and sudorific, and the leaves are sometimes made into curries. The stems are used to make baskets of, and ropes, and a durable purplish ink is expressed from the ripe berries (Wight).

#### CISSAMPELIDIEÆ.

*Flowers 3-5-merous. Ovaries usually solitary. Style-scar usually almost basal. Endocarp dorsally muricate or echinate. Seeds horseshoe-shaped. Albumen scanty. Embryo linear, the cotyledons appressed.*

STEPHANIA, Loureiro.

*Petals 3-5, shorter than the sepals, rather thick. Staminal column peltate at summit. Flowers umbellate.*

× *Flowers with very short pedicels.*

S. HERNANDIFOLIA, Willd.

Mixed forests from Ava and Chittagong to Tenasserim.

*Cissampelos hexandra*, Roxb.

× × *Flowers with slender pedicels forming loose cymose umbellules.*

S. (CISSAMPELOS) GLABRA, Roxb.

Mixed forests in Pegu. Tenasserim. Andamans.

*S. rotunda*, Lour.

CISSAMPELOS, Linnæus.

*Male flowers: Sepals 4. Petals united in a cup. Female flowers: Sepals and Petals 1-2, the latter entire 2-cleft or -parted. Styles simple. Flowers cymose or racemose.*

C. PAREIRA, L.

Common all over Burma up to 3000 feet.

*C. caapa*, L.

*C. convolvulacea*, Willd.

CYCLEA, Arnott.

*Male flowers: Sepals connate. Petals more or less connate. Female flowers: Sepals 2, lateral, free. Petals none. Styles 2-parted. Flowers panicled.*

C. PELTATA, H. f. et Th.

Ava and Chittagong to Tenasserim. The Nicobars.

*C. pendulina*, Miers.

#### PACHYGONIEÆ.

*Flowers usually 3-merous. Ovaries and carpels usually 3, rarely 9-12. Style-scar almost basal or ventral. Seed curved, hooked, or inflexed. Albumen none. Cotyledons thick and fleshy.*

PACHYGONE, Miers.

*Sepals 6, the inner larger. Petals 6, embracing the stamens. Males: Stamens 6, free. Anthers nearly globular, 2-celled. Females: Staminodes 6. Carpels 3, with horizontal styles. Drupes reniform, the style-scar nearly basal. Putamen conform wrinkled. Seed horseshoe-shaped. Woody climbers with racemose flowers.*

× *Inflorescence and drupes densely tomentose. Leaves with prominent nervation.*

P. DASYCARPA, Kz. E.S.S.

Upper Tenasserim.

*Antitaris ramiflora*, Miers.

× × *Inflorescence glabrous. Leaves almost polished.*

P. ODORIFERA, Miers. E.W.C.

Common in swampy forests in Pegu, Martaban and Tenasserim.

Ngā-hpyu.

PYCNARRHENA, *Miers.*

*Flowers* dioecious. *Males*: *Sepals* 6, with 3 bracts, the inner ones large and orbicular. *Petals* 6, small, lobed. *Stamens* 9, the filaments very short, anthers bursting transversely. *Female flowers* unknown. *Drupe* broadly oblong. *Style-scar* lateral, the endocarp almost reniform. Shrubs with small fascicled flowers.

P. PLENIFLORA, *Miers.* E.S.S.

Ava. Khakyen Hills.

ANTITAXIS, *Miers.*

*Flowers* dioecious. *Males*: *Sepals* 8 in decussate pairs, the outer ones small, the 4 inner ones larger and imbricate. *Petals* 2, obovate. *Stamens* 4, filaments club-shaped, anthers 1-celled, opening transversely. *Females* unknown. *Drupe* 1-3, almost globose with a ventral style-scar, the endocarp crustaceous, almost reniform-oblong.

A. CALOCARPA, *Kz.* E.W.C.

Tropical forests of Chittagong. Katchall.

## Order MAGNOLIACEÆ.

*Sepals* and *Petals* very deciduous, arranged in whorls of 3, hypogynous. *Stamens* indefinite, hypogynous. *Filaments* free, or connate. *Anthers* basifix, cells adnate, bursting longitudinally. *Carpels* indefinite, free, or partly cohering in one whorl or in several on an elongated torus. *Styles* stigmatic on the inner face. *Ovules* 2 or more, or those of the ventral suture anatropous or amphitropous. *Fruit* berry-like or follicle-like carpels, rarely woody or indehiscent, sometimes arranged as a cone. The species of this family are rich in a bitter aromatic principle chiefly contained in the bark of the root and stem.

## WINTERIEÆ.

*Stipules* none. *Perianth* double. *Carpels* in a single whorl.

ILICUM, *Linnaeus.*

*Sepals* 3-6. *Petals* 9 or more, in 3 or more series. *Stamens* indefinite. *Filaments* thick. *Anthers* adnate, introrse. *Ovaries* indefinite, in a single whorl, 1-ovuled. *Style* subulate, recurved. *Follicles* stellately spreading, hard, compressed. *Seeds* compressed. *Albumen* fleshy. Evergreen aromatic trees or shrubs with simple pellucid-dotted leaves and small solitary or fascicled flowers.

I. MAJUS, *H. f. et Th.*

Tenasserim. Thoung-yeen, at 5500 feet.

TALAUMA, *Jussieu.*

*Sepals* 3. *Petals* 6 or more, in 2 or more rows. *Stamens* indefinite, in many series. *Anthers* linear, introrse. *Ovaries* sessile, indefinite, in spikes or heads, 2-ovuled. *Stigmas* decurrent. *Carpels* woody, separating from the woody axis at the ventral suture. *Seeds* suspended from a long funicle, the outer testa fleshy. *Albumen* oily. Trees or shrubs with simple leaves and convolutedly stipuled leaf-buds. *Flowers* large, terminal.

*Leaves glabrous.*

T. (LIRIODENDRON) LILIIFERA, *Roxb.*

Tenasserim. Mergui.

T. Rabamiana, *H. f. et Th.*

*Leaves downy beneath.*

T. CANDOLLEI, *Bl.*

Tenasserim. South of Maulmain.

T. mutabilis, *Bl.*

MAGNOLIA, *Linnaeus.*

*Sepals* 3. *Petals* 6-12, in 2-4 whorls. *Anthers* linear. *Carpels* sessile, many, oblong-spicate, 2-ovuled. Ripe carpels coriaceous, persistent and opening dorsally by a longitudinal slit. *Seeds* suspended by a filiform funicle, the outer testa fleshy. *Albumen* oily. Habit as in Talauma.

M. SPHENOCARPA, Roxb.

Chittagong. Pegu.

*Liriodendron grandiflorum*, Roxb.

## MANGLIETIA, Blume.

*Petals* 6 or more, in 2 or more rows. *Anthers* linear. *Carpels* sessile, many, forming an oval or oblong cone, 6- or more-ovuled. Ripe carpels almost woody, persistent, free, dehiscing dorsally by a longitudinal slit. *Seeds* suspended from a filiform funicle, the outer testa fleshy. *Albumen* oily. Trees with simple leaves and large terminal flowers.

M. INSIGNIS, Bl.

Pegu.

## MICHELIA, Linnæus.

*Sepals* and *Petals* usually conform, 9 or more, imbricate, in 3 or more rows. *Anthers* linear. *Carpels* stalked, numerous, in spikes, with 8 or more ovules in each. Ripe carpels laxly spiked on the elongate torus, coriaceous, persistent, dehiscing dorsally by a longitudinal slit. *Seeds* and *albumen* as in *Manglietia*. *Flowers* large, solitary, axillary.

M. CHAMPACA, L.

Martaban (rare), Tenasserim, Ava, Bhamo, Prome.

*M. aurantiaca*, Wall.

Sa-gā.

This tree, says Mason, is "in flower or fruit a great part of the year, and its orange blossoms, which are exquisitely fragrant, are also used by Burmese maidens to adorn their long dark hair." The yellow flowers are powerfully scented, and it is one of the five flowers with which the Hindu God of Spring tips the five shafts of the God of Love. The bark is bitter and aromatic, and used in intermittent fevers.

## Order ANONACEÆ.

*Flowers* usually monœcious. *Sepals* 3, free or connate, usually valvate in bud. *Petals* 6, hypogynous, in 2 rows, or the inner series wanting. *Stamens* numerous, rarely definite, hypogynous, closely packed on the torus. *Filaments* short or wanting. *Anthers* adnate, the cells extrorse or almost lateral, the connective often produced. *Ovaries* several, or rarely solitary, free (in *Anona* connate). *Styles* short or none, ovules one or more in each cell. Ripe *carpels* 1 or more on the torus, sessile, or stalked, 1- or more-seeded, usually berry-like and indurulent. *Seeds* glossy, crustaceous or coriaceous. *Albumen* dense, ruminant, often divided almost to the axis into horizontal plates. *Embryo* small or minute, the cotyledons diverging. Trees or shrubs, often scandent, with alternate simple and entire leaves. *Stipules* none.

## UVARIÆ.

*Petals* in 2 rows, 1 or both rows imbricate in bud. *Stamens* many, closely packed.

## UVARIA, Linnæus.

*Sepals* 3, usually united at the base, valvate in bud. *Petals* 6, imbricate in 2 rows, sometimes united at base. *Stamens* indefinite, the connective foliaceous or truncate-dilated and produced beyond the anther-cells. *Torus* somewhat raised. *Ovaries* many, with numerous, rarely few, or a single ovule in each. *Berries* differently shaped, many or by abortion few to 1-seeded. Scandent, rarely erect shrubs with opposite leaves and usually conspicuous flowers.

× *Ovules* usually solitary, rarely 2 or 3. *Erect shrubs*.

U. FERRUGINEA, Ham. E.S.

The 'Eng' forests of the Irrawaddy zone, especially in Prome; also Upper Tenasserim.

Hooker gives *U. dulcis*, Dun., as a Burmese plant, but I suspect it is referable to this species (Kurz).

× × *Ovules many, rarely few. Scandent shrubs.*

§ *Flowers large.*

† *Carpels on long stalks.*

*U. PURPUREA*, Bl. *E.S.S.* Martaban. Tenasserim.

Flowers solitary. All parts tomentose.

*U. HIRSETA*, Jack. *E.S.S.* Rare on the Eastern Slope of Pegu Range.

Flowers solitary. All parts hirsute.

*U. PTYCHOCALYX*, Miq. *E.S.S.* Not uncommon on Southern Slopes of the Pegu Range and in Tenasserim.

Flowers 2 or 3 on a peduncle. All parts minutely puberulous.

† † *Carpels sessile or on a very short stalk.*

§ *Flowers large.*

*U. MACROPHYLLA*, Roxb. *E.W.C.* Mixed forests of Chittagong. Ava. Pegu. Tenasserim.

Peduncles 3-5-flowered. Carpels glabrous.

*U. BRACTEATA*, Roxb. *E.W.C.* Tenasserim.

Peduncles 1-2-flowered. Carpels tomentose.

§ § *Flowers minute. Berries long-stalked.*

*U. MICRANTHA*, H.f. et Th. *E.W.C.* Pegu. Tenasserim. Andamans. Kamorta.

*U. Sumatrana*, Kz.

Mason describes the fruit of *U. purpurea* (*U. grandiflora*) as like the North American 'Pawpaw,' and as common in the Tenasserim jungles.

#### *Bocagea, St.-Hilaire.*

*Sepals* orbicular or ovate, imbricate. *Petals* 6, imbricate, in 2 series, nearly equal, concave. *Stamens* 6-21, imbricate, in 2 or more series, broadly oblong, thick, fleshy, the connective produced beyond the dorsal oblong anther-cells. *Ovaries* 3-6, with 1 or 2-8 ventral ovules in each. *Style* short. *Stigma* obtuse or capitate. *Berries* globose, stalked. Trees with shining leaves and small flowers.

*B. ELLIPTICA*, H. f. et Th. *E.T.* Tenasserim.

#### UNONIEÆ.

*Petals* valvate in the bud, more or less spreading, somewhat unequal, or those of the inner row small or wanting, not or little narrowed at base.

\* *Petals* spreading from the base.

× *Ovules* many, ventral.

#### *ALPHONSEA, Hooker, f. and Thomson.*

*Sepals* 3, small, valvate. *Petals* valvate, in 2 series, larger than the sepals, or the inner rather smaller. *Torus* cylindrical or hemispherical. *Stamens* numerous, loosely packed, the connective apiculate. *Ovaries* 1 or more, with 4-8 ventral ovules in 2 rows in each. *Style* oblong or depressed. *Berries* stalked or nearly sessile. Trees with coriaceous leaves. *Flowers* rather small, in leaf-opposed peduncled fascicles.

*A. (UVARIA) VENTRICOSA*, Roxb. *T.* Chittagong. Andamans.

Carpel as long or longer than the stalk.

*A. (UVARIA) LUTEA*, Roxb. *T.* Ava.

Stalk of carpels very short.

CANANGA, *Rumphius*.

*Sepals* 3, valvate in bud. *Petals* 6, valvate, in 2 rows, nearly equal or the inner smaller. *Stamens* indefinite, closely packed, the connective ovate, acute. *Torus* slightly convex and somewhat concave in the centre. *Ovaries* many, with numerous ovules in 2 rows. *Style* narrow oblong. *Stigma* capitate. *Berries* stalked. *Seeds* imbedded in pulp. A large tree, with rather large solitary or fascicled flowers.

C. (UVARIA) ODORATA, Lamk.

Martaban. Tenasserim. Ava.

*Uvaria axillaris*, Roxb.

Kadāt-ngān.

CYATHOSTEMMA, *Griffith*.

*Sepals* 3, connate. *Petals* 6, valvate, in 2 rows, with fleshy base, the inner ones rather smaller. *Torus* flat, with convex margin. *Stamens* many, linear. *Anthers* almost introrse, the connective process obliquely incurved. *Ovaries* many. *Style* cylindrical, notched. *Ovules* many, in 2 series. *Ripe carpels* turgid, many-seeded.

C. VIRIDIFLORUM, Griff. H.

Tropical forests of South Andaman.

UNONA, *Linnaeus*.

*Sepals* 3, valvate. *Petals* 6, valvate in 2 rows, almost equal, or the inner ones smaller or wanting. *Stamens* numerous, closely packed, cuneate-4-gonous, the connective beyond the anther-cells globular or truncate-dilated. *Torus* somewhat raised, flat, or slightly concave. *Ovaries* numerous, with 2 or more ovules in a single row. *Style* ovate or oblong, rarely elongate. *Berries* usually stalked, often moniliform and elongate, rarely ovoid and continuous. Trees or shrubs, with rather large solitary flowers.

× *Petals* 6. *Berries* necklace-like, constricted between the seeds.† *Petals* glabrous.

U. DUNALII, Wall. S.S.

Chittagong.

Leaves glabrous, pale below.

†† *Petals* appressed, pubescent.

U. DISCOLOR, Vhl. E.S.

Tropical forests of Chittagong, Ava, Tenasserim.

Ta-nāt-sā (Mason).

Leaves glabrous, glaucous below. Peduncle 2-4 inches long. Petal 2 inches long by 1 inch broad.

U. DESMOS, Dun. E.S.

Pegu. Martaban. Tenasserim. Katchall.

Leaves beneath glaucous, and usually pubescent. Peduncle 4-8 lines long. Petals  $2\frac{1}{2}$  by 1 broad.

U. LATIFOLIA, H. f. T.

Martaban. Deciduous forests on limestone rocks along the Ngā-choung of the Salween.

Leaves while young greyish tomentose. Peduncle 4-8 lines long. Petals  $1-1\frac{1}{4}$  inches long, oblong.

U. STENOPETALA, H. f. T.

Tenasserim.

Leaves pale coloured and below pubescent along the nerves.

††† *Outer petals* 3, large. *Inner ones* suppressed.

U. LONGIFOLIA, Roxb. E.S.

Chittagong.

Petioles rather long. Petals 4-6 inches long.

U. DASYMACHALA, Bl. E.S.

Tropical forests of Ava, Andamans, Martaban, Tenasserim.

*Pelticalyx argentea*, Griff.

Leaves almost sessile, cordate at the base. Petals nearly 3 inches long.

var. *α Blumei*, H. f. et Th.

var. *β Wallichii*, H. f. et Th.

*POLYALTHIA, Blume.*

*Sepals* 3, usually valvate. *Petals* 6, valvate, in 2 rows, but spreading or opened out long before full sized, nearly equal and flat. *Stamens* numerous, cuneate, the connective truncate dilated beyond the anther-cells. *Torus* slightly raised, flat, or slightly concave. *Ovaries* numerous, with 1 or 2 erect ovules. *Style* short, oblong, or capitate. *Berries* stalked, globose, or oblong, 1-seeded.

× *Flowers hermaphrodite. Petals flat. Oculcs solitary, erect.*

† *Flowers large. Carpels oblong, elongate, or cylindrical.*

*P. LATRIFOLIA*, Bl. T.

Tropical forests of Pegu, Martaban,

*P. simiarum*, Bth.

Tenasserim, and the Nicobars.

*G. spatulata*, T. et B.

Petals oblong-spatulate. Leaves glabrous, unicolorous.

*P. (GUATTERIA) SUMATRANA*, Miq. E.S. Tenasserim.

Petals linear-lanceolate. Leaves glabrous, whitish beneath.

*P. (GUATTERIA) NITIDA*, DC. E.T.

Tenasserim.

Petals ovate, thick, rusty-velvety beneath.

*P. JENKINSII*, Bth. et H. f. E.T.

Tropical forests of South Andaman,  
and adjacent islands.

*P. Andamanica*, Kz.

Carpels elongate, oblong, glabrous. Leaves oblong, the nerves pubescent.

†† *Flowers small on slender pedicels. Carpels pisiform.*

*P. (UVARIA) SUBEROSA*, Roxb. D.T.

Upper Tenasserim.

Leaves blunt, nerves beneath pubescent.

*P. (UVARIA) CERASOIDES*, Roxb. S.T.

Prome.

*P. bifaria*, Bth.

Leaves acuminate, pubescent beneath.

× × *Flowers hermaphrodite. Petals flat. Oculcs 2, superposed, ascending.*

*P. RUBIA*, Kz. E.S.

Tropical forests of Andamans var. *α*,  
and Upper Tenasserim var. *β*.

var. *α glabriuscula*. Leaves and branchlets glabrescent.

var. *β Falconeri*. Leaves and branchlets pubescent below.

*P. COSTATA*, H. f. et Th., is a small tree of Tenasserim imperfectly known, and referred by H. f. and Th. to *Tricalcaria*.

*ANAXAGOREA, St-Hilaire.*

*Sepals* 4, valvate, connate at base. *Petals* 6, valvate, nearly equal, in 2 series. *Torus* convex. *Stamens* indefinite. *Anther-cells* extrorse or sub-lateral, the connective with a terminal process. *Ovaries* few or many. *Style* variable. *Oculcs* 2, almost basilar, collateral, ascending. *Ripe carpels* dehiscent, follicle-like, stalked. *Seeds* 1 or 2, shining. Shrubs, with small white, leaf-opposed flowers.

*A. LUZONENSIS*, A. Gray. E.S.

Pegu Range. Martaban. Andamans.

*A. Zylantica*, H. f. et Th.

*CYATHOCALYX, Champion.*

*Sepals* united in a cyathiform 3-toothed calyx. *Petals* 6, free, valvate in 2 rows, concave at base. *Stamens* numerous, the connective truncate-dilated beyond the anther-cells. *Torus* depressed, conical, concave. *Carpels* solitary, with many ovules

in a double row along the ventral suture. *Stigma* large, peltate. *Berry* ovoid, large. Small trees, with glabrous leaves, and solitary or clustered flowers.

C. MARTABANICUS, H. f. et Th. *E.T.* Martaban. Tenasserim.

#### XYLOPIÆ.

*Petals* valvate, connivent or hardly open, those of the outer row usually thick, not narrowed at base, and inclosing the 3 inner, smaller or minute ones, or the latter wanting.

\* *Ovules* solitary.

ANONA, *Linnaeus*.

*Sepals* 3, valvate. *Petals* usually 6, valvate, in 2 series, the outer ones fleshy, connivent or almost spreading, the inner ones almost conform, but somewhat smaller, rarely wanting. *Stamens* numerous, the connective, beyond the anther-cells, ovate. *Torus* hemispherical. *Ovaries* numerous, usually united with a solitary ovule in each. *Style* oblong. *Berries* fleshy, connate into a many-celled oval or globular fruit. Trees or shrubs with solitary, terminal, or leaf-opposed flowers. The genus is indigenous to America.

× *Fruit* arcolate.

\* A. SQUAMOSA, L. Cultivated.

Au-zā. Custard apple.

Leaves usually blunt, fruits with prominent convex arches.

\* A. RETICULATA, L. Cultivated.

Bullock's heart.

Leaves acuminate. Arcoles of fruit barely convex.

× × *Fruit* very large. *All parts* glabrous.

\* A. MURICATA, L. Cultivated in Burma and the Nicobars.

Sour sop.

ARTABOTRYS, *R. Brown*.

*Sepals* 3, valvate in bud. *Petals* 6, valvate in 2 rows, concave at base, the flat or terete limb more or less spreading. *Stamens* numerous, the connective truncate dilated beyond the anther-cells. *Torus* plano-convex. *Ovaries* numerous, with 2 erect ovules in each, the style ovate, or linear-oblong. *Berries* variously shaped. Shrubs with yellow or yellowish-white flowers, solitary or clustered.

§ *Petal-limb* flattened. *Petals* oblong lanceolate.

× *Flowers* rising from hooked peduncles.

A. CRASSIFOLIUS, H. f. et Th. *E.W.C.* Tenasserim.

Leaves firmly coriaceous and glabrous. Young parts rusty-tomentose.

A. ODORATISSIMUS, R. Br. Martaban. Tenasserim. Ava.

*A. hamatus*, Bl.

*Uraria nucata*, Roxb.

*A. Blumei*, H. f.

*A. intermedius*, Hassk.

Leaves thin coriaceous, glabrous.

× × *Flowers* rising without peduncles from lateral branchlets.

A. KUNZII, H. f. et Th.

Eng forests of the Irrawaddy region.

Adult parts all glabrous.

Toukya-gat. Martaban.

§§ *Petal-limb terete or triquetrous, fleshy, subulate or linear.*

A. BURMANICUS, DC. *E.W.C.* Ava. Pegu. Tenasserim.

*Rhopalopetalum uniflorum*, Griff.

Petals triquetrous. Leaves pubescent below.

A. SUAVEOLENS, Bl. *E.W.C.* Chittagong. Tenasserim.

Petals terete. All parts glabrous.

POPOWIA, *Endlicher*.

*Sepals* 3, ovate, valvate. *Petals* 6, valvate in 2 series, the outer ones sepal-like, spreading, the inner ones thick, concave, connivent, acute or the tips reflexed. *Stamens* indefinite or nearly so, cuneate. *Anther*-cells dorsal, remote. *Ovaries* few, about 6, ovoid. *Style* oblong or almost clavate, straight or recurved. *Ovules* 1-2 on the ventral suture, rarely 1 and basilar. *Carpels* berry-like, stalked. Trees with extra-axillary or leaf-opposed flowers.

P. HELFERI, H. f. et Th.

Tropical forests of South Andaman and adjacent islands.

P. PARVIFLORA, Kz.

Tropical forests of Kamorta. Car Nicobar. Trice and Truck.

Berries 3-1-seeded.

#### MITREPHORIEÆ.

*Petals* valvate, the outer ones open, the inner ones erect, connivent or connate at their tips and often claw-like, narrowed at the base.

\* *Petals of the inner row shorter or equally long.*

† *Petals not narrowed at the base or the claw-like base broad.*

OXYMITRA, *Blume*.

*Sepals* 3, valvate, usually united at base. *Petals* 6, valvate in 2 series, the outer ones elongated, narrow, the inner smaller and broader, sometimes narrowed at base. *Stamens* numerous, linear oblong, the connective truncate. *Torus* conical or almost truncate. *Ovaries* many, with 1 or 2 ascending ovules in each. *Style* obovate. *Berries* stalked, 1-seeded. Shrubs or trees with usually large solitary flowers.

× *Sepals* short coriaceous, 2-3 lines long.

O. STENOPETALA, H. f. et Th. *S.*

Upper Tenasserim.

*Petals* from a broad base narrowly linear, nearly 2 inches long, slightly pubescent.

O. MACCLELLANDII, H. f. et Th. *E.S.*

Pegu Range.

*Petals* oblong lanceolate, blunt, very thick, tawny puberulous.

O. UNONIFOLIA, H. f. et Th.

Tenasserim. Tavoy.

Imperfectly known.

× × *Sepals* large, membranous, nerved, 7-8 lines long.

O. (UVARIA) FORNICATA, Roxb. *S.S.*

Tenasserim and South Andaman.

GONIOTHALAMUS, *Blume*.

*Sepals* 3, usually large, valvate. *Petals* 6, in 2 rows valvate, the outer ones flat, the inner ones united in a conical mitre, and at base narrowed into a broad claw. *Stamens* numerous, the connective beyond the anther-cells ovate or capitate. *Torus* truncate, or excavate in the centre. *Ovaries* numerous with 2 superposed ovules in each. *Style* oblong or elongated. *Berries* 1-seeded. Small trees or shrubs, with solitary, axillary, or lateral flowers.

G. SESQUIPEDALIS, Wall. *E.S.*

Ava. Khakyen Hills. Tenasserim.

Flowers about 9 lines long.

G. GRIFFITHII, H. f. et Th. *E.S.* Pegu Range, East side, Martaban, Tenasserim.  
Flowers about 2 inches long.

MELODORUM, *Dum.*

*Sepals* 3, small, united at base, valvate. *Petals* 6 in 2 rows, valvate, nearly conform and thick-fleshy, the inner ones smaller, or triquetrous upwards. *Stamens* numerous, the connective beyond the anther-cells, oblong or truncate. *Torus* conical. *Ovaries* numerous, with 2 or more ventral ovules in each. *Style* oblong. *Carpels* berry-like, stalked. Shrubs, often scandent, with terminal or leaf-opposed flowers.

× *Calyx* cup-shaped, 3-lobed. *Flowers* 4-5 inches long.

M. MACRANTHUM, Kz. *E.T.* Tropical forests of South Andaman.

× × *Calyx* deeply trifid. *Flowers* small, 1 inch or less.

M. RUBIGINOSUM, H. f. et Th. *E.S.S.* Tropical forests of Chittagong,  
Flowers an inch long. *Carpels* tomentose. Martaban, Tenasserim.

M. SCANDENS, Griff. Tenasserim.

*M. Griffithii*, H. f. et Th. *S.S.*  
Flowers 3-4 lines long.

M. VERRUCOSUM, H. f. et Th. *W. C.* Ava. Khakyen Hills.

Flowers nearly an inch long. *Carpels* densely verrucosely pubescent.

M. (UVARIA) BICOLOR, Roxb. *E.S.S.* Pegu Range, Western Slopes. Ava.  
Flowers 1 inch long. *Carpels* almost glabrous.

†† *Petals* narrowed into curved not angular free slender claws, the laminæ cohering in a sort of mitre.

MITREPHORA, *Blume.*

*Sepals* 3, orbicular or ovate. *Petals* 6, in 2 rows, valvate, the outer ones free and spreading, the inner ones clawed and cohering, their blades forming a mitre. *Stamens* oblong, cuneate, the connective truncate-capitate. *Ovaries* many, with many ovules in each, attached to the suture in 1 or 2 rows. *Style* oblong. *Berries* stalked. Trees or shrubs, with rather conspicuous flowers.

× *Flowers* small, dioecious, about 3 lines long.

M. (UVARIA) RETICULATA, Bl. *S.T.* Tenasserim.

× × *Flowers* conspicuous, 1-2 inches in diameter.

M. TOMENTOSA, H. f. et Th. *T.* Chittagong. Pegu Range.

Leaves tomentose beneath. Flowers on short and thick pedicels.

M. VANDÆFLORA, Kz. Chittagong. Pegu Range. Martaban.

Leaves almost glabrous. Flowers 1 inch in diameter, and on long slender pedicels.

There is a variety, *chartacea*, with broader leaves, thin papery, and above glaucous. Wood is light-brown and perishable (Kurz).

OROPHEA, *Blume.*

*Sepals* 3, valvate. *Petals* 6, valvate, in 2 series, the inner ones clawed and cohering with their tips into a mitre-shaped cap. *Stamens* 6-12, ovoid, fleshy; the anther-cells dorsal, large, continuous. *Ovaries* 3-15, with 4 ovules in each. *Style* short or none. *Berries* 1- or few-seeded. Trees or shrubs, with usually small axillary flowers, solitary, fascicled, or cymose.

\* *Flowers* very small, hardly 2 to 3 lines in diameter.

O. POLYCARPA, A. DC. Tropical forests of the Andamans and

*Melodorum monospermum*, Kurz. the Salween Valley.

Leaves glabrous. *Sepals* minutely hispid, ciliate. *Carpels* globular, stalked.

O. HEXANDRA, Bl. Tenasserim.  
*O. acuminata*, A. DC.

Leaves along the nerves pubescent. Sepals densely pubescent. Carpels elongated, oblong, sessile.

\* \* *Flowers rather large, about an inch in diameter.*

O. KATSCHALLICA, Kz. Katchall (Nicobars).

"It comes nearest to *O. Brandisii*" (Kurz).

O. BRANDISII, H. f. et Th. Tropical forests of Tenasserim.

Leaves rather large, pubescent beneath.

SACCOPETALUM, Bennett.

S. HORSFIELDII, Benn. Katchall.

MELIUSA, Leschenault.

*Flowers* usually dioecious. *Sepals* 3, minute, valvate, usually reflexed. *Petals* 6, valvate, in 2 series, the outer ones minute and usually conform with the sepals, the inner ones much longer, erect, connivent, sometimes cohering. *Stamens* few or numerous, the connective hardly apiculate. *Torus* cylindrical. *Ovaries* numerous, with 1 or 2, rarely more, ventral ovules in each. *Style* oblong. *Berries* globular or oblong. Trees with solitary or clustered flowers.

× *Pedicels 2-4 inches long.*

M. (UVARIA) VILLOSA, Roxb. Ava. Pegu. Rare in Tenasserim.

*M. velutina*, H. f. et Th.

Tha-bwôt-gyi.

Tomentose. Berries tomentose. Shortly stalked.

× × *Pedicels short, only 6-10 lines long.*

M. (HYALOSTEMMA) ROXBURGHIANA, Wall. T. Chittagong. Tenasserim.

*M. (Uvaria) dioica*, Roxb.

*Phæanthus dioicus*, Kz.

Branchlets and leaves beneath rusty-pubescent. Flowers about  $\frac{1}{2}$  an inch long. Pedicels bracted.

M. TRISTIS, Kz. E.T. Ava. Khakyen Hills.

Leaves glabrous. Flowers nearly an inch long. Pedicels bracted.

M. SCLEROCARPA, Kz. T. Martaban. Tenasserim.

Almost glabrous. Pedicels without bract.

\* *Sepals usually 5 or fewer. Petals uni-seriate.*

#### Order DILLENIACEÆ.

*Sepals* usually 5 (rarely 4 or 6), persistent, imbricate in æstivation. *Petals* 5, rarely fewer, deciduous. *Stamens* usually indefinite and free, rarely variously connate at base. *Anthers* adnate, dehiscing by lateral slits or by terminal pores. *Gynæcium* free, of 1 or many distinct or coherent carpels. *Ovules* solitary, or many in each carpel. *Styles* distinct, terminated by a single stigma. *Ripe carpels* either capsule-like, and opening along the top edge, or succulent and indehiscent, rarely crustaceous. *Seeds* solitary or many, with an arillus. *Embryo* very small at the base of a fleshy albumen. Most species of this Order possess astringent properties. The very scabrous leaves of some are used for polishing wood. The fruits of *Dillenia* enveloped in the enlarged fleshy calyx are eaten either raw or cooked.

## DILLENIEÆ.

*Filaments equal. Anther-cells parallel. Trees or herbs.*DILLENIA, *Linnaeus.*

*Sepals* and *petals* 5, spreading. *Stamens* almost free. *Carpels* 5-20, adhering to the axis and united only by the ventral margin. *Styles* as many, stellately reflexed. *Ovules* many, in 2 rows. *Fruit* indehiscent, almost berry-like, 5 to many-celled, inclosed in the fleshy calyx. *Seeds* in pulp, or pulpless without arillus. Trees with large parallel-nerved leaves. *Flowers* white or yellow, solitary or in lax panicles.

× *Seeds along the margin hairy. Flowers very large, white.*

D. INDICA, L. *E.T.*

Martaban. Tenasserim. Rather rare  
in the Pegu Range.

*D. spreiosa*, Thbg.

*D. elongata*, Miq.

Tha-hpyu.

× × *Seeds smooth. Flowers yellow.*

† *Calyx pubescent. Flowers solitary.*

D. PULCHERRIMA, Kz.

Pegu. Martaban.

Byu or Hpyu.

Peduncles very long, straight. Styles 12.

D. AUREA, Sm. *H.S.*

Martaban. Tenasserim.

*C. ornata*, Wall.

Peduncles short and thick. Styles 10.

D. PILOSA, Roxb.

Andamans. Nicobars.

Peduncles very long and slender. Styles 6.

The insular species may require separation, as Kurz writes of it: "I formerly identified this tree with Roxburgh's, but I now entertain great doubts as to the correctness of my identification, having ascertained that the insular species is a Southern form, which is unlikely to extend so far North as Assam" (J.A.S.B. 1876, Part ii. p. 115).

† † *Flowers fascicled.*

D. PARVIFLORA, Griff.

Pegu. Tenasserim, to 2000 feet.

Calyx and peduncles densely tomentose. Styles 5-7.

† † † *Calyx and peduncles glabrous. Flowers fascicled.*

D. SCABRELLA, Roxb.

Chittagong.

Peduncles bracted.

D. PENTAGYNA, Roxb. *H.S.*

Pegu, Tenasserim to 2000 feet, M.F.

*D. floribunda*, H. f. and Th.

Zyn-bywōn or Zym-byun.

Peduncles without bracts.

Mason calls the trees of this genus the "Magnolias of Burma," but in opposition to general belief considers the wood to be the reverse of durable. Most authorities however describe the wood of the *Dillénias* as strong and good, though rather coarse. The large fruits the size of a small melon have when ripe a very pleasant smell, something like that of an apple, but are terribly astringent. Elephants are however very fond of them, and Mason says they are brought to the bazaars, and are a favourite fruit with the natives, who put them into their stews or 'messes,' for a Burman does not eat curry, or any dish containing butter. To the habitual chewers of 'pān' the rough astringent flavour is doubtless not so disagreeable as it is to the palate of a European.

ACROTREMA, *Jackson.*

*Carpels* 3. Stemless herbs, with radical leaves.

*A. COSTATUM*, Jack.

Maulmain.

*A. Wightianum*, Wall.

## DELIMIEÆ.

*Filaments* more or less dilated at apex. *Anthers* short, the cells diverging, or rarely parallel. *Woody* climbers.

DELIMA, *Linnaeus.*

*Sepals* 5. *Petals* 2-5. *Filaments* dilated at the upper end; outer cells much diverging. *Carpel* solitary, 2-3-ovuled, almost globose, narrowed in a subulate style. *Ripe carpels* follicle-like, coriaceous. *Seed* solitary, with a cup-shaped toothed arillus. Climbers, with harsh leaves and small paniced flowers.

*D. SARMENTOSA*, L. *E.W.C.*

Chittagong. Ava. Pegu. Andamans.

TETRACERA, *Linnaeus.*

*Sepals* 4-6. *Petals* as many or fewer. *Filaments* dilated at apex. *Anther-cells* distinct, or more or less diverging. *Carpels* 3-5, rarely fewer, many-ovuled. *Ovules* in rows. *Ripe carpels* follicle-like, coriaceous, 1-5-seeded. *Arillus* lacinate. Climbers, with usually harsh leaves, and small white paniced flowers.

*T. ASSA*, DC. *E.C.*

Chittagong.

*T. trigyna*, Roxb.

*T. HYGROPHILA*.

Swamps between the Hlein and Irrawaddy Rivers.

## Order RANUNCULACEÆ.

*Flowers* hermaphrodite, regular, sometimes irregular and spurred. *Sepals* 3-5, often petaloid, deciduous, rarely wanting. *Stamens* indefinite. *Anthers* adnate, opening by lateral slits, filaments subulate. *Arillus* none. *Stipules* none. Herbs or shrubs with opposite or alternate leaves. Many of the herbaceous species possess acrid vesicatory and poisonous properties. A virulent poison is obtained from a species of *Aconitum* in the hills North of Ava.

## CLEMATIDIEÆ.

*Sepals* valvate. *Carpels* inbhiscent, with a solitary ovule or seed in each. *Leaves* opposite. Usually woody climbers.

CLEMATIS, *Linnaeus.*

No petals, or if any they gradually pass into stamens. *Leaves* without tendrils. The stems when fresh are often used for ropes and are very strong.

× *Achenes* simply braked, without feathery tail. *Flowers* large.

*C. (THALICTRUM) BRACTEATA*, Roxb. *C.* Ava.

*C. cadmia*, Ham.

× × *Achenes* terminating in a feathery tail.

† *Leaves* simple. All parts glabrous.

*C. SMILACIFOLIA*, Wall. *W.C.*

Ava. Tenasserim.

*C. subpeltata*, Wall.

*C. Munroana*, Wight.

*C. inversa*, Griff.

†† *Leaves* compound.

*C. HEYDYSARIFOLIA*, DC. *W.C.*

Pegu (?).

*Anthers* terminating in a subulate appendage.

- |                                      |   |
|--------------------------------------|---|
| C. GOURIANA, Roxb. C.                | Ava. Tenasserim.  |
| Leaflets serrate, glabrous, shining. |   |
| C. SUBUMBELLATA, Kz. W.C.            | Martaban. Karen-ni.   |
| C. floribunda, Kz.                   |   |
| Leaflets entire, tomentose.          |   |
| C. HOTILE, Kz. S.S.                  | Khakyen Hills.  |
| Leaflets entire, glabrous.           |   |
| C. ACUMINATA, DC. W.C.               | Martaban. Toung-ngoo 3000 to 4000 feet. Ava. Khakyen Hills. |
| Filaments hairy. Flowers small.      |   |
| C. BUCHANANIANA, DC. W.C.            | Martaban Hills.   |
| Filaments hairy. Flowers large.      |   |

#### NARAVELIA, *De Candolle.*

*Petals* terete, abruptly separated from the stamens. *Leaves* 2-foliate, the petiole tendril-bearing. Woody climbers of the tropical plains.

- |                               |            |
|-------------------------------|------------|
| * N. (ATRAGENE) ZEYLANICA, L. | Pegu. Ava. |
| N. dasyneura, Korth.          |            |

Leaves tomentose.

- |                           |                       |
|---------------------------|-----------------------|
| * N. LAURIFOLIA, Wall.    | Martaban. Tenasserim. |
| All parts quite glabrous. |                       |

#### RANUNCULIEÆ.

*Sepals* imbricate. *Carpels* with a solitary ascending ovule or seed in each. *Achenes* indehiscent. *Herbs* or perennials.

#### RANUNCULUS, *Linnaus.*

- |  |  |
|--|--|
| * R. DIFFUSUS, DC.                             | Ava. Bhamo.                              |
| R. sub-pinnatus, W.A.                          |  |
| A spreading creeping pubescent annual.         |  |
| * R. SCLEPERATUS, L.                           | On mud banks between Prome and Henzadah. |
| R. Indicus, Roxb.                              |  |
| An erect, glabrous, somewhat succulent annual. |  |

#### HELLEBORIEÆ.

*Sepals* imbricate. *Petals* small, deformed, or sometimes none. *Carpels* many-seeded, dehiscent. Usually herbs.

#### NIGELLA, *Linnaus.*

*Petals* small or clawed, never spurred. *Carpels* more or less connate.

- |                  |  |
|------------------|--|
| * N. SATIVA, L.  |  |
| N. Indica, Roxb. |  |

Sa-mung-net. The small fennel flower, or 'Devil in a bush,' or the 'Kalonja,' or 'Kala-jira,' of Indian Bazaars. "The seeds of this plant, which were formerly used for pepper, are valued by the inhabitants for their carminative properties, but the plant is rarely seen in cultivation. The Hebrew word which in Isaiah is rendered 'fitches' designates this plant, but not in Ezekiel, where the original word for 'fitches' signifies 'spelt,' a species of wheat" (Mason).

The seeds are black, triangular, and have been likened to coarse gunpowder. They are warm and stimulating, and therefore used to mix with unpalatable drugs.

They are also supposed to stimulate the secretion of milk, and are mixed in curry or administered to nursing mothers with that object, and they enter into the composition of chutnies.

DELPHINIUM.

*Petals* small, 2-4, the two upper prolonged into a pointed spur.

\* D. AJACIS.

Cultivated.

Larkspur.

Having now completed the review (so far as the imperfect record in the foregoing pages deserves the name) of the plants and animals of Burma, nothing remains for the Editor save to close his labours with an expression of the strong testimony which, in his opinion, the contemplation of the works of Nature bears to the presence throughout of Providential design. Theology has been too much discredited, and rightly, by the well-meant and sincere, but not the less absurd and misdirected efforts of schoolmen, to elucidate the mystery of the unseen and declare the laws and principles of the universe, in accordance with their own preconceived views of the fitness of things. In the hands even of a Milton, and as an avowed effort of the imagination, this tampering with the impenetrable mystery of being, with the result of making "God the Father turn a School divine," is at the present day somewhat of a pitiable spectacle, but when pressed further, and identified with a dogmatic assertion of spiritual truth, becomes offensive and (using the phrase in its proper sense) blasphemous—"Who is this that darkeneth counsel by words without knowledge?" Job. xxxviii. 2.

With a wider knowledge of Nature than was possessed by schoolmen of this class, came a reaction against all confident assertions of the relation of man to the universe, resulting in that form of 'agnosticism,' which those of the 'old religion' characterize by a harsher and more opprobrious term. Here the study of Nature comes in as a corrective, just as the mediæval conception of a camel, as it was presumed to be, stands corrected by our knowledge of a camel, as we find that it now-a-days is; and whilst admitting that there are some subjects, which, even in their physical relations, such, for example, as matter and space, we must admit to be beyond the grasp of the human mind, yet that same mind, limited as its powers are in particular directions, nevertheless compels us to admit that all we see around us is not the result of blind chance. In the very existence of the creature, an 'agnostic' may read in signs not to be misunderstood the antecedent interference of a Creator, and without attempting to fathom what by us is unfathomable, we are compelled to own that inanimate nature teaches a no less significant lesson than does the animate world, whereof we ourselves are a part, of the power, glory, and pervading presence of the unseen Author of all.

Sol qualis niteat, quali sit origine natus,  
Indicia, assiduo dum redit orbe, facit;  
Per quascumque vagum late jubar extulit oras,  
Sedulus Artificem predicat ille suum.  
  
Cum modo victrices descendunt Vesperis umbræ,  
Excipit alternam luna diserta vicem;  
Et sua miranti memorans primordia terræ,  
Edita quo fundat lumina forte, refert.  
  
Illius ætherium quot servant sidera cursum,  
Quot gyri in cælo, noctivagæque faces,  
Singula confirmant cantu, quæ singula narrant  
Et caput unanimes axis uterque modos.

Psalm xix. W. G. Humphrey, *Arundines Carm.* p. 315.

## APPENDIX A.

## PART I. ADDENDA.

THE following list of plants is composed mainly of species (communicated to me by the Rev. C. Parish) which, though referred in the Flora Indica to Burma, are not mentioned by Kurz, in some cases perhaps, from their not being recognized specifically by that botanist, in others, from his not being possessed of the store of materials accumulated at Kew. A few species already enumerated, but again given for some additional information of habitat or synonymy, are included in brackets, and for fuller details the reader is referred to Hooker's great work above quoted.

P. 145 (before POTAMEÆ).

## Order APONOGETEÆ.

APONOGETON UNDULATUM.

An aquatic stemless herb, with starchy rhizome.

P. 220 (before BALANOPHOREÆ).

## Order PODOSTEMACEÆ.

Aquatic herbs, sometimes frondose, often resembling *Alge* or *Hepaticæ*. One genus only is Indian.

## EUPODOSTEMACIÆ.

*Flowers hermaphrodite, without perianth, and inclosed in an involucre. Ovary 2-3-celled with axile placentas, or 1-celled with a central placenta.*

HYDROBRYUM LICHENOIDES, Kz.

Martaban.

Leaves very few, scale-like at the base of the pedicels. Pedicels filiform, half a line long. Capsules globose, a quarter line in diameter, broadly 8-ribbed. Rhizome broad, lobed and membranous, applied to the earth or rocks, and up to 3 lines in length. Discovered by the Rev. C. Parish near Maulmain.

## Order CERATOPHYLLIÆ.

*Flowers monœcious, sessile in the axils of the leaves, involucrate, achlamydeous. Anthers numerous. Ovary 1-celled and 1-ovuled. Ovule pendulous, orthotropous. Albumen none.* Aquatic, submerged, branched herbs.

## CERATOPHYLLUM, Linnaeus.

*Stamens several. Styles 2. Fruit a nut.*

C. DEMERSUM, L.

*C. verticillatum*, Roxb.

Page 220. Order BALANOPHOREÆ.

LANGSDORFFIA INDICA. Hook. Icones, Plantarum, tab. 205 b.

A parasite on roots of trees.

Page 221. Order SANTALACEÆ.

HENSLOWIA HOOKERIANA. Tenasserim. Maulmain.

Page 280. Order PROTEACEÆ (after ELEAGNEÆ).

\* GREVILLEA ROBUSTA.

A tree of Australia with pinnatifid fern-like leaves of a prevailing grey colour. Mr. Parish adds: "I introduced it into Maulmain, and left two fine specimens at my departure, one in my compound in cantonments, and the other in the Burial-ground. They must have been 30 feet high when I left."

P. 317. Order ACANTHACEÆ.

„ EBERMERIA LEUCOBOTRYS.

P. 321. Order GESNERACEÆ (after EPITHEMA).

„ B.EA. sp.

P. 322. Order UTRICULAREÆ (LENTIBULARIACEÆ).

„ UTRICULARIA FLEXUOSA, Vahl.

P. 331. Order CONVOLVULACEÆ.

„ IPOMÆA FILICAULIS, Bl.

P. 333. CALYSTEGIA HEDERACEA.

P. 344. Order APOCYNÆÆ.

„ CARISSA SPINARUM, A. DC.

P. 345. RAUWOLFIA PEGUANA, Kz.

„ R. MICROCARPA, Hook. f. Upper Burma (Wallich).

„ OCHROSIA BORBONICA, Gmel.

P. 346. HUNTERIA CORYMBOSA, Roxb. Tavoy.

P. 348. (VALLARIS HEYNEI).

Kurz says: "The follicles are always solitary." "On the contrary, having had an immense plant of this species under my eye for many years, I can testify to their being as often twin."—C. Parish.

P. 348. PARAMERIA POLYNEMA, H. f.

P. 350. MICROCHITES POLYANTHA, Miq.

„ WRIGHTIA TOMENTOSA, Roem. et Schult.

„ STROPHILANTHUS WALLICHII, A. DC.

P. 371. Order VACCINIACEÆ.

„ (AGAPETES MACROSTEMON, Clarke)=V. SETIGERA, Don.

„ A. SALIGNA, Hook. f. Maulmain, 5000 feet (Lobb).

„ A. PARISHII, Clarke. Nāt-toung, 6000 feet (Parish).

„ A. MACRANTHA, Hook. f. Kalā-mā-toung (Lobb).

„ A. BRACTEATA, Hook. f. Dauna-toung, 5000 feet (Parish).

„ A. CAMPANULATA, Clarke. Nāt-toung (Parish).

P. 372. VACCINIUM ARDISIOIDES, Hook. f. Nāt-toung (Parish).

„ V. BANCANUM, Miq. Martaban (Kurz).

P. 373. Order ERICACEÆ.

Parish records *R. Veitchianum* from Moolce-it at 6000 feet.

and *R. PARISHII*, Clarke. Moolce-it.

## P. 374. Order CAMPANULACEÆ.

- „ CODONOPSIS CELEBICA, Bl. Chittagong. Burma.  
 P. 375. LOBELIA MICROCARPA, Clarke. Tenasserim.  
 „ L. TRIALATA, Ham. Pegu at 5000 feet.  
 „ L. *pyramidalis*, Wall. Syn. of L. WALLICHIANA.

## P. 379. Order COMPOSITÆ.

- „ WEDELIA WALLICHII, Less.  
 P. 382. ARTEMISIA CARUIFOLIA, Ham. At 5000 to 6000 feet.  
 P. 383. INTULA EUPATORIOIDES, DC.  
 P. 385. GNAPHELIUM PULVINATUM, Delile.  
 „ SPILERANTHUS AFRICANUS, L.  
 P. 389. LAGGERA ALATA, Schultz.  
 P. 390. CONYZA VISCIDULA, Wall.  
 „ C. STRICTA, Willd.  
 P. 392. DICROCEPHALA LATIFOLIA, DC.  
 „ LAGENOPHORA BILLARDIERI, Cass.  
 „ GYNURA ANGULOSA, DC. Maulmain (P.).  
 „ G. PSEUDO-CHINA, DC. Martaban. K. (?).  
 P. 394. SENECIO ZEYLANICUS, DC.  
 „ S. DENSIFLORUS, Wall. Tenasserim (Parish).  
 „ var. *Parishii*. Nāt-toung at 6000 feet (Parish).  
 „ var. *Lobbii*. Thong-yeen at 5000 feet (Lobb).  
 P. 398. VERNONIA HELFERI, H. f.  
 „ V. LOBBII, H. f.  
 „ V. CLIVORUM, Less.  
 „ V. CINEREA, L.  
 „ V. SOLANIFOLIA, Benth.  
 „ V. PARISHII, H. f. Hills along the Attaran (Parish).  
 „ V. SCANDENS, DC.  
 P. 400. SAUSSUREA AFFINIS, Spreng.  
 P. 401. CREPIS ACAULIS, H. f.  
 „ C. SILHETENSIS, H. f.  
 (Included no doubt by Kurz under C. JAPONICA.—W.T.)  
 P. 402. PRENANTHES HOOKERI, Clarke. Martaban Hills (Kurz).  
 „ LACTUCA SAGITTEFOLIA, Clarke. Upper Burma.  
 „ L. POLYCEPHALA, Clarke.

## P. 436. Order UMBELLIFERÆ.

- „ PIMPINELLA INVOLUCRATA, Roxb. = *Carum Roxburghianum*, Benth.

## P. 440. Order FICOIDEÆ.

- „ TRIANTHEMA MONOGYNE, L. = *T. obcordata*, Roxb.

## P. 443. Order BEGONIACEÆ.

- „ BEGONIA DUX, Clarke. Moolce-it (Parish).  
 „ B. ALBOIDA, Clarke. Limestone Rocks, Maulmain (Parish).  
 „ (B. *Cathartii*, H. f.). Syn. of B. NEMOPHILA, Kz. (Parish).  
 „ (B. MODESTIFLORA, Kz.). Limestone Hills, Maulmain (Parish).  
 „ (B. SURCULIGERA, Kz.). Arakan.  
 „ B. TRICUSPIDATA, Clarke. Limestone Hills, Maulmain (Parish).  
 „ B. TRIADIATA, Clarke. Limestone Hills, Maulmain (Parish).  
 „ B. MAULMAINENSIS, Clarke. Maulmain (Lobb).

- P. 443. B. BARBATA, Wall. Burma and Chittagong.  
 „ B. INTEGRIFOLIA, Dalzell. Maulmain (Parish).  
 „ B. GONDIOTIS, Clarke. Burma at 3000 to 4000 ft. (Griffith).  
 „ B. SANDALIFOLIA, Clarke. Burma (Griffith).  
 „ B. PARISHII, Clarke. Limestone Hills, Maulmain (Parish).  
 „ B. CRENATA, Dryander. Tenasserim (Helfer).  
 „ B. DELICATULA, Parish. Limestone Rocks, Maulmain (Parish).  
 „ B. FIBROSA, Clarke. Limestone Rocks, Maulmain (Parish).

## P. 445. Order CUCURBITACEÆ.

- „ TRICHOSANTHUS PALMATA, Roxb. = *T. bracteata*, Kz.  
 „ T. MULTILoba, Miquel. Bhamo.

## P. 446. LUFFA ACUTANGULA, Roxb.

## P. 447. (THLADIANTHA DUBIA, Bunge).

A Japanese plant. The confusion arose out of a misrepresentation in Bot. Mag. t. 5469.

- P. 447. MOMORDICA BALSAMINA, L.  
 „ \*CUCURULUS COLOCYNTHIS, Schrad. Cultivated.  
 P. 448. \*CUCURBITA MAXIMA, Duch. Cultivated.  
 „ \*C. PEPO, DC. Cultivated.  
 „ MELOTHRIA WALLICHII, Clarke. Prome (Wallich).  
 P. 449. RHYNCHOCARPA PÆTIDA, Schrad. Ava (Wallich).  
 „ ALSOMITRA CLAVIGERA, Hook. f. Tenasserim (Helfer).  
 „ ZANONIA INDICA, L.

## P. 450. Order SAMYDACEÆ.

- „ CASEARIA GRAVEOLENS, Dalz.  
 „ C. tomentosa, Roxb. = C. CANZIALA, Wall.  
 „ C. LOBBIANA, Turczaninow. Maulmain (Lobb).  
 „ C. KURZII, Clarke.

## P. 456. AMMANIA BUCCIFERA, L. Burma.

## P. 458. Order LYTHRARIÆ.

- „ SONNERATIA ALBA.

## P. 461. Order MELASTOMACEÆ.

- „ OTANTHERA MOLUCCANA, Bl. Mergui (Griffith).  
 „ O. NICOBARIENSIS, Teysm. Nicobars.  
 „ PHYLLAGATHIS ROTUNDIFOLIA, Bl. Andamans (Helfer).  
 P. 462. OXYSPORA VAGANS, Wall. Chittagong (Roxb).  
 P. 463. SONERILA RECTA, Jack. Maulmain (Lobb).  
 „ (S. PICTA, Korth.). Maulmain (Parish), Mergui (Griff.).  
 „ S. NUDISCAPE, Kurz. Mergui (Griffith), Andamans (Helfer).  
 „ (S. MACULATA, Roxb.) = *S. Brandisiana*, Kurz.  
 „ (SARCOPYRAMIS LANCEOLATA, Wall.) = *S. Nepalensis*, Wall.  
 „ (ASPECTRUM CYANOCARPUM) = A. GLAUCUM, Triana.  
 „ MARISSIA RETICULATA, Bl. Tenasserim.  
 P. 464. (MEMECYLON LEVIGATUM) = *M. pachyderma*, Wall.  
 „ (M. CELASTRINUM, Kz.) = M. GRANDE, Ritz. var.  
 P. 466. (M. FIDULE, Roxb.) = *M. umbellatum*, Burm.  
 „ M. punctatum, Presl. = *M. scutellatum*, Nand.  
 „ M. ovatum, Smith.  
 „ M. HETEROPLEURUM, Bl. Burma (Griffith).  
 „ M. GRANDE, Retz.  
 „ \*M. AMPLEXICAULE, Roxb. In gardens.  
 „ M. INTERMEDIUM, Bl.

- P. 466. Order MYRTACEÆ.  
 „ BECKIA FRUTESCENS, L. Burma (Griffith).  
 „ LEPTOSPERMUM JAVANICUM. Maulmain (Lobb).
- P. 450. Order SAMYDACEÆ.  
 „ CASEARIA GRAVEOLENS, Dalz.  
 „ C. TOMENTOSA, Roxb.  
 „ C. ESCULENTA, Roxb. Maulmain (Lobb).  
 „ C. LOBBIANA, Turczaninow. Maulmain (Lobb).  
 „ C. KURZII, Clarke.
- P. 483. Order DROSERACEÆ.  
 „ (DROSERA BURMANNI, Vhl.).  
 “Grows abundantly on the sandy flats a little way from the sea, between Tavoy and Henzai” (Parish).
- P. 485. Order ROSACEÆ.  
 „ PARINARIUM COSTATUM, Bl. and  
 „ P. *Sumatranum*, Benth. and *petrocarya*, Jack.  
 „ P. GRIFFITHIANUM, Benth. Tenasserim and the Andamans (Helfer).  
 „ (P. SUMATRANUM, Kurz Flora, non Bush)=P. HELFERI, Hook. f.
- P. 486. PYGEUM CAPITELLATUM, Hook. f. Tenasserim (Helfer).  
 P. 487. ERIOBOTRYA LATIFOLIA, Hook. f. Maulmain (Lobb).  
 „ E. BENGALENSIS, Hook. f. Ava (Wallich), Tenasserim (Helfer).  
 P. 489. RUBUS HEXAGYNUS, Roxb. Khakyen Hills.  
 „ R. *pysifolius*.  
 „ R. BIRMANICUS, Hook. f. Burma (Griffith).
- P. 490. (R. FLAVA).  
 „ R. *ellipticus*, Smith.  
 „ DOCYNIA INDICA, Dem. Burma (Kurz).  
 „ POURTHLEA ARGUTA, Dem. Burma (Griffith).
- P. 494. Order LEGUMINOSÆ.  
 „ DESMODIUM OBLATUM, Baker.  
 „ D. ROTTLEI, Baker. Prome (Wallich).  
 P. 499. LOUREA VESPERTILIONIS, Desv.  
 „ L. ORCORDATA, Desv. (Wallich).  
 „ L. CAMPANULATA, Benth. Ava (Wallich).  
 P. 500. URARIA REPANDA, Wall.  
 P. 501. SMITHIA GEMINIFLORA, Roth. Tavoy.  
 P. 503. (ABRUS LEVIGATUS). Tavoy, sea-shore (Parish).  
 P. 504. GALACTIA OXYPHYLLA, Benth. Tavoy (Gomez), Amherst (Parish).  
 P. 508. VIGNA LUCENS, Baker. Tavoy (Gomez).  
 P. 509. PHASEOLUS CALCARATUS, Roxb.  
 „ P. FUSCUS, Wall. Prome (Wallich).  
 „ P. VELUTINUS, Grah.  
 P. 510. DOLICHOS CILIATUS, Klein.  
 P. 513. GLYCINE JAVANICA, L.  
 „ ATYLOSIA SCARABÆOIDES, Benth.  
 P. 514. ERIOSEMA VISCOSA, Bl.  
 P. 515. FLEMINGIA WALLICHII, W. et A. Prome (Wallich).  
 „ F. INVOLUCRATA, Benth.

- P. 519. *CROTALARIA SEMPERFLORENS*, Vent.  
 „ „ *C. INCANA*, L.  
 P. 520. (*PAROCHETUS COMMUNIS*, Huml.). Top of Moolee-it (Parish).  
 P. 521. *INDIGOFERA CORDIFOLIA*, Heyne.  
 P. 527. *DALBERGIA GLOMERIFLORA*.  
 P. 529. *DERRIS DALBERGIOIDES*, Baker.  
 „ „ *D. ELEGANS*, Benth.  
 „ „ *D. FERRUGINEA*, Benth.  
 P. 539. *MELONEURUM SUMATRANUM*, W. et A.  
 „ „ *PTEROLOBIUM INDICUM*, A. Rich.  
 P. 530. *CASSIA ABSUS*, L.  
 P. 537. *SARACA LOBBIANA*, Baker.  
 „ „ *S. TRIANDRA*, Baker.  
 P. 535. *AFZELIA PALEMBANICA*, Baker.  
 P. 533. *BAUHINIA TOMENTOSA*, L.  
 „ „ *B. SEMITRIFIDA*, Roxb. Tenasserim (Helfer).  
 „ „ *B. GLABRIFOLIA*, Baker. Tenasserim (Helfer).  
 „ „ *B. DIVERGENS*, Baker. Burma (Griffith).  
 „ „ *B. BRACTEATA*, Graham.  
 P. 541. *PARKIA BIGLANDULOSA*, W. et A.  
 „ „ *P. ROXBURGHII*, G. Don.  
 P. 545. *PITHECOLOBIUM BIGEMINUM*, Benth.  
 „ „ *CALLIDURA UMBROSA*, Benth.  
 P. 556. (*DITTELASMA RARAK*).

Mr. Parish adds: "I left a fine young tree which I raised from seed in my compound, Maulmain cantonments; it must have been some 30 feet high when I left in 1876."

P. 557. Order SAPINDACEÆ.

- „ „ *ALLOPHYLLUS LOBBI*, Bl.  
 P. 559. *NEPHELIUM MUTABILE*. Bhamo (Griffith).  
 P. 561. *ÆSCULUS PANDUANA*, Wall. Wayta-maryng, near the three Pagodas (P.).

P. 564. Order AMPELIDÆ.

- „ „ *VITIS PALLIDA*, W. et A.  
 „ „ *V. INDICA*, L.  
 „ „ *V. AURICULATA*, Roxb.  
 „ „ *V. TENUIFOLIA*, W. et A.  
 „ „ *PEDATA*, Vahl.

P. 570. Order RHAMNACEÆ.

- „ „ *RHAMNUS NIPALENSIS*, Wall. Burma (Griffith).

P. 572. Order CELASTRINÆ.

- „ „ *CELASTRUS STYLOSA*, Wall. Burma (MacClelland).  
 „ „ *KURRIMIA PULCHERRIMA*, Wall. Burma (Griffith, Helfer).  
 P. 574. *LOPHOPUTALUM CELASTROIDES*, Lam.  
 „ „ *L. FILIFORME*, Lam. Mergui (Griffith).  
 P. 573. *SALACIA VIMINEA*, Wall. Burma (Griffith, Helfer).  
 P. 574. *HIPOCRATEA OBTUSIFOLIA*, Roxb.

P. 576. Order OLACINÆ.

- „ „ *OLIX MERGUENSIS*, Planch. Burma (Griffith).

- P. 578. *GOMPHANDRA CRASSIPES*, Mart.  
 P. 579. *SARCOSTIGMA WALLICHII*, Baill.  
 P. 580. Order CHAILLETACEÆ.  
 „ *CHAILLETEA LONGIPETALA*, Turc. Mergui (Helfer).  
 P. 581. Order MELIACEÆ.  
 „ *MELIA DUBIA*, Cass.  
 P. 583. *AGLALA ROXBURGHIANA*, Miq. Burma (Helfer).  
 P. 584. *AMOORA CHITTAGONGA*, Hierb.  
 P. 588. Order OCHNACEÆ.  
 „ *OCHNA PUMILA*, Ham.  
 „ *O. BREVIPES*, Planch.  
 P. 589. Order SIMARUBEÆ.  
 „ *SAMADERA LUCIDA*, Wall. Burma (Helfer).  
 P. 591. Order RUTACEÆ.  
 „ *ZANTHOXYLON RETSA*, DC.  
 P. 592. *MURRAYA ELONGATA*, Alphonse DC.  
 P. 595. *CITRUS*.

Parish remarks: "I have gathered wild oranges of good size, but of an indiffer-ent character, in the Tenasserim jungle on the Eastern border, but I do not know what species."

- P. 597. Order GERANIACEÆ.  
 „ (*OXALIS CORNICULATA*, L.) A weed, introduced, *vide* Parish.  
 P. 598. (*IMPATIENS PARISHII* and *CIRCÆOIDES*).

Of both species Parish remarks: "A lovely little plant, abundant during the rains on the limestone rocks, Maulmain."

- P. 599. Order MALPIGHIACEÆ.  
 „ *HIPTAGE THADABLOTA*, Gaertn.  
 P. 600. Order ZYGOPHYLLACEÆ.  
 „ *TRIBULUS TERRESTRIS*, L.  
 P. 601. Order LINEÆ.  
 „ (*ERYTHROXYLON KUNIHIANUM*).  
 „ var. ? *PARISHII*. Top of Dauna-tonng (Parish).  
 P. 604. Order TILIACEÆ.  
 „ *GREWIA UMBELLATA*, Roxb.  
 „ *G. MULTIFLORA*, JUSS.  
 „ *G. POLYGAMA*, Roxb.  
 P. 605. *TRIFUMETTA SEMITRILoba*, L.  
 P. 606. *PLAGIOPTERON FRAGRANS*, Griff.  
 P. 608. *ELILOCARPUS CUNEATUS*, Wight.  
 „ *E. TUBERCULATUS*, Roxb.  
 „ *E. ORBICULATUS*, Gaertn.  
 „ *E. MONSCERA*, Cav.  
 P. 609. \**MALVASTRUM SPICATUM*, A. Gray. Mergui (Griffith).  
 P. 611. *URENA SINUATA*, L.

- P. 616. *HIBISCUS RADIATUS*, Wall.  
 P. 618. *DURIO MALACCENSIS*, Planch. Wild Durian.

P. 620. Order STERCULIACEÆ.

- „ *STERCULIA GUTTATA*, Roxb.  
 „ *S. STRIATIFLORA*, Masters. Burma (Griffith).  
 „ *S. RUBIGINOSA*, Vent.  
 „ *S. CAMPANULATA*, Wall.  
 P. 621. *HERITIERA FOMES*, Buch.  
 „ *KLEINHovia hospita*, L.  
 P. 622. *HELICTERES ANGUSTIFOLIA*, L.  
 „ *H. SPICATA*, Colebr.  
 „ *PTEROSPERMUM SCABERIFOLIUM*, Lam.  
 P. 623. *ERIOLENA QUINQUELOCULARIS*, Wight.  
 „ *MELHANIA HAMILTONIANA*.  
 „ *MELOCHIA VELUTINA*, Beddome.

P. 625. Order DIPTEROCARPEÆ.

- „ *ANCISTROCLADUS EXTENSUS*, Wall. Burma (Helfer).  
 „ *A. ATTENUATUS*, Dyer.  
 P. 630. *VATICA GRANDIFLORA*, Dyer. Burma (Wallich).  
 „ *V. FAGINEA*, Dyer. Burma (Helfer).  
 „ *V. HELFERI*, Dyer. Mergui (Helfer).

P. 633. Order TERNSTROMIACEÆ.

- „ (*SCHIMA CRENATA*, Korth.) = *Gordonia floribunda*, Wall.  
 P. 635. *GARCINIA XANTHOCHYMUS*, Hook. f.  
 P. 636. *CALOPHYLLUM RETUSUM*, Wall.

P. 641. Order POLYGALACEÆ.

- „ *POLYGALA TRIPHYLLA*, Ham. Ava (Wallich).

P. 645. Order BIXINEÆ.

- „ *FLACOURTIA RUKAM*, Zoll. et Moritz. Mergui (Griffith).  
 „ *F. RAMONTCHI*, L'Héritier.

P. 647. Order VIOLACEÆ.

- „ (*VIOLA SERPENS*, Wall.). Dauna-toung, 4-5000 feet (Parish).

P. 651. Order CAPPARIDACEÆ.

- „ *CAPPARIS TENERA*, Dalz.

P. 655. Order BERBERIDACEÆ.

- „ (*BERBERIS NIPALENSIS*, Sprengl.)

Parish remarks: "The Flora of British India gives '*Mergui, Griffith*,' but I venture to think there must be some error here."

P. 659. Order MAGNOLIACEÆ.

- „ *TALAUUMA LANIGERA*, Hook. f. et Th.

P. 664. Order ANONACEÆ.

- „ *ARTABOTRYS SPECIOSUS*, Kurz.

- P. 663. *POLYALTHIA MACROPHYLLA*, Hook. f. et Th.

- P. 665. (*POPOWIA HELFERI*, Hook. f. et Th.) King's Island, Mergui (Helfer).  
 Maulmain (Parish).

P. 667. *SACCOPETALUM SCLEROCARPUM*, Hook. f. et Th. Martaban (Wallich).

P. 668. Order DILLENIACEÆ.

„ *DILLENIA GRANDIFOLIA*, Wall.

#### ADDITIONAL ORCHIDS.

*MICROSTYLIS TRILOBULATA*, Kuntz. Gard. Chron. Sept. 23, 1882.

*LIPARIS GROSSA*, R. fil. Gard. Chron. Jan. 27, 1883. Near to *L. PACHYPUS*.

*BULBOPHYLLUM CUPREUM*, var. *FLAVUM*, Gard. Chron. March 11, 1881.

“A variety with light yellow flowers instead of the red ones.” The so-called variety is, from my experience, the prevailing one. I never saw “red” flowers, though I have seen dull rufous ones.—C.P.

*DENDROBIUM (PEDILONUM) IGNOBUS*, R. fil. Gard. Chron. Dec. 23, 1882.

*DENDROBIUM SECUNDUM*, var. *NIVEUM*. Gard. Chron. June 3, 1882.

*DENDROBIUM DEAREI*, R. fil. Gard. Chron. Sept. 16, 1882. Burma?

*DENDROBIUM LUBBERSIANUM*, R. fil. Gard. Chron. April 8, 1881.

“In growth like a small *D. formosum*. The flowers are much like those of *D. cariniferum*. Sepals and petals yellowish-white, with a white chin. On each of the lateral divisions of the 3-lobed lip there is a cinnabar blotch, and the same colour is seen at the base of the middle lobe.”

*DENDROBIUM DALHOUSIANUM*, var. *ROSSIANUM*. Gard. Chron. June 17, 1882.

“A variety described as differing from the normal plant in its shade of yellow (‘nankin’), somewhat shaggier lip and richer markings on the stem-sheath.

“These slight differences are carefully noted and made the most of by Orchid growers at home with a view to a new name, and the consequently increased sale of the plant; but their after want of value is soon learnt by observers of Orchids in their native wilds.”—C.P.

*CÆLOGYNE BRACHYPTERA*, R. fil., near to *C. LENTIGINOSA*. Gard. Chron. July 2, 1881.

*AERIDES EMERIL*, R. fil. Gard. Chron. Nov. 4, 1882.

Exceedingly close to *A. VIVENS*.

*THRINPERMUM BERKLEYI*, R. fil. Gard. Chron. April 29, 1881. Andamans?

A species with terete leaves.

*VANDA BOXALLII*, var. *COBBIANA*. Gard. Chron. Dec. 17, 1881.

*VANDA PARISHII*, var. *MARCOTTIANA*. Gard. Chron. June 12, 1880.

A distinct variety as far as colour is concerned, as the flowers are wholly purple.

*VANDA VIPANI*, R. fil. Gard. Chron. July 29, 1882.

For an account of the fertilization of Orchids consult Darwin's work on that subject. Le Maout also observes: “In *Orchideæ*, owing to the consistence of their pollen, extraneous agency is required to ensure fertilization, which, as in *Asclepiadææ*, is effected by insects; and in our hot-houses, where these auxiliaries are wanting, fertilization must be artificially secured. In some species the lip is irritable; it oscillates opposite the column (*Megacelinium*), or turns round it (*Culeana*); on an insect settling on the surface of the lip, the latter quickly approaches the column, and presses the insect against it, which in its efforts to disengage itself, breaks up and crushes the pollen-masses, and spreads them over the stigma.”

## APPENDIX A.

## PART II.

## FIRE BY FRICTION (Page 103).

ANOTHER method of obtaining fire from bamboos is thus described by Capt. T. H. Lewin, as practised in the Chittagong Hills. "The Tipperahs make use of an ingenious device to obtain fire; they take a piece of dry bamboo, about a foot long, split it in half, and on its outer round surface cut a nick or notch, about an eighth of an inch broad, circling round the semi-circumference of the bamboo, shallow towards the edges, but deepening in the centre until a minute slit of about a line in breadth, pierces the inner surface of the bamboo fire-stick. Then a flexible strip of bamboo is taken, about  $1\frac{1}{2}$  feet long and an eighth of an inch in breadth, to fit the circling notch or groove in the fire-stick. This slip or band is rubbed with fine dry sand, and then passed round the fire-stick, on which the operator stands, a foot on either end. Then the slip, grasped firmly, an end in each hand, is pulled steadily back and forth, increasing gradually in pressure and velocity as the smoke comes. By the time the fire-band snaps with the friction, there ought to appear through the slit in the fire-stick some incandescence dust, and this placed, smouldering as it is, in a nest of dry bamboo shavings, can be gently blown into a flame."—*Hill Tracts of Chittagong and the Dwellers therein*, Calcutta, 1869, p. 83.

## COCOS NUCIFERA (Page 143).

The native plan of soaking, crushing, and carding the strongly cohering fibre of the cocos husk (coir), which now occupies weeks and months, and entails severe manual labour to carry out, will, it can scarcely be doubted, be entirely replaced in future, or so soon as Europeans devote themselves to its manufacture by the Ekman (Patent) process or some similar one. A late experiment on this material is thus described by Mr. Christy:<sup>1</sup>—

"At the request of Mr. Hinde some husks were put in the cylinder by Mr. Ekman, and they yielded in one hour a fibre that could be removed with the hand, the soft pithy waste disappearing. The fibre when dry was strong and had a good colour. It is quite a mistake to suppose that the fibre can be simply extracted by boiling in water." With this result of the 'Ekman' process before us, who can doubt the enormous supply of cordage and textile fibres that Burma is capable of yielding, as numbers of other palms, rattans, and other vegetable products, which may be had for the cost of gathering, treated as the above 'husks' were, would yield similar and even superior products? The Forest Department would do wisely to purchase the right of using this process in experimenting on Burmese forest-products and similar materials.

<sup>1</sup> New Commercial Plants and Drugs, No. 6, p. 52.

## DEATH OF KAYKREE (Page 188).

The following note, communicated by the Rev. C. Parish, points out an appalling danger, which may through want of care or foresight overtake the sportsman or collector in the rankly luxuriant jungles and savannas of Burma.

"Before leaving the subject of Orchids, perhaps I may be allowed to say a few words on the sad end of my poor old collector—*Kaykree* by name, and by race a "*Mug*," or native of Arracan.

"He came to me about the year 1859 from Gen. Johnson, in whose service at Toung-ngoo he developed a taste for observing and collecting wild flowers. When Gen. Johnson left Toung-ngoo, Kaykree accompanied him to the Nilgiris, but, after a short stay there, he begged permission to be allowed to return to Burma. On his return he entered my service, in no very definite capacity at first; but, as he proved himself to be extremely intelligent in the recognition of plants, and was evidently fond of jungle life, I soon found him congenial employment, and he became finally my botanical collector. I purchased a boat, of which he was to all intents and purposes the owner, and as he was fond of sport after his fashion, I gave him a gun; and it was this last gift which, unhappily, like Nessus' shirt, proved the cause of his death.

"He invariably accompanied me in my journeys, whensoever I left home, and when in the jungles with me, he acted as guide, interpreter, and general factotum. As, after a while, he became well known in all the villages far and near, I never found any difficulty in procuring supplies, elephants, and carriers, Burman or Karen. Altogether he had a very happy time of it, spending all the fine seasons in making longer or shorter jungle trips, going and returning nearly as he pleased, but always ready to start when I desired him, and to go whithersoever I bade him and however far. In these journeys, however, he always had a companion, a second man, also in my service, to help him in paddling the boat and otherwise; and he farther had '*carte blanche*' from me to enlist any number of additional hands, when he left the boat, as he might require, either as carriers or for safety.

"In the rainy season he seldom went out, and then not very far, but lounged about the house, drying my plants, or playing with my children, who were extremely fond of him.

"He was always keenly alive to the pleasure of any new discovery, and was proud when he could bring me a plant which he thought I had not seen before. On one occasion he brought me in this way a very pretty new *Bulbophyllum*, which I determined at once to call *D. Kaykreei*, but, alas for his immortality! it has disappeared without record. For want of leisure just at the time I allowed the flower to perish, without drawing or description, and, being a small plant, I suppose it died when sent to England with other things. At all events I never saw it again. All I recollect is that it came from the top of *Dan-kyeik*, near *Kaukarit*. I always intended to have sent him for more, but, before I could do so, his career was suddenly cut short.

"One day, when he had been but five or six years in my service, and he was out on one of his excursions, his companion returned in haste alone, and informed me that he had left Kaykree in a Karen village, about three days' journey off, badly burned. I at once sent him back with my head servant, and a supply of cotton and sweet oil, bidding them make all possible speed; but, alas! before they could reach him, the poor fellow had expired in dreadful agony.

"It appears that he had climbed a tree with his gun to watch for and shoot a wild pig, and that, while waiting for some Karens to beat the jungle, the grass in the neighbourhood caught fire, and advanced rapidly towards him. The Karens shouted to him to come down, but, fancying himself safe, and out of the reach of the flames, he did not do so till too late. The fire reached the tree and soon enveloped it in flames, through the midst of which he was at last obliged to let himself down as he best could, but in so doing was so fearfully scorched that, after lingering for two or three days, he died. It was always surprising to me that so experienced a jungle traveller as he was should not have known better! I need not dwell on

the grief this terrible accident caused us—as we were all very fond of him—and it was long before we ceased to mourn the loss of as kind and good, true and faithful a servant as ever Christian could be.”

#### MUSA PARADISIACA (Page 204).

As Burma is emphatically a plantain-growing country, I give the following extract<sup>1</sup> for the information of those who may be inclined to try, even on a small scale, the manufacture of plantain fibre for exportation:—

“The extraction of plantain fibre is accomplished in two ways, the first by machine-crushing, and the second by fermentation. The tree is cut by a single stroke of a hatchet or cutlass, six inches above the surface of the ground; the trunk is then divided longitudinally into four parts, and the heart is taken out, which is always left for manure. One man can cut and split 800 trees in a day. If fermentation is decided on, the trees are left upon the ground until the juice and sap are separated from the fibre, when considerable weight will have been lost, and the labour of transportation much reduced. On the other hand, if the tree is not subjected to this process, it must be carried to the mill at once, and passed through the rollers, which are a foot in diameter, and about three feet long. In crushing, the tender layers are separated from those which are harder and riper, and the different kinds passed through the mill lengthwise, the rollers being placed horizontally. The produce is about 4 pounds of fibre to each tree. The stalks of the branches give the best fibre, and a larger quantity as compared with the body of the tree. One hundred pounds of stalk will give about 15 pounds of fibre, net weight, and when a whole tree furnishes 4 pounds of fibre, one-fourth of the quantity is derived from the stalks. One hundred plantain trees can be crushed in twenty minutes, with one horse, allowing five minutes for rest.

“After crushing, the fibre is boiled to separate the gluten and colouring matter, carbonate of soda and lime being used as chemical agents.

“To make three tons of fibre a day, it is necessary to have four boilers of 800 gallons each, and give five boilings in a day, which amounts to 1650 pounds of net fibre for each boiler or 6600 pounds for the four boilers. They require about 300 pounds of soda and a proportionate amount of quicklime. As the different grades of fibre are pressed separately, they should also be kept separate in the process of boiling, the lighter fibres requiring about six hours to bleach, while the darkest require fully eighteen. Levers are arranged to lift the mass from the kettles or tank when sufficiently boiled, allowing it to drain into the boiler before it is carried away to be washed.

“The washing should be thorough, that no extraneous matter may be left upon the fibre, and the work is done by machinery, such as is used by paper-makers, or the arrowroot-makers in the West Indies. After a thorough washing it is hung up to dry, and when thoroughly dried is ready for baling, hydraulic pressure being used for the purpose.”

#### ORIGIN OF MYTHS (Page 219, note).

In his preface to ‘Zoological Mythology,’ De Gubernatis thus alludes to the relationship between many a Christian myth and its pagan prototype:—“It is by no means true that the ancient systems of Mythology have ceased to exist; they have only been diffused and transformed. The *nomen* is changed, the *numen* remains. The splendour is diminished because it has lost its celestial reference and significance, because it has become more earthly; but its vitality is still enormous. . . . Nothing clings more to the earth, nothing is more vegetative than a superstition. A scientific truth requires years and sometimes centuries of demonstration before it can obtain for itself general acceptance, and, rather than suffer martyrdom, its defender will generally prefer to succumb to the infamous Papal motto ‘*Laudabiliter se subiecit*,’ but an error that is founded upon a sense of the supernatural does not need the

<sup>1</sup> New Commercial Plants and Drugs, No. 6, p. 49, Christy and Co., 155, Fenchurch Street, London.

electric wires to flash it from heart to heart, and awaken a response in the credulous world, while the ponderous dialectics of an entire army of rationalists will not thereafter suffice to dislodge it."

Space will not permit any more lengthened quotation, but one interesting example may be given of how imagination and simplicity unite to people the sky with material beings instinct with life, the *dramatis personæ*, so to speak, of the great celestial epic, in which all Mythology has its ultimate root.

"The children of to-day will repeat the experiences of the ancient ones, that is, our ancestors in the youth of Humanity; and will enable us to understand certain illusions which may appear impossible to the perception or even imagination of the erudite and sceptical modern. I myself, to realize more thoroughly the simplicity of our ancestors, am obliged to remember that one of the most vivid impressions ever made on me was received when, a child of scarcely four years of age, I was looking up into the sky. My family was living in a remote part of Piedmont; one autumn evening, towards night, one of my elder brothers pointed out to me, over a distant mountain, a dark cloud of a rather strange shape, saying, 'Look down there, that is a hungry wolf running after the sheep.' I do not know whether my brother was then repeating what he had heard the villagers say, or whether that heavenly scene had presented itself to his own imagination; but I well recollect that he convinced me so entirely of that cloud being really a hungry wolf running down the mountains, that fearing it might in default of sheep overtake me, I instantly took to my heels and escaped precipitately into the house. The reader will kindly pardon this personal allusion. I recall and refer to it now, to explain how the credulity which we always find in children may give us an idea of the credulity of infant nations. When Faith was pure, when Science did not exist, such illusions must have been continually awakening enthusiasm or fear in the breasts of our ingenuous forefathers, who lived in the open air with their herds of cattle, and stood with earth and sky in constant relation, and in continual communion. We busy dwellers in great cities, held back by a thousand social ties, oppressed by a thousand public or private cares, never happen to raise our eyes towards the sky, except it be to consult it on the probability of fine or wet weather; but evidently this is not sufficient to enable us to comprehend the vast and complicated epic poem transacted in the heavens."—*Zoological Mythology*, p. xxiv.

As no one passage which space allows me to introduce here can give a full idea of the mode in which the subject-matter of myths originated in the childhood of our race, so no attempt can be here made to follow the process of development whereby the elemental changes furnished matter for the countless mythical creations which the mind of primeval man so prodigally evolved. A few words, however, may be here quoted from that interesting and valuable work, "*Mythology of the Aryan Nations*," by the Rev. G. W. Cox, which illustrates two prominent points which may not be known to every reader, *i.e.* the polymorphic adaptations, of one and the same idea, and the disguises and variations it is capable of assuming; and, secondly, how a pure and spiritualized fancy or conceit comes in time (as a matter of course it may almost be said) to degenerate into a gross and sensual symbolism. Speaking of the Vedas, Cox remarks (*Mythology of the Aryan Nations*, vol. i. p. 52):

"In these poems the names of many, perhaps of most, of the Greek gods indicate natural objects which, if endued with life, have not been reduced to human personality. In them Daphné is still simply the morning twilight ushering in the splendour of the new-born sun: the cattle of Helios there, are still the light-coloured clouds, which the dawn leads out into the fields of the sky. There, the idea of Hæraclès had not been separated from the image of the toiling sun, and the glory of the life-giving Helios had not been transferred to the God of Delos and Pytho. In the Vedas, the myths of Endymion, of Kephalos, and Prokris, Orpheus and Eurydiké are exhibited in the form of detached mythical phrases, which furnished for each their germ. The analysis may be extended indefinitely, but the conclusion can only be that in the Vedic language we have the foundation, not only of the glowing legends of Hellas, but of the dark and sombre mythology of the Scandinavian and the Teuton. Both alike have grown up chiefly from names which have been grouped around the sun; but the

former has been grounded on those expressions which describe the recurrence of day and night, the latter on the great tragedy of alternation of summer and winter.

"Of this vast mass of solar myths, some have emerged into independent legends, others have furnished the groundwork of whole epics, others have remained simply as floating tales whose intrinsic beauty the poet has wedded to his verse. Whether the whole may be classified in order of priority may be doubtful; but the strong presumption would be, that those which have not been systematized into coherent narratives are the oldest, as not having sufficiently lost their original meaning. At the least, they exhibit to us the substance of Mythology in its earliest form. Thus the legends of Kephalos and Prokris, of Daphnè, Narkissos and Endymion, have come down to us in a less artificial form than that of Heraklès, while the myth of Heraklès has been arrested at a less advanced stage than that of Zeus and Apollôn. But all alike can be translated back into mythical expressions, and most of these expressions are found in the Vedas with their strict mythical meaning. The marvellous exuberance of this early language, and the wealth of its synonyms, may well excite astonishment as we watch its divergence into such myths as those of Kephalos and Endymion, Heraklès, Daphnè, the Pythian and Delian Apollôn, Phaethôn and Meleagros, Memnôn and Bellerophôn.

"That the form of thought which found utterance in mythical language would lead to the accumulation of a vast number of names for the same object, we have already seen; and so clearly does the mythology of the Aryan nations exhibit the working of this process, that the task of tracing it through the several legends of which it is composed becomes almost a superfluous work. It seems impossible not to see that when the language of Mythology was the ordinary speech of daily life, the night laboured and heaved with the birth of the coming day, and that his toil and labour is reproduced in the Homeric hymn, in which Leto, the power of forgetfulness and sleep gives birth to the lord of light in Delos. His coming was preceded by the pale twilight, who, in mythical times, drove his cows to their pasture, but in the *Odyssey* his herds feed at Tainaron or in Thrinakia far away, where Phaethousa and Lampetiè, the bright and gleaming daughters of Neaira, the early morning, tend them at the rising and the setting of the sun. . . . But the sun loves not only the clouds, but the dawn who is their leader; and so the dawn comes before us as followed by him, and flying from his love, or else returning to it. The former phrase ('the dawn flies from the sun') is embodied in the legend of Daphnè, who flies from her lover and vanishes away as he seeks to embrace her. In the tale of Orpheus she appears under the name of Eurydikè, as the bride of the sun, loved by him and returning his love, yet falling a victim to it, for whether to Daphnè or Eurydikè, the brightness of his glance is fatal as he rises higher in the heaven. . . . So again the legend of Meleagros exhibits only the capricious action of the sun, and the alternations of light and shade are expressed in the sudden exploits and moody sullenness of the hero: but this life is bound up with the torch of day, the burning brand, and when its last spark flickers out, the life of the hero is ended. More commonly, however, he is the mighty one labouring on, and finally worn out by an unselfish toil, struggling in his hard task for a being who is not worthy of the great and costly sacrifice. So Phoibos Apollôn, with his kinsman Heraklès, serves the Trojan Laomedôn; and so he dwells as a bondsman in the house of Admètos. So likewise, as Bellerophon, he encounters fearful peril at the bidding of a treacherous host, and dies, like Sarpédôn and Memnôn, in a quarrel which is not his own. But nowhere is his unutterable toil and scanty reward brought out so prominently as in the whole legend, or rather the mass of unconnected legend, which is gathered round the person of Heraklès. Doomed before his birth to be the slave of a weak and cruel master, he strangles while yet in his cradle the serpents of the night, which stung to death the fair Eurydikè. His toils begin. His limbs are endued with an irresistible power, and he has a soul which knows no fear. He may use this power for good or for evil, and his choice for good furnishes the groundwork for the apologue of Prodikos. Other legends there were, which perverted this idea; and in these he is exhibited under gross, uncouth or repulsive forms. But he goes upon his way, and is hurried on through many lands. In all he has mighty

works to do, and he fails in none. The remembrance of Iolè may linger in his memory, but there are others who claim his love in the days of his strength and power, and it would seem as though he had forgotten the daughter of Eurytos. But his time draws towards its close: the beautiful maiden, whose face had gladdened him long ago, returns to cheer him in the evening of his life. With her comes the poisoned robe (the mantle of cloud) which he strives in vain to tear away from his bleeding limbs. In a deeper and redder stream flows the life-blood, till, after a convulsive struggle, the strife is closed in the dead silence of night.

"But it is in the case of Heraklès that the perfect truth of the old mythical language gave rise more especially to that apparently strange and perplexing meaning which repelled and disgusted even the poets and philosophers of Greece. Pindar refuses to believe that any God would be a sensualist or a cannibal: he might in the same spirit have rejected the tales which impute something of meanness and cowardice to the brave and high-souled Heraklès. For Heraklès fights with poisoned arrows, and leaves them as his bequest to Philoktètès. But the poisoned arrows are the piercing rays which burn on the tropical noon-day, and they reappear as well in the poisoned robe of Deianeira, as in that which the Kolchian Medeia professes to have received from her kinsman Helios.

"A deeper mythical meaning, however, underlies and accounts for the immorality and licence which was introduced into the transmuted legend of Heraklès. The sun looks down on the earth, and the earth answers to his loving glance by her teeming and inexhaustible fertility. In every land she yields her special harvest of fruits and flowers, of corn and wine and oil. Her children are countless, but all spring up under the eye of the sun as he journeys through the wide heaven.

"It is easy to see what must be the result when the sun is transmuted into the human, yet god-like Heraklès, and how repulsive that myth must become which, in its primitive form, only told how

‘The sunlight clasps the earth  
And the moonbeams kiss the sea.’<sup>1</sup>

The same explanation removes the mystery of the even greater degradation to which the Hellenic mythology reduces Zeus himself, the supreme father of gods and men. He who should be the very type of all purity and goodness becomes the very embodiment of headstrong lust and passion, while the holiness of the lord of life and light is transferred to Apollôn, and his virgin sister Athênê. The difficulty is but slight. Zeus, the Vedic Dyaus, is but another form of Ouranos, the veiling heaven or sky, and again, as in the words of our own poet, who sings how

‘Nothing in the world is single,  
All things by a law divine  
In another’s being mingle,’

and how

‘The mountains kiss high heaven,’

so Ouranos looked down on Gaia, and brooded over her in his deep, unfailing, life-giving love. But these are phrases which will not bear translation into the conditions of human life, without degrading the spiritual god into a being who boasts of his unbounded and shameless licence."

The intelligent reader will be amply repaid by studying this interesting subject at greater length in the work of Cox and other writers, but the above short extracts will, I hope, show by what process a pure and spiritual idea becomes converted into an impure and sensuous one. There is one other point also which I will here briefly refer to as connected with the early mental conceptions of man: "Thus far it is only on Iranian soil that we have seen the struggle between day and night, the sun and the darkness, represented as a conflict between moral good and evil, the result

<sup>1</sup> Shelly, *Love's Philosophy*.

being a practical, if not a theoretical, dualism, in which the unclean spirit is at the least as powerful as the righteous being with whom he is at war. This absolute partition of the universe between two contending principles was the very groundwork of Iranian belief; but the idea was one which could not fail to strike root in any congenial soil. To a certain extent it found such a soil in the mind of the Jewish people, who had become familiar, by whatever means, with the notion of a being whose office it was to tempt or try the children of men. The Satan who discharges this duty is, however, one of the sons of God; and in the Book of Job there is no indication of any essential antagonism between them. The position of Satan in this narrative is, indeed, in strict accordance with the Hebrew philosophy which regarded God as the author both of good and evil, as the being who hardened Pharaoh's heart and authorized the lying spirit to go forth and prevail among the prophets of Ahab. But when a portion of the Jewish people was brought into contact with the fully developed system of Persian dualism, the victory of the Iranian mythology seemed complete. Henceforth the notion of two hierarchies, the one heavenly, the other diabolical, took possession of their minds; and the Satan who ruled over the powers of darkness and exercised a wide dominion as prince of the air, was confined to a level lower than that of Ahriman, only because he had once stood among the most brilliant angels in the courts of heaven. At this level he remained a fallen creature, ruling over hosts of malignant demons, who did his will among mankind, plaguing them with sorrow, disease, and madness, until the convictions of the first Christian societies magnified him into proportions if possible more overpowering than those of the Iranian enemy of Ormuzd. The Jew, chiefly, if not wholly, from the conviction which led him to regard God as the author both of good and evil, drew no sharp distinction between mind and matter as existing in irreconcilable antagonism; and since as a nation they can scarcely be said to the last to have attained to any definite ideas either of the fact or the conditions of a life continued after death, Satan could with them obviously have no definite dominion beyond the bounds of our present existence. He could torture the bodies, afflict the souls, or darken the minds of men; but of his everlasting reign over countless multitudes, ruined by his subtle wiles, we find no very definite notion.

"But Christianity, while it rested on a distinct assurance of personal immortality, altogether stronger than any to which the most fervent of the Hebrew prophets had ever attained, took root among nations who had filled all the world with gods or demons, each with his own special sphere and office. These deities the Christian teachers dethroned; but far from attempting to destroy them, they were careful to insist that they had always been, and must for ever continue to be, malignant devils;<sup>1</sup> but unless their horrible fellowship was speedily to come to an end, they must be under the rule of some king, and this they found in the Semitic Satan. . . . Hence grew up, by a process which cannot much excite our wonder, that severe theology which, known especially as that of Augustine, represented the Christian Church as an ark floating on a raging sea, open only to those who received the sacrament of baptism, and shut both here and hereafter to infants dying before it could be administered. It was inevitable that under such conditions the image of Satan should more and more fill the theological horizon for the Jew, whose enthusiasm and convictions were sincere. But these conditions were changed with the conversion of tribes, in whom the thought of one malignant spirit marring and undoing the work of God had never been awakened; and although henceforth the teaching of the priesthood might continue to be as severe as that of Augustine or Fulgentius, it was met by the passive resistance of men whose superstitions were less harsh and oppressive. 'The Aryan nations,' says Professor Max Müller, 'had no devil. Pluto, though of a sombre character, was a very respectable personage:

<sup>1</sup> The Christian missionaries were further conscious that their own thaumaturgy might be called into question if that of the old creed were treated as mere imposture or illusion. "Die neue Lehre konnte leichter keinen und wurzeln wenn sie die alte als gehässig und sündlich, nicht als absolut richtig schätzte: die Wunder des Christen erscheinen dadurch glaubhafter, dass auch dem althergebrachten Heidenthum etwas übernatürliches gelassen wurde."—*Grimm*.

and Loki, though a mischievous person, was not a fiend. The German goddess, Hel, too, like Proserpine, had seen better days.' It was thus no easy task to imbue them with an adequate horror of a being of whose absolute malignity they could form no clear conception."—Rev. G. W. Cox, *Mythology of the Aryan Nations*, vol. ii. p. 360.

It is lamentable to reflect how deeply imbued modern Christianity is with so contemptible a heaven as the belief in a personal<sup>1</sup> and almost omnipotent fiend! No reasonable man can doubt that the religion of the future must be purged of this monstrous admixture, meanwhile how many devoted servants of Christ are wasting their energies in preaching the gospel of everlasting damnation, as it merits being called, in place of the simple gospel of Love. In years gone by it was perhaps as possible to believe in a personal Devil, as in a personal Saviour, but we, who know whence the idea of the Christian devil has been derived, and how in monkish times Satan came to be elevated into the position he holds in popular theology, have not the same excuse, if we fail to lift up our voices in protest at the continued profanation involved in the prominence vulgarly assigned to the Devil in the religion of Christ.

#### ARISTOLOCHIA (Page 229).

An undetermined species is thus alluded to in a note by Rev. C. Parish:—"At the top of Zwa-ka-bin, the limestone rock, known as 'the Duke of York's nose,' North of Maulmain, a small species of *Aristolochia* is to be found, which may prove to be new. I have not seen the flower, but the fruit is very remarkable, resembling when dry and fully expanded and empty (the state in which I found it) a small inverted parachute."

According to De Gubernatis<sup>2</sup> a species of *Aristolochia* was used as a counter charm for fumigating the bridegroom, "*si quis devotatus defixusque fuerit in suis nuptiis.*" These words refer to that very curious superstition which lived down to past the time of the Tudors, called 'point-tying,' it being supposed that a magical knot being tied in one of the 'points' or laces of the bridegroom's dress, prior to the wedding, wholly prevented him from reciprocating the endearments of his bride till the charm was removed or destroyed by some more powerful counter-charm. One such counter-charm quoted from Apuleius (l.c.) was as follows: "*Herbæ pedis leonis frutices numero septem sine radicibus decoque cum aquâ, lunâ decrescente, lavato eum, et teipsum qui facis ante limen extra domum primâ nocte, et herbam incende Aristolochiam et suffumigato eum, et redito ad domum, et ne post vos respiciatis, resolvisti eum.*" The superstition is a very curious one and laughable, but for the fact that it has consigned numbers of hapless creatures to the stake, and the dread of being 'point-tyed' was a veritable sword of Damocles to many a mediæval bridegroom. The practice was, of course, usually believed to originate from the malice of a discarded mistress or jealous rival, but it might also be done as a joke by some friend of the luckless bridegroom. Anyhow, if there was the least suspicion of any such trick having been perpetrated, it was one of the most arduous tasks of the groomsmen to furnish a counter-charm. A similar superstition is evidently alluded to by Ovid:

"Quid me ludis? ait, Quis te, male sane, jubebat

Invitum nostro ponere membra toro?

*Aut te trajectis Aëa renifica lanis*

*Devocet, aut alio lassus amore venis."*

*Amorum*, iii. 7. 77.

<sup>1</sup> It is hardly necessary, of course, to more than simply remark that the tempter or serpent in Paradise of the Book of Genesis is wholly distinct from the Satan of the Book of Job, or the Persian or Miltonic Satan of the New Testament, and is (it is well known) simply an allegorical impersonation of sensual love, an explanation less recondite perhaps than that commonly dilated on to poor Sunday School children, but claiming nevertheless our consideration from its essential truth. The subject is doubtless one which does not readily lend itself to a very copious exegesis before a mixed or juvenile audience, but that is no excuse for the deliberate falsification so much in vogue of the now well understood sense of the original myth.

<sup>2</sup> *Mythologie des Plantes*, vol. i. p. 208.

## THE ALLEGORY OF THE FALL OF ADAM (Page 274).

The Semitic legend of the tree of life should be compared with its Aryan counterpart, wherein the same personae, a tree, a fruit and a dragon, figure, and of which De Gubernatis remarks: "The legends<sup>1</sup> concerning the tree of the golden apples or figs, which yields honey or ambrosia, guarded by dragons, in which the life, the fortune, the glory, the strength, and the riches of the hero have their beginning, are numerous among every people of Aryan origin; in India and in Persia, in Russia and in Poland, in Sweden and in Germany, in Greece and in Italy, popular myths, poems, songs, and fairy tales amplify with a great variety of incidents, partly unconscious of their primitive signification, this strange subject of phallical cosmogony."

On the same page De Gubernatis gives a variation of the legend of the Cross which he concludes with the following words pregnant with meaning: "To the continuers of the admirable studies of Strauss and Renan will be reserved the office of seeking the sense hidden in this myth, made poetical by the evangelical morals. When we shall be able to bring into Semitic studies the same liberty of scientific criticism, which is conceded to Aryan studies, we shall have a Semitic Mythology; for the present, faith, a natural sense of repugnance to abandon the beloved superstitions of our credulous childhood, and more than all, a less honourable sentiment of terror for the opinion of the world have restrained men of study from examining Jewish history and tradition with entire impartiality and severity of judgment. We do not wish to appear Voltairians, and we prefer to shut our eyes not to see, and our ears not to hear what history, studied critically and positively, presents to us less agreeable to our pride as men, and to our vanity as Christians."

Well did James Russell Lowell write:

"I do not fear to follow out the truth,  
Albeit along the precipice's edge.  
Let us speak plain: there is more force in names  
Than most men dream of: and a lie may keep  
Its throne a whole age longer, if it skulk  
Behind the shield of some fair-seeming name.  
Let us call tyrants, *tyrants*, and maintain  
That only freedom comes by grace of God,  
And all that comes not by his grace must fall;  
For men in earnest have no time to waste  
In patching fig-leaves for the naked truth."

## OATHS IN PATRIARCHAL TIMES (Page 274).

Those who would know more of the curious oath imposed by Abraham (Genesis xxiv. 2), and again by Israel (Genesis xlvii. 29), may refer to Dr. Ginsburg's observations on oaths in Kitto's Cyclopædia, or Dr. Iman's work, vol. i. p. 79.

## TECTONA GRANDIS (Page 301).

The following are some of the results arrived at by me with reference to the experiments in question. So far as I know they are uncontradicted on their merits to this day.

"Forty-four samples were experimented on. Of this number, six were described as ungirdled teak, from the Tharrawadi forests. To these must be added three from Karennce, three from foreign Thonngyeen, and four from Mandalay, all which I have reason for treating as ungirdled, though it is not stated in the experiments. Should this be objected to, yet my general conclusion is not impaired; since, though the inclusion of these ten samples among the girdled teaks would raise their average breaking weight from 182 to 192, yet their abstraction from the column of ungirdled teaks would raise their average also from 238 to 241 lbs. breaking weight; or, to place

<sup>1</sup> *Zoological Mythology*, vol. ii. p. 410.

it in another light, the average strength of six samples of *ungirdled Tharrawadi Teak* is 241 lbs.; of *girdled Tharrawadi Teak* only 184 lbs.! Yet more, the average breaking weight of the whole 28 samples of certainly girdled teak experimented on is only 182 lbs., against the 241 lbs. of ungirdled Tharrawadi teak; and of the whole 28 samples, not one attains the average of the 6 ungirdled samples! Of the 10 samples, which, though not so specified, I treat as ungirdled teak (for a reason given below),<sup>1</sup> the average breaking weight is 222 lbs., one specimen only of the ten falling below the average of the 28 girdled samples, whilst two specimens exceed the remarkably high average of ungirdled Tharrawadi teak.

"Assuming therefore that the forty-four samples of teak may be classed as twenty-eight girdled and sixteen ungirdled, we have an average breaking weight of 182 lbs. for the former, and 229 lbs. for the latter.

"To arrive, however, at perfectly satisfactory results, a little elimination is desirable, as specimens rendered unsound by knots or other causes cannot give fair results, and I accordingly prefer to select from the above experiments only those which are free from any objection of unsoundness in the samples under trial.

"Rejecting then all samples rendered unsound either by knots or other causes, and all cut 'across grain,' we find fourteen samples of sound girdled teak to give a breaking weight of 202 lbs., whilst eleven samples of ungirdled teak give a mean breaking weight of 238 lbs., a difference of about 15 per cent. *ceteris paribus* in strength in favour of ungirdled over girdled teak."

These experiments strongly support the view I have all along entertained of the injurious results of girdling timber, based on personal observation of trees so killed in clearings, and on the rapid decay of many woods if allowed to remain 'unconverted,' some of which there is little doubt would yield fairly useful timber if at once sawn into planks, and thereby allowed at once to season, instead of weltering for months in their own sap, at a mean temperature of 80° or thereabouts. Other remarks of mine were nearly as follows:

"Regarding the practice as it now obtains of 'Girdling' or killing timber (teak) before felling it, I shall endeavour to show that, whereas no one single good reason can be advanced in its favour, three valid objections to it can be satisfactorily made out. The Forest Office rule is—'*The trees will always be allowed to stand three years before felling, which is one year longer than is generally considered to be sufficient for seasoning in this climate.*' From this it may be inferred that the seasoning of the timber was the main reason for the practice being introduced into Pegu by Dr. J. McClelland, and continued to the present day by his successors. Now practically no timber seasons to an appreciable extent till it is felled; and how should it? The fluids circulate in a tree very much as they do in an animal, and the moisture consequently remains in the trunk, till by cutting it into logs a ready exit is afforded for their transudation; and it is absurd to suppose that any notable abstraction of sap from the body of the tree takes place till it is felled. The three years therefore a tree is allowed to stand under the present system are simply three years wasted, and something more, as I shall presently show. In standing three years girdled, a portion of the trunk towards its circumference becomes seasoned, and by the time the tree is felled and 'logged' its general gravity is reduced sufficiently for rafting; but there can be no question, if the tree were felled at once, without 'girdling' and converted into logs, that a far more complete seasoning of the whole tree would take place at an earlier period than is now allowed for felling it, and that consequently the process of girdling actually tends to retard the very end, to accelerate which it would seem to have originally been devised. This then is my first objection

<sup>1</sup> My reason for classing the foregoing ten samples of foreign teak as ungirdled is, that the native method of "girdling" (if it can be so called) or killing trees differs in toto from the method enforced by the Forest Department, and consists, as I am informed by Mr. Slym, in *half cutting through* the tree as it stands, and driving augur holes through and through the remaining portion. This plan, as far as regards the abstraction of the sap, differs little from cutting the tree down at once, as I argue should be done; anyhow, its superiority over the ridiculous system of "girdling" in vogue in Pegu cannot for a moment be contested.

to girdling. The second involves a more serious question than mere delay, and lies in the fact of the deterioration which the practice causes in the timber of trees so treated.

“Major Morgan (Report 1861-62) tells us Malabar teakwood has been discontinued in Madras for the use of gun carriage wheels by the Superintendent, as *it was found brittle*; but he had explained to Colonel Maitland, and shown him that the manufactory must have been supplied with *girdled teak*. Good cross-grained Malabar teak, Major Morgan adds, is superior to any wood for wheels, and *the girdling of teak*, he says, *has long ago been given up, as it makes the wood brittle and deprives it of its oil*. Major Morgan, of course, is speaking of Malabar, but is it not strange, if girdling has been abandoned for such a reason in Malabar, that it should still flourish unsuspected, and be rigorously enforced in Pegu? Major Pearson thus also writes of girdling: ‘With reference to the girdling of teak, it seems to me that the process tends to a certain extent to make the timber brittle. This was found to be the case with a number of trees which were girdled, for some European timber merchant, in the Boree forest, prior to its being formed into a Reserve. When those trees were felled by this department, *many of them used to split and splinter in the fall*, rendering some portion of the timber quite useless, *whereas trees that are felled without being girdled do not seem to be liable to injury of this kind*. The natives of this part of India seem never to have practised the killing of trees before felling, and yet you find timber cut by them a century ago as sound as if it had only been cut for a few years.’

“The above extracts go far to establish conclusively the injurious results of ‘girdling,’ and that the results are not more palpable than they are, is simply due to the great excellence of teak timber and its capacity of withstanding trying conditions. It is a matter of certainty that there are numbers of trees which, if felled and at once converted into planks, would yield an average timber for common purposes, but which, if ‘girdled’ and allowed to stand weltering in their own sap, would be rotten before the official term of three years had expired, owing to the fact that there is no real seasoning whatever, so long as a tree remains standing in the ground.

“The third objection is a more trivial one, viz. that many trees are girdled in spots where they cannot be profitably removed, but where they might have been advantageously preserved for propagation—and few traders would ever think of felling a tree which they did not think was capable of being removed. I am, of course, aware of the claim of the Forest Department to select trees for the axe; but this right is in no wise bound up with the question of girdling, since a broad-arrow mark impressed by the Department would as clearly indicate the trees for felling as the laborious plan of girdling them; hence I cannot but hope that a dispassionate revision of the subject may lead to the abandonment of a pernicious custom. As for the fact that a broad-arrow mark might be dishonestly imitated, there is surely no more difficulty in girdling a tree surreptitiously than in branding it; and the same means of detection and punishment that succeed in one case would equally well apply in the other, any difference, so far as security goes, being in favour of the broad-arrow brand *versus* girdling, as the mere possession of such a branding hammer would suffice for conviction, whereas for surreptitious girdling a ‘dah’ alone is required, which is in everybody’s hands.”

#### AGANOSMA ACUMINATUM (Page 349).

Mr. A. L. Hough tells me this makes an excellent ‘chutnee.’

#### BLUMEA BALSAMIFERA (Page 389).

Dr. Mason remarks: “One of the most abundant weeds throughout Burma is a species of *Blumea*, that grows six to eight feet high, with leaves like ‘mullen,’ which, when bruised, emit a strong odour of camphor. Many years ago the Tavoyers informed me that they were in the habit of making an impure camphor from the

weed by a very simple process; but Mr. O'Riley was the first to make a good article from it, and to bring it to public notice. He made more than a hundred pounds, and the specimens which he sent to Calcutta were reported: 'In its refined form it is identical in all its properties with Chinese camphor.' The plant is so abundant that Burma might supply half the world with camphor. Wherever the trees are cut down, this weed springs up, and often to the exclusion of almost everything else; so that an old clearing looks like a field under cultivation." The apparatus required for the distillation of camphor is extremely simple, consisting simply of a capacious vessel wherein the material containing the camphor, cut up and mixed with water, is boiled, and a head, consisting of one or more pots, to receive the products of distillation, and which, being kept cool by means of wet cloths, receive the crude camphor deposited during the process of condensation. A redistillation by dry heat of the crude camphor, produced by the first process, is all that is required to produce the refined article.

#### ENTADA SEEDS (Page 540).

The seeds of the *Entada* are used for playing the game gohn-nyin-toh-pwē, so popular and universal in Burma, and which is equally popular, as we learn from Capt. Lewin,<sup>1</sup> among the wild tribes of the Chittagong Hills. The game resembles 'nine-pins' in miniature. The large flattish seeds are stuck up on end, and a player fires at them with another seed, projected by drawing back, with a flip, the middle finger of the right hand. The party bowling over most seeds wins.

#### PENTACME SIAMENSIS (Page 629).

This is the tree which the Burmese believe to be the one which has been petrified and scattered so plentifully over many parts of Pegu, and the petrified wood is therefore called *Enjyn chook*. They believe when a tree reaches maturity and dies it becomes petrified, especially if immersed in water, and this nonsense is believed by many Europeans, and even receives a sort of *quasi*-confirmation by the solemn recognition of it in Dr. Balfour's work,<sup>2</sup> who writes: "It is said to harden by exposure to water, and even to strike fire with steel after having been kept in water a length of time." It is to be hoped this passage will be in future editions expunged, and committed to the limbo where similar curiosities find their last home.

<sup>1</sup> Hill Tracts of Chittagong, p. 40.

<sup>2</sup> Balfour's 'Timber Trees,' under *Shorea robusta*.

## APPENDIX A.

## PART III.

## NOTES ON SOME BURMESE WOODS.

IN the following notes are embodied the observations of the Editor on some of the woods of Burma, and some vernacular names of trees are given which have not been recorded by any previous writer.

Many of the woods here recorded, which are little known or esteemed, would probably prove of value if quickly seasoned by being at once converted into planks and stacked under cover for a couple of years in a manner to insure proper ventilation. By felling and converting at once into planks on the spot, the costly employment of elephants to drag the logs is dispensed with, as planks could be removed on buffaloes or bullocks; but it is to be feared some hampering regulation or other of the Forest Department may stand in the way of this. How exceedingly unpractical and piddling some of these rules are is exemplified by that one which prescribes (or did do so) that all creepers are to be cut with an *upward* stroke of the 'dah,' a piece of nonsense worthy some bespectacled fogie who had never handled a dah in his life!

The figures denote the weight of a cubic foot of the seasoned wood, in all cases from original experiments.

Bam-bwē . . . . . *Careya arborea*, Roxb. . . . . 55

Reddish-brown, close-grained, strong and durable. Adapted for furniture and house carpentry.

Kurz applies the name to *Planchonia valida*, which Gamble also styles Bam-bwē-ni. This is clearly because its wood resembles that of *Careya*, for a tree confined to the Andamans can by no possibility possess of right a Burmese name. Of course Burmese or Indian convicts, if asked, apply the names of Indian or Burmese trees with which they are familiar to trees resembling them, in the Andamans; but this is a misuse of terms, and should be discouraged as leading to confusion.

Ban-a-nen . . . . . 43

A pale-coloured wood, like English ash; little known, but deserving of attention for light work.

Ba-shu . . . . . *Mimusops littoralis* . . . . . 65

A very close-grained wood, of a very dark-brown, the sapwood a pale-brown, but close-grained and of excellent quality. For strength and durability surpassed by few.

This is also called Kap-pa-li, according to Kurz.

Bē-byā . . . . . *Cratoxylon neriifolium*, Kz. . . . . 52

A nice-looking rather close-grained wood of a reddish-brown colour, but deficient

in strength and endurance; would suit, however, for various uses where it would not be exposed to the weather.

Kurz describes the wood as "brown, close-grained, rather soft." Gamble calls it "hard."

Byu-ben . . . . *Dillenia pulcherrima*, Kz. . . . . 66

Wood pale reddish-brown, fine-grained, but rather coarse-looking, reputed to be strong, but not much used. It splits more easily than any wood I know, and is therefore of value as a firewood and for faggots. For sleepers, however, it would have to be hooped at the ends to prevent splitting.

Bwē-zyn . . . . *Bauhinia variegata* . . . . . 42

Wood a very pale brown, rather coarse, but easy to work. Would probably prove a fair second-class wood where protected from exposure.

Bha-mor. . . . . *Tetranthera grandis*, Wall. . . . . 52

Wood a pale yellow, rather close and straight-grained. A good second-class wood.

In his 1862 catalogue Brandis did not know the tree yielding this wood. In his Forest Flora, Kurz (who, it must be remembered, was a botanist as well as mere forest officer) identifies the wood as belonging to *Tetranthera*; yet Gamble (or Dr. Brandis, who really dictated the words, I presume) refers the wood to *Anonaceæ*. Now this I consider as hardly justifiable. The wood before Gamble may have belonged to the *Anonaceæ* as is suggested, but as he describes it as "olive grey" (page 11) it is very unlikely that it is *Bha-mor* at all, for *Bha-mor* is a yellowish wood comparable with box. At all events, before so completely ignoring the testimony of Kurz, the authority should at least have been given, on which the *Anonaceous* (?) wood, forwarded in 1867 from Burma, was identified as *Bha-mor* (Baman) by Gamble, in so summary a fashion.

Bôn-mē-zā . . . . *Albizia stipulata*, Boiv. . . . . 28

Colour a lively brown, grain coarse and open, but a thoroughly good wood for light carpentry purposes, with much of the look of walnut, only much lighter.

Byn-gā . . . . . *Nauclea rotundifolia*, Roxb. . . . . 37

Wood a very pale yellowish-brown, rather close and easy to work. A good second-class wood. Gamble gives 47 lbs. as the weight of the wood, but this I regard as erroneous for the seasoned wood.

Chin-yōk. . . . . *Garuga pinnata*, Roxb. . . . . 45

Pale reddish-brown. A coarse wood, not much esteemed.

Choun-douk . . . . *Paysonia multijuga* . . . . . 25

Yellowish-brown, straight-grained and not unlike teak in appearance. Works easily and seems a good second-class wood for light indoor work.

The wood described by Gamble (Brandis) from the Andamans seems totally different from the Pegu tree, the wood of which is certainly not "orange-brown." As a single specimen only is quoted, I consider it not improbable that the Andaman wood may have been wrongly identified. *Choundouk* in Pegu is certainly not a "fine wood," as Gamble (Brandis) describes it.

Chē-ben. . . . . *Smecarpus panduratus*, Kz. . . . .

Wood worthless.

Chē-thē, see Thayet-thyt-si.

Dwā-ni . . . . . *Eriolæna Candollei*, Wall. . . . . 42

Wood pale orange-red, rather coarse, and a fair second-class wood for light carpentry.

Eng-jyn. . . . . *Pentacme Siamensis*, Miq. . . . . 55

Colour light brown, grain close and straight, wood strong and lasting. A first-class wood, surpassed by few for general purposes.

Eng . . . . . *Dipterocarpus tuberculatus*, Roxb. . . . . 57

Brown, pretty close-grained and easily worked. Decays when exposed to the weather, but for indoor purposes is worthy of attention from its size and cheapness. It would probably prove durable enough if fully seasoned first, and painted afterwards, or tarred if exposed out of doors.

Gyn-di . . . . . *Quercus Amherstiana*, Wall. . . . . 59

Colour when fresh brownish-red, fading to pale reddish-brown. Wood hard, strong and durable, but not easy to work from its crooked grain. An excellent wood for coarse carpentry, and these remarks doubtless apply to more than one species of *Quercus* in Burma.

Gān-gor. . . . . *Mesua ferrea*, L. . . . . 69

Red or brownish-red. Wood hard, strong and imperishable; close, but cross-grained, and very difficult to dress. Selected slabs would form handsome furniture, and for all purposes calling for strength and durability this wood has few superiors.

Hmā-ni . . . . . *Gardenia erythroclada*, Kurz. . . . . 54

Wood very pale, but hard and close-grained. Is too small in scantling to prove of use, save perhaps for the manufacture of toys.

Hmā-chouk . . . . . (Botanical name unknown) . . . . . 51

Brown, with rather a fine and pretty grain. It would serve for ornamental furniture.

Hnor (Hnau) . . . . . *Nauclea cordifolia*, Roxb. . . . . 61

Heartwood brownish-yellow, sapwood paler and brighter, both close-grained and excellent for furniture, toys, combs, and the like. The wood dresses easily, and looks well when finished.

Gamble says this tree has no heartwood. In speaking therefore above of the heartwood, I mean the inner wood, which is certainly differently coloured from the outer: call it heartwood or not. I cannot understand the weight of this wood as given by Gamble, only one of his specimens reaching 50 lbs., whereas mine weighs 61 lbs., a picked sample it is true. The name is correctly given by Brandis 'Hnau' (Catalogue, 1862), but mis-spelt by Kurz. Hnau, which is unfortunately copied by Gamble.

Hpān-gā . . . . . *Terminalia tomatella*, Kz. . . . . 64

Heartwood dark brown, sapwood pale yellowish. Hard, strong and durable, the sapwood of old trees being scarcely inferior to the heart. An excellent wood for house carpentry and strong furniture, and procurable of great size. Furniture made of the dark heartwood would be scarcely inferior in look to that made of walnut.

Hpa-la-wā . . . . . (*Garcinia speciosa*, fide Gamble) . . . . . 60

Reddish-brown, with a rather fine grain, and probably well suited for furniture.

Hpē-wun . . . . . *Berrya anonilla*, Roxb. . . . . 56

Reddish-brown, with a fine grain, dresses easily, and is well adapted for ornamental carpentry, but usually of small scantling. Seasons very slowly, never seeming thoroughly to get rid inside of a certain amount of moisture.

Hpet-thān . . . . . *Spathodea stipulata*, Wall. (fide Brandis) . . . . . 53

Pale brownish-orange, pretty close-grained, dresses easily, and when polished is a remarkably handsome wood, equal to mahogany. It is admirably adapted for furniture and fancy carpentry.

Brandis was no doubt correct in his original reference of Hpet-thān to *Spathodea*, and Gamble has followed Kurz in his error of applying the name to *Heterophragma*. Kurz is also in error in applying the name *Mahā* to the same tree. I judge this to be the case, as Gamble describes the wood of *Heterophragma* as "yellowish-white," which does not apply to 'Hpet-thān.'

- Hpet-lē-zin . . . . (Botanical name unknown) . . . . . 55  
 Very pale brownish. Runs small, but useful for light carpentry.
- Htonk-shā . . . . *Vitex leucoxylon*, L. . . . . 38  
 Pale brown, rather open grain, soft, and easily worked, but deficient in strength and readily decays. A very inferior wood. Kurz describes it as 'durable.' If so, it would do well for furniture; but I believe it to be the reverse.
- Jio . . . . . *Schleichera trijuga*, Willd. . . . . 68  
 Pale brown, very hard, close-grained, and lasting. A handsome wood when polished, but usually of rather small scantling. Valuable for all purposes demanding hardness and strength.
- Jio-bō . . . . . *Walsura villosa*, W.A. . . . . 61  
 Heartwood purplish, very hard and strong.
- Jōk . . . . . *Diospyrus cordifolia*, Roxb. . . . . 45  
 Very pale brownish, and of rather coarse fibre, adapted for ordinary purposes. No dark heartwood, or only in aged trees. This is of course the 'Chope-pen' of Kurz.
- Ka-thyt . . . . . *Erythrina ovalifolia*, Roxb. . . . . 23  
 A very light open wood, adapted for some of the purposes to which cork is put, as buoys for nets, etc. Kurz applies this name erroneously to *Pentace Burmanica*, Kz., a heavy red wood.
- Kam-lā . . . . . (Botanical name unknown) . . . . . 43  
 A tree loving salt or brackish water. Very pale brown, grain moderately fine, and fit for ordinary purposes.
- Ka-la-mat . . . . . *Cordia fragrantissima*, Kz. . . . . 47  
 A fragrant brown wood much prized by the Burmese. Kurz identifies it as above. Gamble, however, applies the name *Young Kalamat* to this species, reserving (as I understand the reference, Manual, p. 322) the name Kalamat for a species of *Santalum*. I question if Young kalamat refers to a *Cordia*, and think Kurz undoubtedly right, and still less likely is it that either apply to a *Santalum*.
- Kal-o-wē . . . . . *Cinnamomum obtusifolium*, N.E. . . . . 42  
 Very pale brown, grain moderately fine, seems adapted for planking and ordinary uses.
- Kē-u-ē . . . . . (Botanical name unknown) . . . . . 39  
 Pale brown, grain fibrous and open, suitable for coarse planking and packing cases.
- Ka-tēn . . . . . (Botanical name unknown) . . . . . 63  
 Pale orange-brown, like a pale mahogany, grain close; works up well, and when polished is a very handsome wood, and well adapted for ornamental furniture.
- Ka-thyt . . . . . (Botanical name unknown) . . . . . 42  
 Reddish-brown, grain rather fine, but a little feathery. A soft, easily-worked wood, adapted for most purposes for which *Cedar* is used, but not for pencils.
- Ka-sha-wē . . . . . (Botanical name unknown) . . . . . 38  
 Yellowish-brown, grain rather coarse, but when dressed looks well, and seems suitable for planking and light carpentry.
- Ka-nā-zo, or Pyn-lē-ka-nā-zo *Heritiera littoralis*, Dry. . . . . 66  
 Brownish-red, close-grained, hard and difficult to work, but very strong and imperishable. It is closely allied to the Bengal 'Sundri,' one of the toughest woods known, and is highly deserving of attention for all purposes demanding strength and durability. The wood seasons slowly.

Ka-nā-zo . . . . *Baccaurea sapida*, Muell. . . . .

This is an entirely different tree, and cultivated in Burma for its fruit. Its timber must not be confounded with the last, which bears the same name.

Kan-y-oung . . . . *Dipterocarpus* (?) . . . . . 48

Pale yellowish-brown, grain coarse, but works easily, and is suitable for planking and common uses.

Kan-y-in . . . . *Dipterocarpus alatus*, Roxb. . . . .

Similar to the last. The timber of *Dipterocarpus* is only worth attention from its cheapness and great scantling. It would be more valuable could any chemical process be devised for increasing its durability.

Kurz says *D. laevis* is *Kanyin-ni*, and *D. alatus*, *Kanyin-hpyu*.

Kyun-lō . . . . (Botanical name unknown) . . . . . 43

Yellowish brown, dresses easily and resembles teak, but is an inferior wood, fit only for light work.

Keun-a-lyn . . . . *Premna tomentosa*, Willd. . . . . 45

Pale yellowish, of medium grain, dresses easily and deserves attention for small articles.

Kay-zai . . . . (Botanical name unknown) . . . . . 45

Very pale yellowish-brown, close-grained and dresses easily. Seems adapted for furniture.

Koung-gouk . . . . (Botanical name unknown) . . . . . 43

Pale reddish-brown, close-grained, but an inferior wood, fit only for planking and common uses.

Kōn-tha-byē . . . . *Eugenia*, sp. . . . . 52

Pale purplish-brown, rather close-grained, but an inferior wood, good only for planking and packing cases.

Ku-zī . . . . (Botanical name unknown) . . . . . 59

Pale brown, fine-grained, but an inferior wood, fit only for planking.

Kō-kō . . . . *Albizzia lebbek*, Bth. . . . . 42

Dark brown, grain coarse and open, but an excellent furniture wood, being easy to work, handsome in appearance, and not heavy.

Kya-nān (Kyat-hnan) *Carapa?* . . . . . 47

Dark brownish-red, very much resembles mahogany. Fine-grained and easy to dress. An excellent furniture wood, and superior in every way to 'Toon.'

Kyet-mouk . . . . *Nephelium longana*, Camb. . . . . 59

Very pale brown, grain rather coarse and irregular. A good second-class wood for planking and common carpentry.

Kyet-yō . . . . *Vitex pubescens*, Vhl. . . . . 61

Yellowish brown, or nankin colour. Hard and close-grained, and a handsome furniture wood, taking a beautiful polish, and lighter in colour than most similar woods. Gamble gives its weight as 55 lbs.; but picked samples as above run heavier even when fully seasoned.

Lē-yō . . . . (Botanical name unknown) . . . . . 52

Pale reddish-brown, heartwood very dark. Fine-grained, but an inferior wood, useful perhaps for toys and fancy carpentry.

Lē-myor . . . . (Botanical name unknown) . . . . . 43

Pale reddish-brown, rather coarse in grain, but suitable for planking and common carpentry.

- Laī-zā . . . . . *Lagerstræmia tomentosa*, Presl. . . . . 39  
 Very pale brown, grain rather fine, but fit for planking and coarse carpentry only.
- Ma-da-mā . . . . . (Botanical name unknown) . . . . . 65  
 Orange-red, hard, fine and straight-grained, but very fissile. A favourite wood for knife or sword handles, sticks or the like, and posts, being very durable.  
 Kurz applies this name (incorrectly I think) to two species of *Dalbergia* (*D. glauca* and *ovata*).
- Mani-ok-khā . . . . . *Carallia lucida*, Roxb. . . . . 47  
 Pale orange-yellow, fine-grained, but feathery; dresses easily, but has no great strength. It would make a good furniture wood, as it looks well when polished.
- Ma-ji. . . . . *Tamarindus Indica*, L. . . . . 86  
 Heartwood dark purple. Sapwood pale yellowish. Intensely hard and close-grained, the heartwood being one of the most imperishable woods I know. A splendid ornamental wood for massive carved furniture, but costly to work, and never used. No workman could carve it without specially tempered tools. Highly to be commended for turnery, blocks, etc., as a substitute for *lignum vitæ*.
- Mā-tha-lē. . . . . (Botanical name unknown.)
- Mā-u. . . . . *Sarcocephalus cadamba*, Miq. (*vide* Kurz). . . . . 37  
 Light yellow, soft and easily worked, and therefore much used for common carpentry, but terribly liable to the attacks of xylophagous coleoptera. Having no specimen of this wood, I follow Brandis, as Kurz is certainly wrong in giving 73 lbs. as its weight.
- Mā-ū-ka-dun . . . . . *Sarcocephalus cordatus*, Miq. (*vide* Kurz). . . . . 37  
 Light yellow, close-grained and easily dressed, and a good wood for light carpentry. Selected planks display a pretty dotted or mapled grain.
- Mōng-theh-ōk . . . . . (Botanical name unknown) . . . . . 53  
 Reddish-brown, fine-grained and easily dressed. Would probably prove a good second-class furniture wood and adapted for indoor work, not requiring great strength.
- Mi-ai-ā . . . . . *Grewia microcos*, L. . . . . 45  
 Very pale reddish-brown, fine-grained, and would serve for planking and coarse carpentry.
- Mi-na-bān. Myet-hna-bān. . . . . (Botanical name unknown). . . . . 55  
 Pale, or whitish, hard and very close-grained. A good wood for ordinary carpentry purposes, planking, etc., and as a substitute for 'Box.'  
 This is I believe the so-called Martaban lance-wood. Kurz applies the name to a shrub, *Strobilanthes flava*.
- Myouk-na-doung . . . . . *Cassia auriculata*, L. . . . . 52  
 Pale orange-brown, grain coarse, but wood strong and esteemed for rough uses.
- Myouk-meng-thwē-gē (Botanical name unknown) . . . . . 50  
 The name signifies "*The blood-gouts of the monkey king.*"  
 Pale coloured, rather fine-grained, but little used save for bows and spears, for which it is highly esteemed. Whence its vernacular name I cannot say.
- Myouk-shor . . . . . *Homalium tomentosum*, Bth. . . . . 62  
 Pale yellowish-brown, close-grained, but little esteemed. It probably decays rapidly under exposure, but from its abundance and large scantling is deserving attention for coarse indoor work, planking, etc.  
 Gamble says the wood is 'durable,' which requires confirmation.
- Myouk-goung . . . . . (Botanical name unknown) . . . . . 43  
 Pale yellowish-brown or yellow, open grain, but an excellent light furniture wood resembling *Young-ben*, and perhaps some species of *Artocarpus*.

- Na-bhê . . . . . *Odina woder*, Roxb. . . . . 39  
 Pale reddish-brown, grain a little coarse, but a good second-class wood for furniture and indoor carpentry, planking, etc.
- Na-ji. . . . . *Pterospermum lanceaefolium*, Roxb. . . . . 41  
 Pale brown, grain rather coarse. An inferior wood of small scantling, might be used for toys and small domestic articles.
- Nē-u-ē . . . . . *Placourtia cataphracta*, Roxb. . . . . 56  
 Very pale reddish, with many dark knots (thorns), close-grained, but works unkindly, and is of small scantling. It might serve for toys or turning.
- Ngū or Ngū-gyi . . . *Cassia fistula*, L. . . . . 53  
 Brown, with a slight orange tint, fine-grained, hard, and imperishable, but of small scantling. Good for tool handles and purposes demanding hardness and durability.
- Ngu-shwē . . . . . *Cassia renigera*, Kurz . . . . . 54  
 Wood similar to the last.
- Ngān-pē-yōk . . . . (Botanical name unknown) . . . . . 52  
 Bright brown, with a close grain, and often mottled or clouded. Looks very well when polished, and is an admirable wood for ornamental furniture, though deficient in strength. Might veneer well.
- Ōng-dē-bō . . . . . (Botanical name unknown) . . . . . 35  
 Pale brownish-yellow, of a rather coarse and open grain, fit only for packing cases and common purposes.
- Onk-ehyn-zā . . . . . *Diospyros chretoides*, Wall. . . . . 47  
 Dark greyish, paler streaked, no black heartwood, grain a little coarse, but would prove a good furniture wood and useful for planking and common purposes. The name signifies "Hornbill's food." The tree determined as above was felled by myself and identified by Kurz.
- Pa-dē. . . . . (Botanical name unknown) . . . . . 55  
 Pale brownish-red, fine-grained and esteemed, I believe, for boxes and small articles; might answer for some sorts of ornamental carpentry.
- Pal-en . . . . . *Casuarina equisetifolia*, Forst. . . . . 61  
 Pale reddish-brown, close-grained, hard and imperishable, but difficult to work, and not a handsome wood. Excellent where strength and hardness are required.
- Pāu-tha-gā . . . . . (Botanical name unknown) . . . . . 53  
 Brownish-red, with an open grain, but rather crooked or feathery. Would answer well for planking and boxes and common carpentry.
- Pa-douk . . . . . *Pterocarpus Indicus*, Wall., and *P. macrocarpus*, Kz. 61  
 Red, hard, strong, and imperishable, grain rather crooked, and when so, difficult to dress, but a first-class wood, unsurpassed for general utility.
- Pein ē . . . . . *Artocarpus integrifolia*, Willd. . . . . 53  
 Pale orange-brown, loose-grained, but dresses easily, and is an excellent furniture wood.
- Pein-ē lō . . . . . (Botanical name unknown) . . . . . 44  
 Like the last, but a browner wood, would answer the same purposes.
- Pyn-dor-thēn . . . . (Botanical name unknown) . . . . . 58  
 Pale brownish red, would answer for planking and common carpentry.
- Pwai-nyet . . . . . *Calophyllum inophyllum*, L. . . . . 41  
 Pale brownish-red, tough, and cross-grained, and well fitted for spars, the

celebrated 'Poon' spars being probably cut from a species of *Calophyllum*, if not from the present tree. Good for coarse carpentry.

Pyeng-mā . . . . *Lagerstræmia flos-reginæ*, Retz. . . . . 39

Reddish-brown, a coarse-looking wood, but useful for house carpentry and furniture, dressing easily and being not too heavy, as is so commonly the case with handsomer woods.

Pyan-ān. . . . *Carapa obovata*, Bl. (?) . . . . . 46

Dark red, selected planks look as well when polished as mahogany. A first-class furniture wood, and good for house carpentry and general use.

Kurz applies the name Pyn-lē-ōng to both *Carapa obovata* and *C. Molluccensis*.

Pyn-lē-ōng . . . . *Carapa Molluccensis*, Lam. . . . . 44

Similar to the last, and an excellent substitute for mahogany, for furniture and ornamental carpentry. Is intermediate in looks between mahogany and cedar.

Pyn-lē-ka-nā-zo, see Ka-nā-zo.

Pyn-ga-dō . . . . *Xylia dolabriformis*, Bth. . . . . 68

Brownish-red, hard, close-grained, strong and imperishable. For strength and durability has no superior.

Shā . . . . . *Acacia catechu*, Willd. . . . . 69

Brownish-red, hard, strong, and imperishable. It dresses easily, and, when polished, looks like mahogany. But that it is very fissile and apt to split, it would for hardness and durability have no superior; old stumps exposed to the weather seeming to defy its influence, as though made of iron.

Shā-hpyu. 'White Shā.' *Cicca emblica*, L. . . . .

Kurz incorrectly calls this tree *Ta-sha-pen*. At all events throughout Pegu it is only known as the 'White Shā.'

The wood is said to be durable under water, and so of use in timbering the sides of wells and such purposes.

Shām-pai-ōk . . . (Botanical name unknown) . . . . . 42

Reddish-brown. A second-class wood for coarse carpentry.

Sow-yō . . . . *Walsura robusta*, Roxb. . . . . 57

Pale yellow, rather coarse-grained, but very tough and strong. A coarse but valuable timber where strength is desired, as for house carpentry, etc. I am not sure however if the specific name is correctly determined. Balfour gives its vernacular name as "Joe-boe" (sic), jio-bō, which is *Schleichera trijuga*! Kurz gives "Gyo-pho" (jio-bō or hpyu? which I do not know). Perhaps both names may be applied to the same tree, and it is called Sow-yō in Tenasserim. Mason says it is a *Dalbergia*.

Syn-nen-thayet . . *Mangifera sylvatica*, Roxb. . . . . 30

Grey, coarse-grained, and fit only for coarse carpentry and rough boxes. It resembles mango wood, but is not so strong.

Syt . . . . . *Albizzia procera*, Bth. . . . . 34

Pale yellowish-brown, open fibrous grain, but dresses easily and takes a good polish. An excellent wood for furniture, being very light and good-looking.

Swē-dōr, or Sowē-dō (Botanical name unknown) . . . . .

A strong, hard wood of Tenasserim, of which I only know the name.

Tar-hpi . . . . *Calophyllum inophyllum* . . . . . 35

Pale brownish-red, soft, and easily worked. Excellent for light carpentry, and resembles cedar in appearance.

Tē . . . . . *Diospyros Burmanica*, Kz. . . . . 53

Pale greyish-yellow, rather streaky. A strong wood for coarse carpentry, but of small scantling. The name Tē is applied probably to other species of *Diospyros*.

Tēn or Tein . . . *Nauclea parvifolia*, Roxb. . . . . 57

Pale greyish-yellow, rather fine-grained, and seems well fitted for common carpentry, though rather heavy for furniture.

Thā-hlwin . . . *Olea dioica*, Roxb. . . . . 39

Pale yellowish-brown, fine-grained, and easy to work. An excellent wood for furniture and indoor carpentry. This tree gives its name to the 'Salween' River, as it is commonly called.

Tha-mē . . . *Aricennia officinalis*, L. . . . . 47

A coarse cross-grained wood, little used except for rice mortars, for which its interlacing fibres well fit it. It is a tree of the delta and tidal region.

Gamble (Brandis) describes this wood (Manual, p. 300) as "very brittle," which is singularly erroneous, as from the interlacing of its fibres it is one of the most difficult, I may say impossible, woods to split that grows. On this account it is selected to make the large mortars wherein rice is husked in a Burman's house.

Tha-mein-hpyu . . *Gardenia sessiflora*, Wall. . . . . 60

Hard, reddish-white, and close-grained, but brittle. Seems adapted for turning and fancy work.

Tha-kūt-mā . . . *Spathodea Rheedei*, Wall. . . . . 35

Very pale reddish-white or grey. Seems a fair timber for indoor use, and being light might be useful for common furniture.

Tha-noung . . . *Acacia Suma*, Buch. . . . . 43

Pale orange-red. Wood very coarse, but strong and tough. Would do for coarse work only.

Tha-lē . . . *Symplocos leucantha*, Kz. . . . . 39

Pale reddish-brown, straight, and fine-grained, and suitable for furniture and light carpentry.

Tha-kut-hpyu, or Tha-kwot-hpo *Stereospermum chelonoides*, DC. . . . .

Thān-hlwyn . . . *Eleoarpus*. . . . .

Thayet . . . *Mangifera Indica*, L. . . . . 42

Grey, or pale greyish-brown, coarse and open grain, but strong and tough, and suited for coarse carpentry. The wood is said to hold a nail more firmly than any other. Commonly used for packing cases, but selected planks make very tolerable furniture.

Thayet-thyt-si. . . *Gluta Tavoyana*, Wall. . . . . 52

I have seen the name Chē-thē applied to this wood, but I consider, from the character of the wood, that Thayet-thyt-si is the correct name, as the wood much resembles *Melanorrhœa* (Thyt-si). The wood is dark red, with a handsome grain, and in appearance is not inferior to mahogany. It is a first-class furniture and ornamental wood. Of the Indian allied species, *G. travancorica*, Gamble remarks: "The wood is little used, but its splendid colour and markings should rapidly bring it to notice as a valuable wood for furniture. It seems to season very well, and works and polishes admirably."

Thi-dyn . . . (Botanical name unknown). . . . . 45

Very pale brown. A coarse wood suitable for boxes and common purposes.

Thi-wyn . . . *Millettia leucantha*, Kz. . . . . 63

Dark purplish-brown, when fresh, purplish. Hard, cross-grained, very tough and durable. An excellent wood where great strength and durability are sought.

Kurz applies the name *Theng-weng*, or *Thin-win*, to two distinct trees, e.g. *Pongamia glabra* and *Millettia leucantha*. Brandis also refers it to *Pongamia*, but Kurz transfers Brandis' description of the wood of *Pongamia* to his *Millettia leucantha*, describing the wood of *Pongamia* as white and light. The *Thi-wyn* is certainly a

dark wood, such as in the trade would pass as a 'rosewood,' and one of the toughest known; and I have here preferred relying on Kurz rather than Brandis, but the two authorities are in direct contradiction.

Selected planks of *Thi-wyn* would make handsome furniture, but would be very heavy and very difficult to dress. The wood, however, would probably answer well for turning.

Thi-wyn-pouk-hpyu . (*Dalbergia* ?) . . . . . 59

Pale yellow, coarse-grained and strong, but seems liable to the attacks of insects. Useful for rough carpentry.

Thy-i-ā . . . . . *Shorea obtusa*, Wall. . . . . 67

Yellowish-brown; a handsome close-grained wood, very strong and durable, resembling in its properties the Sāl of India, but darker in colour. It is a first-class wood, though too heavy for furniture, and not easy to work up. For house carpentry it is rivalled by few woods.

Thym-ma-ji . . . . . *Albizzia odoratissima*, Bth. . . . . 54

Rich brown, with the *Albizzia* grain, dresses easily, and would make very handsome furniture equal to walnut. An excellent wood for ornamental and general carpentry.

Thy-myn, or Thyt-myn . *Nageia bracteata*, Kz. . . . . 41

Pale brownish-yellow, close-grained.

Thyn-ga-du . . . . . *Anisoptera glabra*, Kz. . . . . 40

Pale brown, very coarse and open grain, well fitted for making canoes, but an inferior wood for carpentry purposes.

Thyn-gān-net . . . . . *Hopcia odorata*, Roxb. . . . . 48

Yellowish-brown, close but rather wavy grain, easily worked, strong and durable.

A first-class furniture wood used for general carpentry. The freshly cut wood darkens rapidly on exposure to the air.

Thyn-gān-wā . . . . . (Botanical name unknown) . . . . . 46

Similar to the last, but a little paler in colour.

Thyt-kā . . . . . *Pentace Burmanica*, Kz. . . . . 37

Reddish-brown or pale reddish-brown. Soft, fine-grained, and easy to work, but of rather feathery fibre, a good wood for cigar boxes and such purposes as 'cedar' is applied to, but is of no great strength, and unsuitable for outdoor exposure.

Kurz calls it *Pentace Burmanica*, but as he describes the wood as "rather heavy," it cannot be the same as known to me by the name, as *Thyt-kā* is certainly not a heavy wood, but the name is probably applied to more woods than one.

Thyt-ka-do (*scented wood*) *Cedrela toona*, Roxb. . . . . 34

Pale reddish-brown, rather coarse-grained, easily worked, and, when freshly cut, having a delicious scent. This wood is the 'Toon' of India, so largely employed for furniture, but is subject to the attack of insects, and furniture made of it often possesses the unpleasant habit of creaking at night, which might, however, be probably obviated by varnishing and so rendering it less susceptible of hygrometric changes.

Thyt-lyn-dā . . . . . *Heterophragma sulphurea*, Kz. . . . .

Thyt-pyoung . . . . . (Botanical name unknown) . . . . . 48

Pale brownish-yellow, rather fine-grained and easily worked. Seems suitable for furniture and indoor work.

Thyt-si . . . . . *Melanorrhæa usitata* . . . . . 57

Dark brownish-red, fine-grained, and a good substitute for mahogany in appearance, but more brittle. An excellent wood for furniture and fine carpentry.

Thyt-si-bō . . . . . . . . . . 54

Reddish-brown, fine-grained, easily dressed, and takes a good polish. It resembles Thyt-si, but is not so red and not quite so heavy. My specimen was obtained in the Bassein district, but I could not discover the tree which produced it.

Thyt-so-ay-lē . . . *Schrebera swietenoides*, Roxb. . . . . 47

Kurz recommends this wood as hard and durable, and as not given to warping. Gamble says the wood is "durable, works freely, and does not warp or split."

Thyt-to . . . . . (Botanical name unknown) . . . . . 35

Very pale reddish-grey, easy to dress and rather close-grained. Seems suitable for indoor carpentry and ordinary furniture.

Touk-kyān . . . . *Terminalia crenulata*, Roth. . . . . 70

Dark brown, close-grained, hard and durable. An excellent first-class timber for all purposes, too heavy perhaps for ordinary furniture, though handsome, and, allowing for its hardness, not difficult to work. Gamble says 37 lbs. is its average weight; but this is far too low.

Toung-ben . . . . *Artocarpus chaplasha*, Roxb. . . . . 34

Pale reddish-brown, rather coarse grain, but easily worked, and suitable for furniture and general carpentry purposes, where no great strength is required.

Toung-gān-gor . . . (Botanical name unknown) . . . . . 75

Pale yellowish-brown, very close-grained and intensely hard. One of the strongest, hardest and most durable woods known, and a first-class wood for all purposes calling for strength and durability. It is a very handsome wood as well, taking a superb polish. I do not think either Kurz or Gamble notice it.

Toung-ka-la-mat . . *Cordia fragrantissima*, Kz. (?) . . . . . 47

Brown, rather fine-grained and easily worked, and suitable for furniture and light carpentry, and a rather handsome wood. See *Ka-la-mat*.

Toung-ma-ji . . . *Elaeocarpus floribundus*, Bl. . . . . 46

Pale purplish-red, rather fine-grained and easy to work. Seems suitable for light carpentry.

Toung-mhu. . . . . (Botanical name unknown).

A large tree used for making canoes. Wood light and suitable for light carpentry.

Toung-pa-dē . . . (Botanical name unknown) . . . . . 45

Very pale reddish-brown, coarse and fibrous, fit only for the commonest purposes.

Toung-tha-but . . . (Botanical name unknown) . . . . . 44

Pale yellowish-grey. A rather fine-grained, but an inferior wood.

Toung-tha-lē . . . *Garcinia Kydia*, Roxb. . . . . 46

Very pale brown, rather fine-grained and easy to work, and seems adapted for light carpentry. Kurz says it is very perishable, but this probably is only the case under exposure to the weather.

Tseit-ki or Tseit-chē. *Briedelia retusa*, Spreng. . . . . 39

Pale brownish or greyish. A somewhat coarse but strong useful timber for house carpentry. Its name 'goat's-dung' is due to the spotted appearance the planks display, when one of the imbedded dark woody thorns with which the young tree is armed is cut through, these thorns in section bearing a fanciful resemblance to a dried currant, or to goat's dung.

Tseit-ki-hpa-lān . . *Briedelia*, sp. . . . . 45

Reddish-brown, not much used.

Yē-bi-mā . . . . . (Botanical name unknown) . . . . . 51

Reddish-brown, fine-grained and works easily. Well adapted for light carpentry.

- Yem-a-nen . . . . (Botanical name unknown) . . . . . 42  
 Very pale buffish-yellow, fine-grained, with a satin lustre, and something like bird's-eye maple. A good wood for fancy carpentry.
- Yē-myaing. . . . . (Botanical name unknown).  
 Pale brown. An inferior wood.
- Yen-daik . . . . . *Dalbergia cultrata*, Grah. . . . . 58  
 Sapwood white and said to be perishable, but deserves trial for indoor work. Heartwood dark brown, or blackish, very hard, tough and imperishable. An excellent wood where great strength and toughness are desired. The weight of my specimen is unusually low from excessive seasoning. Gamble gives a more general average at 69 lbs.
- Yen-gāt. . . . . *Gardenia coronaria*, Ham. . . . . 53  
 Pale yellow, hard and brittle, an inferior wood, that might be used for combs and small wares.
- Yeng-bāt . . . . . (Botanical name unknown) . . . . . 50  
 Pale yellow, fine-grained and dresses well. Might be used as a substitute for 'box' for combs and fancy articles.
- Yeng-zāt . . . . . (*Dalbergia*, sp.?) . . . . . 75  
 Purplish-black, very close-grained, hard, strong and durable. A good substitute for *ebony*, though more fibrous in grain.
- Yi-mā . . . . . *Chikrassia tabularis*, Juss. . . . . 53  
 Pale reddish-brown, rather close-grained, and easy to work. An excellent furniture wood, commonly known as 'Chittagong' wood.
- Yōng . . . . . *Anogeissus acuminata*, Wall. . . . . 51  
 Very pale reddish-yellow, rather fine-grained, but an inferior wood, and I believe very subject to the attacks of insects before it is seasoned. Seems adapted for coarse carpentry only. Kurz recommends it for indoor use.
- Zam-ba-lē . . . . . (Botanical name unknown) . . . . . 42  
 Pale yellowish-grey. Rather coarse-grained, and fit only for common uses.
- Zi-hpyu . . . . . (Botanical name unknown) . . . . . 49  
 Pale reddish, rather fine-grained, but an inferior wood. Would do for coarse work and packing cases.
- Zym-byun . . . . . *Dillenia pentagyna*, Roxb. . . . . 46  
 Pale brown, close-grained, and seems a good wood for general carpentry.

## APPENDIX B.

## VERNACULAR NAMES OF BURMESE PLANTS.

Aik-mwē-nweh . . . . .	<i>Embolia robusta.</i>
A-kyor . . . . .	<i>Aquillaria agallocha.</i>
Ā-nān . . . . .	<i>Fagraea fragrans.</i>
Ā-nān-bō (or hpyu) . . . . .	<i>Crypteronia paniculata.</i>
A-pang . . . . .	<i>Achyranthes aspera</i> (Balfour).
A-tha-wa-di . . . . .	<i>Passiflora.</i>
A-thor-kā . . . . .	<i>Amherstia nobilis.</i>
A-thor-kā-bō . . . . .	<i>Saraca Indica.</i>
Au-zā . . . . .	<i>Anona squamata</i> and <i>reticulata.</i>
Ay-ka-yit . . . . .	<i>Millingtonia hortensis.</i>
Ba-la (or Pa-la) . . . . .	<i>Elettaria cardamomum.</i>
Ba-lu-let-wā . . . . .	<i>Heptapleurum venulosum.</i>
Ba-lu-wā . . . . .	<i>Abelmoschus esculentus.</i>
Ba-lu-wā-gyi . . . . .	<i>A. moschatus.</i>
Bam-bwē . . . . .	<i>Careya arborea.</i>
Bam-bwē-nweh . . . . .	<i>Ancistrocladus Griffithii.</i>
Ba-mor . . . . .	<i>Tetranthera grandis.</i>
Ban-khā . . . . .	<i>Terminalia bellerica.</i>
Ba-shu . . . . .	<i>Mimusops littoralis.</i>
Ba-wā-net . . . . .	<i>Justicia gendarussa.</i>
Bē-byā . . . . .	<i>Cratoxylon neriifolium</i> (Kurz).
Beh-kyo . . . . .	<i>Clerodendron serratum</i> (Kurz).
Ben . . . . .	<i>Cannabis sativa.</i>
Bet-mwē-shor . . . . .	<i>Paritium macrophyllum.</i>
Bet-yā . . . . .	<i>Tragia involuerata.</i>
Bi-zat . . . . .	<i>Spilanthes.</i>
Bō-da-tha-ra-nā . . . . .	<i>Cinna Indica.</i>
Bok-net . . . . .	Zebra wood of Tavoy.
Bō-meh-zā . . . . .	<i>Albizia stipulata.</i>
Bor . . . . .	<i>Travisia palmata.</i>
Bor-thi-dyn . . . . .	<i>Rottlera tinctoria.</i>
Bouk-wā . . . . .	<i>Bambusa, sp.</i>
Bu-di-nā . . . . .	<i>Mentha sylvestris.</i>
Bu-gyi-hpyu . . . . .	<i>Clerodendron viscosum.</i>
Bu-gyi-ni . . . . .	<i>C. squamatum.</i>
Bu-hsen-swēh . . . . .	<i>Lagenaria vulgaris.</i>
Bu-ta-let . . . . .	<i>Elaeocarpus lacunosus</i> (Kurz).
Bu-ta-yet . . . . .	<i>Egiceras corniculata.</i>
Bwē-zyn . . . . .	<i>Bauhinia variegata</i> and <i>Malabarica.</i>
Byin-hsen . . . . .	<i>Antidesma ghæsembilla.</i>

Byn . . . . .	<i>Cannabis sativa.</i>
Byn-gā . . . . .	<i>Nauclea rotundifolia.</i>
Byu-ben (or Hpyu) . . . . .	<i>Dillenia pulcherrima</i> and <i>pentagyna.</i>
Chā-thoung-wā . . . . .	<i>Bambusa polymorpha.</i>
Chā-yā . . . . .	<i>Mimusops elengi.</i>
Chē . . . . .	<i>Semecarpus panduratus</i> and <i>albescens.</i>
Chē-ni . . . . .	<i>Barringtonia acutangula.</i>
Chē-thā (or dā) . . . . .	<i>B. pterocarpa.</i>
Chē-thē . . . . .	Tavoy red wood.
Chōk-ben (or Chōp-ben). . . . .	<i>Diospyros montana</i> and <i>cordifolia.</i>
Choun-douk . . . . .	<i>Paysonia multijuga.</i>
Choung-yā . . . . .	<i>Colosanthus Indica.</i>
Chyn-boung-hpyu . . . . .	<i>Hibiscus.</i>
Chyn-douk-nweh-zouk . . . . .	<i>Vitis latifolia.</i>
Chyn-thyā-lek-nweh . . . . .	<i>Hymenopyramis brachiata.</i>
Chyn-y-ōk . . . . .	<i>Garuga pinnata.</i>
Chyn-u-wē . . . . .	<i>Abrus precatorius.</i>
Da-mā-ngeh-nweh . . . . .	<i>Milletia extensa.</i>
Dān . . . . .	<i>Lawsonia alba.</i>
Dān-da-let . . . . .	<i>Impatiens balsamina.</i>
Dān-kyweh . . . . .	<i>Cassia tora.</i>
Da-ni . . . . .	<i>Nipa fruticans.</i>
Da-noung . . . . .	<i>Calamus arborescens.</i>
Dan-yat . . . . .	<i>Symplocos racemosa.</i>
Da-tha-lwōn . . . . .	<i>Moringa pterosperma.</i>
Da-weh-hmaing . . . . .	<i>Lumnitzera racemosa</i> (Tavoy, Mason).
Dhē-lē-ben . . . . .	<i>Symplocos leucantha.</i>
Dī-du . . . . .	<i>Bombax Malabaricum.</i>
Dōk-ka-tet (let) . . . . .	<i>Connarus.</i>
Douk-loung . . . . .	<i>Dalbergia reniformis</i> (Mason).
Douk-let . . . . .	<i>Ficus.</i>
Douk-ta-louk . . . . .	<i>Dalbergia glauca.</i>
Douk-ta-loung-nweh . . . . .	<i>D. stipulacea.</i>
Douk-ya-mā . . . . .	<i>Turpinia Nipalensis.</i>
Douk-yat . . . . .	<i>Photinia.</i>
Doung-kyet-tet . . . . .	<i>Cudrania pubescens.</i>
Doung sāp (or sōk) . . . . .	<i>Casalpinia pulcherrima.</i>
Doung-tsat-pyā . . . . .	<i>Callicarpa arborea.</i>
Du-yin . . . . .	<i>Durio zibethinus.</i>
Du-yin-yaing . . . . .	Wild durian.
Dwā-bōk . . . . .	<i>Kydia calycina.</i>
Dwā-ni . . . . .	<i>Eriolæna Candollei.</i>
Dwōt-ta-bat . . . . .	<i>Achras sapota.</i>
Eing-bi-zāt . . . . .	<i>Spilanthes paniculata.</i>
En-daik, see Yen-daik.	
Eng . . . . .	<i>Dipterocarpus tuberculatus.</i>
En-gyen . . . . .	<i>Aporosa macrophylla</i> (Kurz).
Enjin . . . . .	<i>Pentacme Siamensis.</i>
Gan-gor (or Ken-gor) . . . . .	<i>Mesua ferrea.</i>
Gōn-nyin-ya . . . . .	<i>Breynia rhamnoides.</i>
Gung-men . . . . .	<i>Anomum corymbostachyum.</i>
Gwē . . . . .	<i>Spondias mangifera.</i>
Gyen-baing . . . . .	<i>Basella alba.</i>
Gyeng-ma-ōk . . . . .	<i>Ardisia humilis</i> and <i>anceps.</i>
Gyen-gā . . . . .	<i>Mollugo spargula.</i>
Gyung-sa-bā . . . . .	<i>Triticum sativum.</i>
Gynt-nweh . . . . .	<i>Gnetum edule</i> and <i>paniculare.</i>
Hen-ka-lā . . . . .	<i>Spilanthes acmella.</i>

Hēn-ka-nweh . . . . .	<i>Amaranthus spinosus.</i>
Hkor-kwā . . . . .	<i>Capparis grandis.</i>
Hleh-zā (or Lai-zā) . . . . .	<i>Lagerstramia tomentosa.</i>
Hlōng or Hlung . . . . .	<i>Ocimum villosum.</i>
Hmaing . . . . .	<i>Lumnitzera racemosa.</i>
Hmān . . . . .	<i>Feronia elephantum, Randia, Gardenia.</i>
Hmān-hpyu . . . . .	<i>Randia uliginosa.</i>
Hmān-ni . . . . .	<i>Gardenia erythroclada.</i>
Hmān-thyn (or thēn) . . . . .	<i>Curcuma Roscoeana.</i>
Hmān-then . . . . .	<i>Sassafras (Mason).</i>
Hmi-a-sait (or sēk) . . . . .	<i>Antiaris toxicaria.</i>
Hmo . . . . .	<i>Arca catechu.</i>
Hmo-a . . . . .	<i>Grewia.</i>
Hmyin-wā . . . . .	<i>Dendrocalamus strictus.</i>
Hnān-ben . . . . .	<i>Nauclea cordifolia.</i>
Hnān or (Hnān-mā) . . . . .	<i>Sesamum Indicum.</i>
Hnān-peh . . . . .	<i>Odina wodier.</i>
Hnen-hsi . . . . .	<i>Rosa.</i>
Hnet-pyā . . . . .	<i>Musa paradisiaca.</i>
Hnor . . . . .	<i>Nauclea cordifolia.</i>
Hnyn-ek . . . . .	<i>Clerodendron.</i>
Hpa-lā . . . . .	<i>Elataria.</i>
Hpa-lān . . . . .	<i>Bauhinia racemosa.</i>
Hpa-la-wā . . . . .	<i>Garcinia speciosa.</i>
Hpa-yong-khā . . . . .	<i>Cucurbita maxima.</i>
Hpa-young-ben . . . . .	{ <i>Allamandra cathartica</i> (Mason). <i>Theretia neriiifolia</i> (Kurz).
Hpet-thān . . . . .	<i>Heterophragma adnophylla.</i>
Hpet-yā . . . . .	<i>Tragia</i> (Mason).
Hpet-yā-gyi . . . . .	<i>Laportea erenulata.</i>
Hpet-wun (or Hpē-wun) . . . . .	<i>Berrya amonilla.</i>
Hpōn-ma-thēn . . . . .	<i>Blumea grandis.</i>
Hpoung-gā . . . . .	<i>Saccharum procerum.</i>
Hpwe-to-ma . . . . .	<i>Calamus.</i>
Hpyu . . . . .	<i>Rhizophora mucronata and conjugata.</i>
Hpyin-hsēn-swē . . . . .	<i>Lagenaria vulgaris.</i>
Hpyu . . . . .	<i>Dillenia pulcherrima.</i>
Hpyu-soung . . . . .	<i>Bruguiera parviflora.</i>
Hsā-nwen . . . . .	<i>Curcuma longa.</i>
Hsat-le-kyoung . . . . .	<i>Commelina caespitosa.</i>
Hsat-la-hpyu . . . . .	<i>Pandanus odoratissimus.</i>
Hsat-thwē-gyi . . . . .	<i>P. furcatus.</i>
Hsch-than-byā . . . . .	<i>Gelonium bifarium.</i>
Hsē-ma-gyi . . . . .	<i>Vangueria spinosa.</i>
Hsē-than-pay-a } . . . . .	{ <i>Gardenia campanulata.</i>
Hsē-than-bya } . . . . .	{ <i>Randia longispina.</i>
Hsen-dōng-mā-nweh . . . . .	<i>Tinospora nudiflora.</i>
Hsen-ka-dē . . . . .	<i>Solanum ferox.</i>
Hsen-mā-nō-pyin (or Sin-ma- no-pyin). . . . .	{ <i>Grewia abutilifolia</i> (Kurz). <i>Bridelia stipularis</i> (Kurz).
Hsen-nen-thayet . . . . .	<i>Mangifera sylatica.</i>
Hsen-ngō-myt . . . . .	<i>Eleusine Indica.</i>
Hsen-thu-hpān . . . . .	<i>Ficus regia and Roxburghii.</i>
Hsen-weh . . . . .	<i>Ochna squarrosa.</i>
Hsi . . . . .	<i>Nicotiana tabacum.</i>
Hsi-lē . . . . .	<i>Daphne pendula.</i>
Hsi-mi-tonk . . . . .	<i>Methonica superba.</i>
Hseik-ba-lu . . . . .	<i>Nyctanthes arbor-tristis.</i>

Hseik-chē . . . . .	<i>Pancoria rubiginosa.</i>
Hseik-gyi . . . . .	<i>Bridelia retusa.</i>
Hsu . . . . .	<i>Carthamus tinctorius.</i>
Hsu-kouk . . . . .	<i>Cæsalpinia paniculata.</i>
Hsu-kyan-bō . . . . .	<i>C. sepiaria.</i>
Htaip-kouk-pen . . . . .	<i>Gualtheria lateriflora</i> (Kurz).
Hta-men-sā-hpyu . . . . .	<i>Gardenia sessiflora.</i>
Hta-men-sā-ni . . . . .	<i>G. turgida.</i>
Hta-men-tsōk-gyi . . . . .	<i>Agaveia coccinea.</i>
Htan . . . . .	<i>Borassus flabelliformis.</i>
Htan-myōuk-lu . . . . .	<i>Livistonia speciosa.</i>
Htat-ta-yā . . . . .	<i>Calendula officinalis.</i>
Htēk-kouk-ben . . . . .	<i>Gualtheria laterifolia.</i>
Htein (or Htēn) . . . . .	{ <i>Nauclea parvifolia</i> (Kurz).
Htein-ga-lē (or ka-lū) . . . . .	{ <i>N. cordifolia</i> (Mason).
Hti-ka-yōng . . . . .	<i>N. sessifolia.</i>
Hti-wā . . . . .	<i>Mimosa pudica.</i>
Htōuk-kyān . . . . .	<i>Bambusa regia.</i>
Htōuk-mā . . . . .	<i>Terminalia alata and crenulata.</i>
Htōuk-shā . . . . .	<i>Drepanocarpus reniformis</i> (Kurz).
Htōuk-shā-mā . . . . .	<i>Vitex leucocylon.</i>
Htōuk-tā . . . . .	<i>Turpinia pomifera.</i>
Htōuk-yat . . . . .	<i>Tacca pinnatifida.</i>
Htwā-ni, see Dwā-ni.	<i>Putranjiva Roxburghii.</i>
Htyn-yu . . . . .	<i>Pinus khasya.</i>
In-jyn (or In-kyin) . . . . .	<i>Aporosa macrophylla.</i>
Jio (or Jyo) . . . . .	<i>Schleichera trijuga.</i>
Jio-bō . . . . .	<i>Walsura villosa.</i>
Jio-hpyu . . . . .	<i>W. robusta.</i>
Jok . . . . .	<i>Diospyros cordifolia.</i>
Ka-byaing . . . . .	<i>Cerriops Roxburghiana.</i>
Ka-dāt (or Ka-tāt) . . . . .	<i>Cratara Roxburghii.</i>
Ka-dāt-guān . . . . .	<i>Cananga odorata.</i>
Ka-du . . . . .	<i>Blumea</i> (Kurz).
Ka-dwē-u . . . . .	<i>Dioscora fasciculata.</i>
Ka-dwōt . . . . .	<i>Ficus hispida.</i>
Kaing-tha-hpo-gyi . . . . .	<i>Symplocos.</i>
Ka-long-lek-theh . . . . .	<i>Phyllanthus columnaris.</i>
Ka-la-mat . . . . .	<i>Cordia fragrantissima.</i>
Ka-lā-peh . . . . .	<i>Cicer orietinum.</i>
Ka-lā-zoung . . . . .	<i>Opuntia Dillenii.</i>
Ka-lā-zoung-let-wā . . . . .	<i>O. cochinillifera</i> (Mason).
Ka-lēng (or Ka-lein). . . . .	<i>Cæsalpinia bonduc.</i>
Ka-let . . . . .	<i>Leea staphylea and sambucina.</i>
Ka-let-thaing . . . . .	<i>L. crispa.</i>
Ka-long-lek-theh . . . . .	<i>Phyllanthus columnaris</i> (Kurz).
Ka-lor . . . . .	<i>Cassia occidentalis.</i>
Ka-lor-lisō . . . . .	<i>Hydnocarpus heterophyllus.</i>
Ka-lwā . . . . .	<i>Cerbera odallum.</i>
Ka-mā-khā . . . . .	<i>Melia azadiracht</i> (Mason).
Kam-ba-lā . . . . .	<i>Sonneratia apetala.</i>
Ka-mung (or Ka-mōn)	{
Ka-mung-kyet-lā	
Ka-mung-net	
Ka-mung-ni	
Ka-mung-taing-byā	{
Ka-nā-zo . . . . .	
	<i>Kempferia.</i>
	<i>Baccaurea sapida and parviflora.</i>

Ka-nā-zo . . . . .	<i>Heritiera</i> (see Pyn-lē-ka-nā-zo).
Kan-čk . . . . .	<i>Zinziber barbatum</i> .
Kan-y-in-hōk . . . . .	<i>Dipterocarpus obtusifolius</i> .
Kan-y-in-hpyu . . . . .	<i>D. alatus</i> .
Kan-y-in-ni . . . . .	<i>D. laris</i> .
Kan-y-in-wet-toung . . . . .	<i>D. turbinatus</i> (Gamble).
Ka-nweh . . . . .	<i>Symphorema unguiculatum</i> (Kurz).
Ka-nyōt . . . . .	<i>Asparagus acerosus</i> .
Kan-y-oung . . . . .	<i>D. pterocarpus</i> .
Kan-zor . . . . .	<i>Bassia longifolia</i> .
Ka-pa-li-thyt . . . . .	<i>Mimusops littoralis</i> .
Ka-pwōt . . . . .	<i>Coffea Arabica</i> .
Ka-byaing . . . . .	<i>Criopsis decandra</i> (Mason).
Ka-ra-meh . . . . .	<i>Santalum album</i> .
Ka-thē . . . . .	<i>Samadera Indica</i> .
Ka-thyt-hsu . . . . .	<i>Xanthoxylon budrunga</i> (Mason).
Ka-thyt-khā . . . . .	<i>Pentace Burmanica</i> .
Kat-se-nē . . . . .	<i>Trena macrocarpa</i> . <i>Sida</i> (Kurz).
Ka-ya . . . . .	<i>Acanthus ilicifolius</i> .
Ka-yor . . . . .	<i>Congea velutina</i> .
Ka-yor-ka-yō . . . . .	<i>Aglaiia rohataka</i> (Mason).
Ka-yu . . . . .	<i>Pluchea Indica</i> .
Ka-zwōn . . . . .	<i>Battatas edulis</i> .
Ken-bwōn . . . . .	<i>Acacia rugata</i> .
Ken-khyōk-hpyu . . . . .	<i>Plumbago Zeylanica</i> .
Ken-khyōk-ni . . . . .	<i>P. rosea</i> .
Kha-boung . . . . .	<i>Strychnos nux-vomica</i> .
Kha-boung-yē-gyi . . . . .	<i>S. potatorum</i> .
Kha-ma-kha, see Ka-ma-khā	
Kha-moung-hpyu } . . . . .	<i>Lagerstrœmia</i> .
Kha-moung-ni }	
Kha-moung-thwē }	
Kha-mung . . . . .	<i>Kœmpferia galanga</i> (Mason).
Kha-na-khō . . . . .	<i>Croton tiglium</i> .
Kha-ōng . . . . .	<i>Ficus conglomerata</i> (Kurz).
Kha-ōng-gyi . . . . .	<i>Chrodendron infortunatum</i> .
Kha-yā . . . . .	<i>Acanthus ilicifolius</i> (Mason).
Kha-yā, Khya-yā or Kha-yā-gōng	<i>Mimusops elengi</i> (Mason).
Kha-yan, Khayan-chyn } . . . . .	<i>Solanum melongena</i> .
Kha-yan-gywōt }	
Kha-yan-pa-meh }	
Kha-yen-wā . . . . .	<i>Bambusa</i> .
Kha-yan-mye-hpōng . . . . .	<i>Lycopersicum esculentum</i> .
Khoung-hth-wen . . . . .	<i>Zinziber</i> .
Khoung-yan . . . . .	<i>Hibiscus rosa-sinensis</i> .
Khu-tsan . . . . .	<i>Hymenodictyon thyrsiflorum</i> .
Khwē-douk . . . . .	<i>Kurrimia robusta</i> .
Khwē-la-bwōt-nweh . . . . .	<i>Canavalia lucens</i> .
Khwē-lē-nweh . . . . .	<i>Mucuna pruri</i> .
Khwē-tan-yen (see Tan-yen) . . . . .	{ <i>Inga dulcis</i> (Kurz). <i>Arillaria robusta</i> (Kurz).
Khwē-tan-yen-ni . . . . .	
Khwē-touk . . . . .	<i>Cnestis platantha</i> .
Khyen-seing . . . . .	<i>Connarus speciosa</i> (Mason).
Khyi-boung . . . . .	<i>Zinziber officinale</i> .
Khyoung-ya-ben . . . . .	<i>Loranthus</i> (generic).
Kio-pan-ben . . . . .	<i>Oroxylum Indicum</i> .
Kō-kō . . . . .	<i>D-smodium latifolium</i> .
Kō-kō . . . . .	<i>Albizzia lebbek</i> .

Kōn-ka-thyt . . . . .	<i>Erythrina oratifolia.</i>
Kōng-pyim-mā . . . . .	<i>Lagerstræmia macrocarpa.</i>
Kōng-nyin-nweh . . . . .	<i>Entada scandens.</i>
Kōng-tha-byē . . . . .	<i>Eugenia, sp.</i>
Koung-limu . . . . .	{ <i>Parashorea stellata</i> (Kurz)? <i>Anisoptera glabra</i> (Kurz)?
Koung-khwā . . . . .	<i>Capparis auricoma.</i>
Koung-yan . . . . .	<i>Hibiscus furcatus.</i>
Ku-ku . . . . .	<i>Smilax oratifolia.</i>
Ku-wē-nweh (or Kyu-nweh) . . . . .	<i>Colubrina pubescens</i> and <i>asiatica.</i>
Kwē (or Kywē) . . . . .	<i>Spondias mangifera.</i>
Kwē-douk . . . . .	<i>Kurrimia robusta.</i>
Kwē-leh-bwōt-nweh . . . . .	<i>Canavalia lucens.</i>
Kwē-tan-y-ēn . . . . .	{ <i>Inga dulcis</i> (Kurz). <i>Millettia atropurpurea</i> (Kurz).
Kwōn-thoung Kwōn-bōng Kwōn-the (or Kwān-the) } . . . .	<i>Areca catechu</i> (Mason).
Kwōn-lyn-hpyu . . . . .	<i>Dracæna angustifolia.</i>
Kwōn-lyn-net . . . . .	<i>D. atropurpurea.</i>
Kwōn-y-wet . . . . .	<i>Piper betel.</i>
Kwōt-nē-nweh . . . . .	<i>Culcypteris Roxburghii.</i>
Kya-bet-gyi . . . . .	<i>Leca macrophylla.</i>
Kya-goung-loung . . . . .	<i>Barclaya oblongata.</i>
Kyā-hen-ka-lē-nweh . . . . .	<i>Ipomæa vitifolia.</i>
Kya-hpyu . . . . .	<i>Nymphaea pubescens.</i>
Kya-ni . . . . .	<i>N. rubra.</i>
Kya-nyo . . . . .	<i>N. stellata.</i>
Kya-kat-wā . . . . .	<i>Bambusa arundinacea.</i>
Kya-lo-wā . . . . .	<i>B. Brandisii.</i>
Kyan . . . . .	<i>Saccharum officinarum.</i>
Kyan-zā . . . . .	{ <i>Castanea tribuloides</i> and <i>diversifolia</i> (Kurz). <i>Toddalia aculeata</i> (Kurz).
Kya-nā (or Kyat-hnān) . . . . .	<i>Xylocarpus granatum</i> (Mason).
Kya-thoung-wā . . . . .	<i>Bambusa polymorpha.</i>
Kyā-zu . . . . .	<i>Terminalia chebula</i> (Mason).
Kyeh (or Kya-thā) . . . . .	<i>Barringtonia racemosa</i> and <i>pterocarpa.</i>
Kyeh-gyi . . . . .	<i>B. speciosa.</i>
Kyeh-ni . . . . .	<i>B. acutangula.</i>
Kyeing-bōk . . . . .	<i>Calamus.</i>
Kyeing-hpyu . . . . .	<i>C. sp.</i>
Kyeing-khā . . . . .	<i>C. fasciculatus</i> and <i>gracilis</i> (Kurz).
Kyeing-na-thā . . . . .	<i>C. sp.</i>
Kyeing-ni . . . . .	<i>C. Guruba</i> (Kurz).
Kyeing-ta-boung . . . . .	<i>C. sp.</i>
Kyeing-tor . . . . .	<i>C. sp.</i>
Kyeh-than-ban . . . . .	<i>Drosera Burmanni.</i>
Kyet-houng-hpyu . . . . .	<i>Aganosma acuminatum.</i>
Kyet-hen-khā . . . . .	<i>Momordica.</i>
Kyet-bet-ya . . . . .	<i>Bolmeria interrupta</i> (Mason).
Kyet-mā-ōk . . . . .	<i>Ardisia Amherstiana.</i>
Kyet-mouk . . . . .	<i>Nephelium litchi, longana</i> and <i>hypoleuca.</i>
Kyet-mouk-ni . . . . .	<i>Cnestis platantha.</i>
Kyet-poung-hpyu . . . . .	<i>Aganosma acuminatum.</i>
Kyet-ta-yor . . . . .	<i>Grewia hirsuta.</i>
Kyet-tet . . . . .	<i>Randia uliginosa</i> (Mason).
Kyet-tet-nweh . . . . .	<i>Combretum orale</i> and <i>squamosum.</i>
Kyet-tha-hen . . . . .	<i>Antidesma paniculata.</i>

Kyet-thwōn hpyu . . . . .	<i>Allium sativum</i> .
Kyet-thwōn-ni . . . . .	<i>A. copa</i> .
Kyet-hsu . . . . .	<i>Ricinus communis</i> .
Kyet-u-wā . . . . .	<i>Dendrocalamus Brandisii</i> .
Kyet-yet . . . . .	<i>Celosia cristata</i> .
Kyet-yō . . . . .	<i>Vitex alata, limonifolia, and pubescens</i> .
Kyi-ā . . . . .	<i>Zamia zehneria and sarcophylla</i> .
Kyi-boung or poung . . . . .	<i>Loranthus</i> (generic).
Kyi-chi-nweh } . . . . .	<i>Vitis lanceolaria</i> (Kurz).
Kyi-ni-nweh }	
Kyn-ba-lyn . . . . .	<i>Antidesma diandrum and menasu</i> .
Kyo-ben . . . . .	<i>Vitex peduncularis</i> (Kurz).
Kyo-ka-mung . . . . .	<i>Komferia</i> .
Kyounk-bān . . . . .	<i>Vitex agnus-castus</i> .
Kyounk-chyu-loung . . . . .	<i>Begonia sinuata</i> .
Kyounk-hpa-yung . . . . .	<i>Benicasa cerifera</i> .
Kyounk-ōk-hneh . . . . .	<i>Euphorbia</i> (Mason).
Kyounk-pu-en . . . . .	<i>Sphaerococcus lichenoides and Gigartina spinosa</i> .
Kyounk-wā . . . . .	<i>Bambusa, sp.</i>
Kyoung-thyt (or chet) . . . . .	<i>Mezocurum cucullatum</i> .
Kyoung-gyet-nweh . . . . .	<i>Pterolobium macropterum</i> (Kurz).
Kyoung-mi-ku . . . . .	<i>Buddleia Asiatica</i> .
Kyoung-shā (or chā) . . . . .	<i>Oroxylum Indicum</i> .
Kyoung-touk . . . . .	<i>Paysonia multijuga</i> .
Kyu . . . . .	<i>Arundo Madagascariensis</i> .
Kyu-na-byn . . . . .	<i>A. Roxburghii</i> .
Kyweh (or Ky-wai) . . . . .	<i>Dioscorea demonum</i> .
Kyweh-laik-thaby-ē . . . . .	<i>Eugenia</i> .
Kyweh-tha . . . . .	<i>Bignonia</i> .
Kyweh-thaby-ē . . . . .	<i>Eugenia</i> .
Kyweh-thweh . . . . .	<i>Myristica</i> (Mason).
Kywōn (or Kynn) . . . . .	<i>Tectona grandis</i> .
Kywōn-a-lyn . . . . .	<i>Premna tomentosa</i> .
Kywōn-hpyu . . . . .	<i>Gmelina arborea</i> (Mason).
Kywōt-nē-nweh . . . . .	<i>Calcyopteris Roxburghii and nutans</i> .
Lain-bha . . . . .	<i>Bignonia</i> (Mason).
Lam-bō (or Lan-bō) . . . . .	<i>Buchanania latifolia</i> (Kurz).
La-mu . . . . .	<i>Sonneratia acida and Griffithii</i> .
La-mwōt . . . . .	<i>Mangifera foetida</i> .
La-men . . . . .	<i>Eurycles amboinensis</i> .
Lan-theh . . . . .	<i>Hedichium coronarium</i> .
La-nyen-pwen . . . . .	<i>Caryophyllus aromaticus</i> .
Lch-bweh . . . . .	<i>Terminalia bialata?</i> (Mason).
Lch-lu . . . . .	<i>Oxalis scandens</i> .
Lch-pa-douk . . . . .	<i>Pontederia vaginalis</i> .
Lch-zā . . . . .	<i>Lagerstromia tomentosa</i> .
Lē-lun-ben . . . . .	<i>Excoecaria baccata</i> (Kurz).
Lē-mē . . . . .	<i>Calamus tigrinus</i> (Kurz).
Lēn (or Lēin) . . . . .	<i>Terminalia pyrifolia and bialata</i> .
Leng-mor . . . . .	<i>Citrus aurantium</i> .
Lē-pa-douk . . . . .	<i>Monochoria vaginalis</i> .
Lep-pān (or Let-pān) . . . . .	<i>Bombax insigne</i> .
Let-litōk . . . . .	<i>Absonia scholaris</i> .
Let-khōk . . . . .	<i>Streulia alata and foetida</i> .
Let-pet-byn . . . . .	<i>Elaeagnus orientale</i> .
Let-tōk-gyi . . . . .	<i>Holarrhena antidysenterica</i> (Kurz).
Let-tōk-thein . . . . .	{ <i>H. cordata</i> (Kurz).
	{ <i>Wightia mollissima</i> (Kurz).

Let-touk . . . . .	{ <i>Elæocarpus lanceaefolius</i> .
Li-lōng-ben . . . . .	{ <i>Holarrhena antidyenterica</i> (Parish).
Lyi-nya-shor . . . . .	<i>Corumbium baccatum</i> .
Lyn-hē . . . . .	<i>Paritium tiliaceum</i> .
Lyn-kyor . . . . .	<i>Acorus calamus</i> .
Len-kyor . . . . .	<i>Dillenia parviflora</i> (Kurz).
Lē-pa-douk . . . . .	<i>Cinnamomum iners</i> (Mason).
Lwōn-bō or hpō . . . . .	<i>Pontedoria vaginalis</i> (Mason).
Lu . . . . .	<i>Buchanania latifolia</i> .
Lu-leng-kyor . . . . .	<i>Panicum paspalum</i> .
Ma-da-mā . . . . .	<i>Cinnamomum Zeylanicum, obtusifolium, and iners</i> .
Ma-dor . . . . .	<i>Dalbergia ovata and glauca</i> .
Mō-gywōt or kywōt . . . . .	<i>Garcinia xanthochymus</i> .
Mā-hā-hlē-gā-hpyu . . . . .	<i>Commelyna cæspitosa</i> .
Mā-hā-hlē-gā-nī . . . . .	<i>Bauhinia acuminata</i> (Mason).
Mā-hā-hlē-gā-wā . . . . .	<i>B. purpurca</i> (Mason).
Ma-hān . . . . .	<i>B. tomentosa</i> (Mason).
Mā-hlaing . . . . .	<i>Feronia elephantum</i> (Kurz).
Mā hnyo-ben . . . . .	<i>Broussonetia papyrifera</i> .
Mai-za-li (or Meh-za-li) . . . . .	<i>Gomphrena globosa</i> .
Ma-ji . . . . .	<i>Cassia Siamea</i> .
Ma-ji-bouk . . . . .	<i>Tamarindus Indica</i> .
Ma-la-kā . . . . .	<i>Gardenia scissiflora</i> .
Ma-la-meh . . . . .	<i>Psidium guyana</i> .
Ma-lein-pen . . . . .	<i>Cardiospermum</i> .
Ma-li . . . . .	<i>Morus lævigata</i> (Kurz).
Ma-lwā . . . . .	<i>Jasminum sambac</i> .
Mā-ni-ōk-kā . . . . .	<i>Spathodea stipulata</i> .
Mā-u . . . . .	<i>Corallia lucida</i> .
Mā-u-ka-dun . . . . .	<i>Sarcocephalus cadamba</i> .
Mā-u-let-tan shwē . . . . .	<i>Sarcocephalus cordatus</i> .
Ma-ya-nheng . . . . .	<i>Acrocarpus fraxinifolius</i> .
Ma-yō . . . . .	<i>Calotropis gigantea and procera</i> .
Meh (or Mai) . . . . .	<i>Indigofera tinctoria</i> .
Meh-byoung . . . . .	<i>Maba buxifolia</i> .
Meh-gyi . . . . .	<i>Ruellia indigofera</i> .
Meh-keh . . . . .	<i>Murraya exotica</i> .
Meh-nī . . . . .	<i>Indigofera tinctoria</i> .
Men (or Ben) . . . . .	<i>Amomum cardamomum</i> .
Men-gu (or Men-gwōt) . . . . .	<i>Garcinia mangostana</i> .
Mi-joung-nweh . . . . .	<i>Derris scandens</i> .
Mim-bō (or Mim-bu) . . . . .	<i>Caryota urens</i> .
Min-gu . . . . .	<i>Elæagnus arborea</i> (Kurz).
Mi-tha-len . . . . .	<i>Zinziber barbatum</i> .
Mi-zī (or Mi-zu) . . . . .	<i>Mirabilis jalapa</i> .
Mō-dwin-the . . . . .	<i>Drosera Burmanni</i> .
Mō-jio-ban . . . . .	<i>Sphenocarpus grandiflorus</i> .
Mōk . . . . .	<i>Aloe socotrina</i> .
Mok-tsō hlan-mā . . . . .	<i>Desmodium triquetrum</i> .
Mō-mā-khā . . . . .	{ <i>Salix tetrasperma</i> .
Mo-mā-khā-nweh . . . . .	{ <i>Homanoya riparia</i> (Kurz).
Mōng-lā . . . . .	<i>Combretum extensum</i> .
Mōng-lā-u-waing . . . . .	<i>Raphanus sativus</i> .
Mōng-nyin . . . . .	<i>Brassica rapa</i> .
Mōng-taing (or Mun-daing) . . . . .	<i>Sinapis dichotoma, Chincensis, alba, and nigra</i> .
Mu-daing . . . . .	<i>Lophopetalum Wallichii</i> (Kurz).
	<i>Cycas circinalis, Rumphii, and Siamensis</i> .

Mu-yan . . . . .	<i>Hordeum hexastichon.</i>
Mya-byit (or Myeh-byit) . . . . .	<i>Portulaca oleracea.</i>
Myat-leh . . . . .	<i>Jasminum grandiflorum.</i>
Myat-leh-ni . . . . .	<i>Quamoelit pennatum.</i>
Myat-ya (or Myai-ya) . . . . .	<i>Grewia microcus.</i>
Myeh-ban-touk . . . . .	<i>Kämpferia rotunda.</i>
Myet-hna-bān (or pān) . . . . .	<i>Strobilanthes flava.</i>
Myeng-ka, see Myn-gā.	
Myeh-peh . . . . .	<i>Arachis hypogæa.</i>
Myeh-zu-nweh . . . . .	<i>Vitis erythroclada.</i>
Myet-yeh (or Myet wā) . . . . .	<i>Polytocha heteroclita.</i>
Myin-che-tan-yet . . . . .	<i>Menceylon umbellatum.</i>
Myin-thwā . . . . .	<i>Arca catechu.</i>
Myin-wā . . . . .	<i>Dendrocalamus strictus.</i>
Myit-pyeh . . . . .	<i>Melastoma Malabathricum.</i>
Myi-zu . . . . .	<i>Mirabilis jalapa.</i>
Myn-gā . . . . .	<i>Cynometra bijuga and ramiflora.</i>
Myouk-goung . . . . .	<i>Artocarpus, sp.</i>
Myouk-hlē-gā . . . . .	<i>Bauhinia ornata.</i>
Myouk-khā-bat . . . . .	<i>Bauhinia, sp.</i>
Myouk-yōng-myin . . . . .	<i>Derris sinuata.</i>
Myouk-hpyu . . . . .	<i>Dioscora globosa.</i>
Myouk-kyā . . . . .	<i>D. crispata.</i>
Myouk-kyen . . . . .	<i>Flagellaria Indica.</i>
Myouk-lōk . . . . .	<i>Artocarpus lacucha.</i>
Myouk-lōk gyi } . . . . .	<i>Artocarpus communis.</i>
Myouk-loung }	
Myouk-lōk-ngeh . . . . .	<i>Artocarpus, sp.</i>
Myouk-ngō . . . . .	<i>Duabanga Sonneratioides.</i>
Myouk-ni . . . . .	<i>Dioscora atropurpurea.</i>
Myouk-o-shyt . . . . .	<i>Siphonodon celustrinus.</i>
Myouk-seit . . . . .	<i>Ulmus integrifolius (Kurz).</i>
Myouk-shor . . . . .	<i>Homalium tomentosum.</i>
Myouk-tan-yet . . . . .	<i>Parkia leiophylla and insignis.</i>
Myouk-zi . . . . .	<i>Zizyphus rugosa.</i>
Nab-hē (or Na-beh) . . . . .	<i>Odina rodier.</i>
Na-bu-nweh . . . . .	<i>Combretum apetalum.</i>
Na-ji . . . . .	<i>Pterospermum semisagittatum.</i>
Na-lyin-bō . . . . .	<i>Mallotus repandus (Kurz).</i>
Na-lyn-kyor . . . . .	<i>Cinnamomum.</i>
Nā-ma-ni-tan-yet . . . . .	<i>Capparis horrida (Kurz).</i>
Nān-lon-kyaing (or lmaing) . . . . .	<i>Acacia Farnesiana.</i>
Nān-nān . . . . .	<i>Coriandrum sativum.</i>
Nan-ta-yōk . . . . .	<i>Altingia excelsa.</i>
Na-shā-gyi . . . . .	<i>Cryptolepis Buchanani.</i>
Nāt-chō . . . . .	<i>Baliospermum montanum.</i>
Neh-men . . . . .	<i>Eurycles amboinensis (Mason).</i>
Nē-n-weh . . . . .	<i>Flacourtia sapida and cataphracta.</i>
Ngā-hpyu . . . . .	<i>Pachygonia odorifera (Kurz).</i>
Ngā-mouk . . . . .	<i>Roydsia obtusifolia (Kurz).</i>
Ngā-teli . . . . .	<i>Lœa aquata.</i>
Ngā-ya-gyi . . . . .	<i>Bambusa, sp.</i>
Ngā-yan-pa-du . . . . .	<i>Pothos giganteus.</i>
Ngā-yōk-koung . . . . .	<i>Clerodendron nutans.</i>
Ngu-gyi . . . . .	<i>Piper nigrum.</i>
Ngu-shwē . . . . .	<i>Cassia fistula.</i>
Ngu-theing (or thēn) . . . . .	<i>C. renigra.</i>
Ngung-myt . . . . .	<i>C. nodosa.</i>
	<i>Chrysopogon aciculatus.</i>

Nheng (or Nhān-ben), see Hnān	
Ni-ba-tsē (or Ni-pa-hsch) . . . . .	<i>Morinda citrifolia</i> (Mason).
Nu-wā . . . . .	<i>Gossypium Barbadense</i> and <i>arborescens</i> .
Nweh-ban . . . . .	<i>Graptophyllum hortense</i> .
Nweh-bouk (or bōk) . . . . .	<i>Pederia lanuginosa</i> .
Nweh-chō . . . . .	{ <i>Thunbergia laurifolia</i> (Kurz).
	{ <i>Acacia poppeah</i> (Mason).
Nweh-hnyo . . . . .	<i>Thunbergia</i> (Mason).
Nweh-ka-zwōn-hpyu . . . . .	{ <i>Ipomœa bona-nox</i> (Kurz).
	{ <i>Calonyction Roxburghii</i> .
Nweh-ni . . . . .	<i>Lettsonia aggregata</i> .
Nweh-hpa-lān . . . . .	<i>Bauhinia glauca</i> , <i>Fahlīi</i> and <i>ferruginea</i> .
Nweh-sat-nweh . . . . .	<i>Synphorema involueratum</i> .
Nya . . . . .	<i>Æschynomene paludosa</i> .
Nyā-gyi . . . . .	<i>Morinda citrifolia</i> (Mason).
Nyan . . . . .	<i>Desmodium reptans</i> .
Nyor (or Nyā) . . . . .	<i>Morinda exserta</i> .
Nyoung . . . . .	<i>Ficus</i> (generic). <i>F. indica</i> and <i>laccifera</i> .
Nyoung-bor-di . . . . .	<i>F. religiosa</i> .
Nyoung-chē-douk . . . . .	<i>F. Benjamina</i> .
Nyoung-chyn (or chin) . . . . .	<i>F. infectoria</i> .
Nyoung-hpyu . . . . .	<i>F. Rumphii</i> .
Nyoung-kyat . . . . .	<i>F. obtusifolia</i> .
Nyoung ōng . . . . .	<i>F. Benjamina</i> .
Nyoung-ōp (or ōk) . . . . .	<i>F. retusa</i> .
Nyoung-peī-nē . . . . .	<i>F. nervosa</i> .
Nyoung-tha-byē . . . . .	<i>F. geniculata</i> and <i>excelsa</i> .
Ōk-hwōn-nweh . . . . .	<i>Argyrea Zeylanica</i> and <i>barbigera</i> .
Ō-nā-kōk-nweh . . . . .	<i>A. populifolia</i> .
Ōk-neh (or Ōp-neh) . . . . .	<i>Streblus aspera</i> .
Ōng . . . . .	<i>Cocos nucifera</i> .
Ōng-dong . . . . .	<i>Tetranthera laurifolia</i> .
Ōng-meh-hpyu . . . . .	<i>Clitoria ternatea</i> .
Ō-shyt . . . . .	<i>Egle marmelos</i> .
Ouk-chyn-zā . . . . .	<i>Diospyros chretoides</i> .
Oung-meh-hpyu . . . . .	<i>Clitoria ternatea</i> .
Pa-daing . . . . .	<i>Crinum Herbertianum</i> and <i>Asiaticum</i> .
Pa-daing-kyet-thwōn . . . . .	<i>Squilla Indica</i> .
Pa-daing-khat-tā } . . . . .	<i>Datura alba</i> .
Pa-daing-hpyu }	
Pa-daing-ngō . . . . .	<i>Globba Careyana</i> .
Pa-dāt-sā . . . . .	<i>Kämpferia candida</i> .
Pa-dong-mē . . . . .	<i>Nelumbium speciosum</i> .
Pa-douk . . . . .	<i>Pterocarpus Indicus</i> and <i>macrocarpus</i> .
Pa-douk-gyi . . . . .	<i>Pontederia dilatata</i> (Mason).
Pa-gā-nyet-su . . . . .	<i>Pometia tomentosa</i> .
Pa-yor-thein . . . . .	<i>Alpinia nutans</i> .
Pa-gyē-theing (or Pa-kyeh-thēn) . . . . .	<i>Garcinia speciosa</i> (Mason).
Pa-lān, see Hpa-lān.	
Pa-lāng toung-weh . . . . .	<i>Costus argyrophyllus</i> .
Pa-len . . . . .	<i>Casuarina equisetifolia</i> .
Pān (or Paik-hsān) . . . . .	<i>Crotalaria juncea</i> .
Pān-ben-nweh . . . . .	<i>Ancistrocladus Griffithii</i> .
Pān-kha-tat . . . . .	<i>Tacca pinnatifida</i> .
Pān-mā . . . . .	<i>Schima Noronhe</i> and <i>Bancana</i> (Kurz).
Pān-na-thē . . . . .	<i>Laurus nitida</i> (Mason).
Pān-sa-yeik . . . . .	<i>Lora coccinea</i> (Mason).
Pān-shit . . . . .	<i>Impatiens balsamina</i> .

Pān-ta-gā . . . . .	<i>Calophyllum spectabile</i> (Kurz).
Pān-u-hpyu . . . . .	<i>Kempferia candida</i> .
Pān-yen (or yin) . . . . .	<i>Andropogon muricatus</i> (Mason).
Pē (or Peh) . . . . .	<i>Corypha umbraculifera</i> .
Pē-eh . . . . .	<i>Citrullus vulgaris</i> and <i>cucurbita</i> .
Peh . . . . .	<i>Labiab. vulgare</i> .
Peh-lyn-mywē . . . . .	<i>Trichosanthes anguina</i> .
Peh-myt (or Peh-hso-wā) . . . . .	<i>Psophocarpus tetragonolobus</i> (Mason).
Peh-noung-ni . . . . .	<i>Canavalia gladiata</i> .
Peh-pa-swōn . . . . .	<i>Cyanopsis psoraloides</i> .
Peh-yen-khyang . . . . .	<i>Cajanus Indicus</i> (Mason).
Peik-khyen (or Pēk-chyn) . . . . .	<i>Piper longum</i> .
Peing (or Pēng) . . . . .	<i>Colocasia antiquorum</i> .
Peing-mā-hor-ya . . . . .	<i>C. odorata</i> .
Peing-neh (or Pāi-nē) . . . . .	<i>Artocarpus integrifolia</i> .
Pen-bu . . . . .	<i>Plectranthus aromaticus</i> .
Pen-zeing . . . . .	<i>Ocimum villosum</i> (Mason).
Pong-ma-theing . . . . .	<i>Blumea balsamifera</i> .
Pōng-nyet (or Pwoing-nyet) . . . . .	<i>Calophyllum inophyllum</i> .
Pō-sā . . . . .	<i>Morus Indica</i> .
Pouk . . . . .	{ <i>Eschynomene paludosa</i> (Mason).
	{ <i>Butea frondosa</i> .
Pouk-hpyu . . . . .	<i>Sesbania grandiflora</i> .
Pouk-nweh . . . . .	<i>Butea superba</i> and <i>parviflora</i> .
Pu-lor-pinān-myok . . . . .	<i>Manihot utilisima</i> .
Pu-lor-pinān-wā . . . . .	<i>Bambusa nana</i> .
Pung-ben . . . . .	<i>Physalis peruviana</i> .
Pu-zyn-swā . . . . .	<i>Thea bohea</i> .
Pwōt-chē-ben (or Pwōt-shor-pen) . . . . .	<i>Macropus longifolius</i> .
Pyen-dan-ngā-len . . . . .	<i>Sida</i> (generic).
Pyen-ka-do . . . . .	<i>Xylia xylocarpa</i> .
Pyen-mā . . . . .	<i>Lagerstrœmia flos-reginæ</i> .
Pyen-mā-hpyu . . . . .	<i>L. calyculata</i> and <i>floribunda</i> .
Pyin-dor-thein . . . . .	<i>Clausena heptaphylla</i> .
Pyi-nyoung (or Pyn-mong) . . . . .	<i>Ficus Bengulensis</i> .
Pyi-zyn . . . . .	<i>Antidesma ghutesmilla</i> .
Pyn-bū . . . . .	<i>Plectranthus aromaticus</i> .
Pyn-hwā . . . . .	<i>Maranta arundinacea</i> .
Pyn-leh-ltān (or tor) . . . . .	<i>Scorola Koenigii</i> .
Pyn-ley-ka-nā-zo . . . . .	{ <i>Carapa obovata</i> (Kurz).
	{ <i>Heritiera minor</i> and <i>littoralis</i> (Kurz).
Pyn-leh-ka-thyt . . . . .	<i>Erythrina Indica</i> (Mason).
Pyn-leh-ka-zwōn . . . . .	<i>Ipomœa pes-capræ</i> .
Pyn-leh-kyoung . . . . .	<i>Crocodendron inerve</i> .
Pyn-leh-ōng (or oung) . . . . .	<i>Carapa obovata</i> and <i>molucaensis</i> .
Pyn-leh-thyt-kouk . . . . .	<i>Gyrocarpus Jacquini</i> .
Pyn-leh-tsi . . . . .	{ <i>Ximonia Americana</i>
Pyn-leh-ku-yin . . . . .	
Pyn-tē-yō . . . . .	<i>Grewia elastica</i> (Kurz).
Pyn-zeing . . . . .	<i>Ocimum villosum</i> .
Pyn-zeing-zi . . . . .	<i>O. sanctum</i> .
Pyor-men . . . . .	<i>Musa glauca</i> .
Pyoung . . . . .	<i>Sorghum vulgare</i> .
Pyoung-bi . . . . .	<i>Zea mays</i> .
Pyoung-lē kouk . . . . .	<i>Panicum</i> .
Pyu (see Hpyu) . . . . .	
Sa-bā . . . . .	<i>Oriza sativa</i> .
Sa-lā-len . . . . .	<i>Andropogon esculentus</i> .
Sa-hyet . . . . .	<i>Momordica dioica</i> .

Sa-byit . . . . .	<i>Vitis vinifera</i> .
Sa-gā . . . . .	<i>Michelia champaca</i> and <i>aurantiaca</i> .
Sā-hpyu . . . . .	<i>Xanthophyllum</i> .
Sā-ka-ōng . . . . .	<i>Ficus</i> .
Sa-kwā (or Sa-kwē) . . . . .	<i>Webera oppositifolia</i> (Kurz).
Sa-lāt . . . . .	<i>Calpicarpum Roxburghii</i> .
Sa-lāt-ni . . . . .	<i>Graptophyllum lurido-sanguineum</i> .
Sā-lu (or Tsā-lu-ben) . . . . .	<i>Licuala peltata</i> .
Sa-mung-net . . . . .	<i>Nigella sativa</i> .
Sa-mung-ni . . . . .	<i>Lepidium sativum</i> .
Sa-mung-sa-bā . . . . .	<i>Pimpinella anisum</i> and <i>involueratum</i> .
Sa-mwōt . . . . .	{ <i>Carum carui</i> .
	{ <i>Anethum graveolens</i> .
Sa-my-eik . . . . .	<i>Anethum sowa</i> .
San-dā-ku . . . . .	<i>Santalum album</i> .
San-let-theh . . . . .	<i>Cesalpinia digyna</i> .
Sa-peh . . . . .	<i>Jasminum sambac</i> .
Sat-shā-ben . . . . .	<i>Sponia orientalis</i> .
Sat-jō-yit . . . . .	<i>Nararelia Ceylanica</i> .
Sat-shā (or Sap-shā) . . . . .	{ <i>Bahmeria Hamiltoniana</i> (Kurz).
	{ <i>Sarcochlamys pulcherrima</i> (Kurz).
Sē-than-yā . . . . .	<i>Gelonium multiflorum</i> .
Sa-the-khwā . . . . .	<i>Cucumis sativus</i> .
Sen-thē-khwā . . . . .	<i>Citrullus vulgaris</i> .
Shā . . . . .	<i>Acacia catechu</i> .
Shā-hpyu . . . . .	<i>Cicca emblica</i> and <i>macrocarpa</i> .
Shā-mā . . . . .	<i>C. albizzoides</i> .
Shān-meh . . . . .	<i>Indigofera tinctoria</i> .
Shā-zoung . . . . .	<i>Euphorbia neriifolia</i> and <i>nirulia</i> .
Shā-zoung-gyi . . . . .	<i>E. Jacquiniflora</i> .
Shā-zoung-lek-hnyo . . . . .	<i>E. tirucalla</i> .
Shā-zoung-pya-that . . . . .	<i>E. antiquorum</i> .
Shor-hpyu . . . . .	<i>Sterculia versicolor</i> .
Shor-lit-pen . . . . .	<i>Beilschmiedia Roxburghiana</i> (Kurz).
Shor-ni . . . . .	<i>Sterculia villosa</i> .
Shor-wā . . . . .	<i>S. ornata</i> .
Shouk . . . . .	<i>Citrus bergamia</i> .
Shouk-chō (or khyō) . . . . .	<i>C. limetta</i> .
Shouk-khā . . . . .	<i>C. sp.</i>
Shouk-leng-mor . . . . .	<i>C. limetta</i> .
Shouk-pōk . . . . .	<i>C. hystrix</i> .
Shouk-to-khwā . . . . .	<i>C. medica</i> .
Shouk-tōng-ō (or tung-ō) . . . . .	<i>C. decumana</i> .
Shyn-byat . . . . .	<i>Bauhinia ferruginea</i> .
Shyt-ma-tet . . . . .	<i>Asparagus acerosus</i> .
Shwē-nweh-pān . . . . .	<i>Cassytha filiformis</i> .
Shwē-hpē-ōng . . . . .	{ <i>Cucurbita maxima</i> .
Shwē-hpē-ōng-khā . . . . .	
Sin-tha-hpān . . . . .	<i>Ficus Roxburghii</i> .
Sō-kā (Kurz), see A-thor-kā . . . . .	
Soung (or Zoung) . . . . .	<i>Bruguiera parviflora</i> .
Soung-ga-lē . . . . .	<i>Ancistrolobus carneus</i> .
Soung-ya (or Zoung-ga) . . . . .	<i>Acerrhoa carambola</i> .
Sow-pein-nweh . . . . .	<i>Combretum trifoliatum</i> and <i>tetragonocarpum</i> .
Su-kouk . . . . .	<i>Cesalpinia nuga</i> .
Su-kyin-bō . . . . .	<i>C. septaria</i> .
Su-pwōt-ka-lā-nweh . . . . .	<i>Acacia glaucescens</i> .
Su-pwōt nweh . . . . .	<i>A. concinna</i> .
Su-yit . . . . .	<i>A. pennata</i> .

Swch-tan . . . . .	<i>Bauhinia monandra</i> (Kurz).
Swōn-pa-lwōn . . . . .	<i>Phoenix dactylifera</i> (Mason).
Syn-tha-lpān . . . . .	<i>Ficus Roxburghii</i> (Kurz).
Syt . . . . .	<i>Albizia procera</i> .
Ta-bwōt-gyi . . . . .	<i>Meliusa velutina</i> .
Ta-chau-sō . . . . .	<i>Heteropanax fragrans</i> (Kurz).
Ta-hāt (or Ta-nāt) . . . . .	<i>Tectona Hamiltoniana</i> .
Ta-kyet . . . . .	<i>Pandanus fétidus and furcatus</i> .
Ta-lu-ku-wā . . . . .	<i>Gigantochloa auriculata</i> .
Ta-la-lpi . . . . .	<i>Ockrocarpus Siamesis</i> .
Ta-li-en-nwe . . . . .	<i>Gynocardia odorata</i> (Balfour).
Ta-li-tē . . . . .	<i>Rourea spokurthoontee</i> (Mason).
Ta-ma-youk . . . . .	<i>Rondeletia tinctoria</i> (Mason).
Ta-ma-seing . . . . .	{ <i>Panicum acariferum</i> .
Ta-myn-sein-ben . . . . .	
Ta-mā-zōk . . . . .	<i>Glochidion multiloculare</i> .
Ta-nāt-sā . . . . .	<i>Unona discolor</i> .
Ta-noung . . . . .	<i>Acacia leucophora</i> .
Ta-nyen . . . . .	{ <i>Pithecolabium angulatum and lobatum</i> (Kurz).
Ta-nyen-ni . . . . .	{ <i>Inga dulcis</i> (Mason).
Ta-nyen-tha-ri-kyen . . . . .	<i>Millettia atropurpurea</i> (Kurz).
Ta-pouk-ben . . . . .	<i>Calamus</i> , sp. (Mason).
Ta-pu-ben . . . . .	<i>Dalbergia paniculata</i> .
Ta-shā . . . . .	<i>Harrisonia Bennettii</i> .
Ta-tayā-nweh . . . . .	<i>Emblia officinalis</i> (Kurz).
Ta-yōk-sa-gā . . . . .	<i>Buettneria pilosa</i> (Kurz).
Ta-yor . . . . .	<i>Plumiera acutifolia</i> .
Ta-yor-nyo-nweh . . . . .	<i>Excaccaria agallocha</i> .
Ta-zin-ban . . . . .	<i>Gouania leptostachya</i> .
Tē . . . . .	<i>Bulbophyllum auricomum</i> (Parish).
Te-hpyu (or Ta-hpyu) . . . . .	<i>Diospyros Burmanica</i> .
Tē-tha-byē . . . . .	<i>Sonneratia Griffithii</i> (Kurz).
Tein, see Htein . . . . .	<i>Eugenia operculata</i> .
Teing-nyet . . . . .	<i>Casalpinia sappan</i> .
Tek-ka-dwōn . . . . .	<i>Cratara Roxburghii</i> .
Tha-beik . . . . .	<i>Quercus velutina</i> (Mason).
Tha-bor . . . . .	<i>Pandanus furcatus</i> .
Tha-bwōt . . . . .	<i>Luffa pentandra</i> .
Tha-bwōt-gyi . . . . .	<i>Meliusa velutina</i> .
Tha-bwōt-khā . . . . .	{ <i>Trichosanthes cucumerina</i> .
Tha-bwōt-khā-nweh } . . . . .	<i>Makia scabrella</i> .
Tha-bwōt-khā-hmwch } . . . . .	<i>Luffa fétida</i> .
Tha-bwōt-nweh . . . . .	<i>Uraria macrophylla and ptychocalyx</i> (Kurz).
Tha-byē . . . . .	<i>Eugenia</i> (generic).
Tha-byē-chyn . . . . .	<i>E. cerasoides</i> .
Tha-byē-gyi . . . . .	<i>E. grandis</i> .
Tha-byē-hpyu . . . . .	<i>E. jambolana</i> .
Tha-byē-htāu-shyt . . . . .	<i>E. sp.</i>
Tha-byē-khā . . . . .	<i>E. venusta</i> .
Tha-byē-ni . . . . .	<i>E. oblata and fruticosa</i> .
Tha-byē-pouk . . . . .	<i>E. Zeylanica</i> .
Tha-byē-ta-ō-kyeh . . . . .	<i>E. sp.</i>
Tha-byē-tsāt-chē . . . . .	<i>E. sp.</i>
Tha-byē-tsāt-ga-lē . . . . .	<i>E. sp.</i>
Tha-di (or Ta-di) . . . . .	<i>Bursera serrata</i> .
Tha-di-wā . . . . .	<i>Croton polyandra</i> .
Tha-lpān . . . . .	<i>Ficus Chittagonga</i> .

Tha-hpyu-tha-lyē . . . . .	<i>Eugenia Malaccensis</i> (Kurz).
Thaik-wā . . . . .	<i>Bambusa affinis</i> and <i>tulda</i> .
Thaik-tu-hmyin-tu-wa . . . . .	<i>Bambusa</i> , sp.
Tha-khwā-hmweh	} . . . . <i>Cucumis melo</i> .
Tha-khwā-khyen	
Tha-khwā-kyouk-yen	
Tha-khwā-lat	
Tha-khwā-mi-joung-u	} . . . . <i>Stercospermum chelenoides</i> .
Tha-khwōt-hpyu . . . . .	
Tha-khwōt-mā . . . . .	
Tha-kyā-nweh . . . . .	
Tha-kyet . . . . .	<i>Pandanus fœtidus</i> .
Tha-lē . . . . .	<i>Panicum granatum</i> (Mason).
Tha-leh . . . . .	<i>Ulmus lancifolia</i> (Kurz).
Tha-ma-jōk . . . . .	<i>Abutilon Indicum</i> .
Tha-ma-kā . . . . .	<i>Combretum Roxburghii</i> .
Tha-ma-kā-nweh . . . . .	{ <i>C. decandrum</i> .
	{ <i>Congea tomentosa</i> .
Tha-mē . . . . .	<i>Arcecnia officinalis</i> .
Tha-men-sā . . . . .	<i>Gardenia</i> , sp.
Tha-men-sā-hpyu . . . . .	<i>G. sessiflora</i> .
Tha-men-sā-nī . . . . .	<i>G. turgida</i> .
Tha-nat . . . . .	<i>Cordia myxa</i> and <i>grandis</i> .
Tha-nat-khā . . . . .	<i>Murraya exotica</i> .
Tha-nat-tor . . . . .	<i>Garcinia elliptica</i> .
Tha-na-wā . . . . .	<i>Bambusa</i> , sp.
Tha-na-yā-shouk . . . . .	<i>Citrus bergamota</i> .
Tha-nē . . . . .	<i>Stercospermum neuranthum</i> .
Tha-nyā-pen (or ben) . . . . .	<i>Chrysophyllum Roxburghii</i> .
Tha-that . . . . .	{ <i>Stercospermum fimbriatum</i> (Kurz).
	{ <i>Albizia lucida</i> (Kurz).
Tha-thit . . . . .	<i>Bignonia crispa</i> (Mason).
Tha-yit . . . . .	<i>Capparis spinosa</i> .
Tha-ya-pu-wā . . . . .	<i>Gigantochloa auriculata</i> .
Tha-yet . . . . .	<i>Mangifera Indica</i> .
Tha-yet-san . . . . .	<i>Sacintonia Schwenkii</i> .
Tha-yet-thi-nī . . . . .	<i>Mangifera longipes</i> (Kurz).
Tha-yet-thyt-si . . . . .	<i>Gluta Taroyana</i> (Kurz).
The-hpyu . . . . .	<i>Dillenia Indica</i> .
Thek-ē-gyi . . . . .	<i>Saccharum spontaneum</i> .
Thek-kē-nyen . . . . .	<i>Imperata cylindrica</i> .
Thēn (or Theing) . . . . .	{ <i>Muranta dichotoma</i> (Mason).
	{ <i>Calamus erectus</i> (Kurz).
Thēn-bō-ma-ji . . . . .	<i>Sophora tomentosa</i> (Kurz).
Thēn-ban-ehyn-boung . . . . .	<i>Hibiscus subdariffa</i> .
Thēn-bor-ka-ma-kha . . . . .	<i>Melia azadirachta</i> .
Thēn-bor-kyet-tsu . . . . .	<i>Jatropha curcus</i> .
Thēn-bor-leh . . . . .	<i>Gossypium Rumphii</i> .
Thēn-bor-ma-hnyo-ban . . . . .	<i>Ficus rosca</i> .
Thēn-bor-ma-li . . . . .	<i>Jasminum</i> .
Thēn-bor-mong-lā . . . . .	<i>Brassica oleracea</i> .
Thēn-bor-myōuk . . . . .	<i>Batatus edulis</i> .
Thēn-bor-thi . . . . .	<i>Carica papaya</i> .
Thēn-bor-zī-hpyu . . . . .	<i>Cicca disticha</i> .
Thēn-boung (or Thyn-boung) . . . . .	<i>Phanix paludosa</i> and <i>acaulis</i> .
Thēn-khwē . . . . .	<i>Jasminum</i> .
Thet-yen-nī . . . . .	<i>Croton malacofolium</i> .
Thet-yen-ka-dor . . . . .	'Rangoon croton' (Mason).
Thi . . . . .	<i>Feronia elephantum</i> .

Thi-dyn . . . . .	<i>Bixa orellana</i> .
Thi-hay-a-zā . . . . .	<i>Limonia acidissima</i> (Kurz).
Thi-hō-tha-yet . . . . .	<i>Anacardium occidentale</i> .
Thi-wyn (or Thyn-wyn) . . . . .	<i>Pongamia glabra</i> .
Thi-yā . . . . .	<i>Shorea obtusa</i> .
Thōng-tsyn-pān . . . . .	<i>Gardenia florida</i> .
Thu-keh-ni . . . . .	<i>Bignonia</i> .
Thu-ngeh-chē . . . . .	<i>Helicteres ixora</i> .
Thwōn-khyen . . . . .	<i>Calamus</i> , sp.
Thwon-ta-bat . . . . .	<i>Achras sapota</i> .
Thym-bān (or Theng-ban) . . . . .	<i>Hibiscus tiliaceus</i> .
Thyn-ga-du . . . . .	{ <i>Anisoptera glabra</i> (Kurz)? <i>Parashorea stellata</i> (Kurz)?
Thyn-gān . . . . .	<i>Hopsea odorata</i> .
Thyn-pen . . . . .	<i>Phrynum dichotomum</i> .
Thyt-chē . . . . .	<i>Castanea javanica</i> .
Thyt-chō . . . . .	<i>Sideroxylon tomentosum</i> .
Thyt-hpyu . . . . .	{ <i>Sterculia scaphigera</i> (Kurz). <i>Xanthophyllum flavescens</i> and <i>glaucum</i> . <i>Lagerstramia</i> , sp. (Mason).
Thyt-hsounk-yō . . . . .	<i>Dalbergia</i> , sp. (Mason).
Thyt-hsw ē-lē . . . . .	<i>Schrebera swietenoides</i> .
Thyt-kā (or khā) . . . . .	<i>Pentace Burmanica</i> .
Thyt-ka-dō . . . . .	<i>Cedrela toona</i> .
Thyt-khet-lan-thē . . . . .	<i>Hedychium coronarium</i> .
Thyt-kyā . . . . .	<i>Quercus</i> (generic).
Thyt-kyān-bo . . . . .	<i>Cinnamomum iners</i> .
Thyt-kyouk-nweh . . . . .	<i>Willughbeia Martabanica</i> .
Thyt-lōng (or loun) . . . . .	<i>Viscum moniliforme</i> .
Thyt-lyn-dā . . . . .	<i>Heterophragma sulphurea</i> .
Thyt-ma-ji . . . . .	<i>Albizzia odoratissima</i> .
Thyt-myn . . . . .	<i>Nageia bracteata</i> and <i>polystachya</i> .
Thyt-ni . . . . .	<i>Amoora rohituka</i> and <i>cucullata</i> .
Thyt-pa-gān . . . . .	<i>Millettia Brandisii</i> and <i>pulchra</i> .
Thyt-pa-young . . . . .	<i>Naravelia sessifolia</i> .
Thyt-pōk . . . . .	<i>Dalbergia purpurea</i> .
Thyt-pouk . . . . .	<i>Tetrameles nudiflora</i> .
Thyt-sā . . . . .	<i>Pardanthus chinensis</i> .
Thyt-tse-nweng . . . . .	<i>Dalbergia nigrescens</i> .
Thyt-sat . . . . .	<i>Aporosa villosula</i> .
Thyt-sēn . . . . .	<i>Terminalia belirica</i> .
Thyt-si . . . . .	<i>Melanorrhœa usitata</i> and <i>glabra</i> .
Thyt-tan . . . . .	<i>Myristica corticosa</i> (Kurz).
Thyt-tō . . . . .	<i>Sandoricum Indicum</i> (Kurz).
Thyt-wā-gyi . . . . .	<i>Sophora robusta</i> (Mason).
Thyt-wyn . . . . .	<i>Millettia pendula</i> .
Thyt-yā (or Thi-yā) . . . . .	<i>Shorea obtusa</i> .
Thyt-yin (or ya) . . . . .	<i>Croton oblongifolius</i> .
Ti-thi . . . . .	<i>Ficus carica</i> (Mason).
Tor-bōk . . . . .	<i>Diospyros</i> , sp.
Tor-chyn-boung . . . . .	<i>Hibiscus</i> .
Tor-htan . . . . .	<i>Livistona speciosa</i> .
Tor-ka-dat-ngān . . . . .	<i>Craria</i> , sp.
Tor-ka-ma-khā . . . . .	<i>Melia Burmanica</i> .
Tor-kwōn . . . . .	<i>Piper ribesoides</i> (Mason).
Tor-kwōn-thi . . . . .	<i>Areca triandra</i> .
Tor-ma-ji . . . . .	<i>Elæocarpus Wallichii</i> .
Tor-mong-tsi . . . . .	<i>Cassia</i> , sp. (Mason).
Tor-peh . . . . .	<i>Dolichos pilosus</i> .

Tor-pyor . . . . .	<i>Musa rubra</i> .
Tor-sa-lat . . . . .	{ <i>Justicia dentata</i> (Mason).
	{ <i>Tabernaemontana recurva</i> (Kurz).
Tor-sa-peh . . . . .	{ <i>Jasminum scandens</i> (Kurz).
	{ <i>Ichnocarpus frutescens</i> (Kurz).
Tor-shouk . . . . .	<i>Glycosmis cyanocarpa</i> (Kurz).
Tor-ta-kyet . . . . .	<i>Pandanus foetidus</i> .
Tor-tha-byē . . . . .	<i>Eugenia thumra</i> .
Tor-tha-pwōt . . . . .	<i>Sideroxylon grandifolium</i> .
Tor-that-hpyu . . . . .	<i>Albizzia lucida</i> .
Tor-thi-ben . . . . .	<i>Rottlera tinctoria</i> .
Tor-thi-dyn . . . . .	<i>Mallotus philippinensis</i> .
Tor-yē-nyo-nweh . . . . .	<i>Gouania leptostachya</i> .
Tor-zi-nweh . . . . .	<i>Zizyphus anoplia</i> .
Touk-tā . . . . .	<i>Tacca pinnatifida</i> .
Toung-phē-wan . . . . .	{ <i>Pterospermum acrifolium</i> (Mason).
	{ <i>Macaranga denticulata</i> and <i>gummiflua</i> (Kurz).
Toung-ka-thyt . . . . .	<i>Erythrina stricta</i> .
Toung-ka-zor . . . . .	<i>Millettia glaucescens</i> .
Toung-ka-zwōn . . . . .	<i>Argyrea capitata</i> .
Toung-ka-zwōn-gyi . . . . .	<i>A. tiliaefolia</i> .
Toung-khē-yeh . . . . .	<i>Pterocarpus</i> , sp. (Mason).
Toung-let-hpet . . . . .	<i>Eurya japonica</i> and <i>serrata</i> .
Toung-meh-sain . . . . .	<i>Indigofera Brunoniana</i> .
Toung-meh-za-li . . . . .	<i>Cassia Timoriensis</i> .
Toung-ōng . . . . .	<i>Arenga saccharifera</i> .
Toung-peing-neh . . . . .	<i>Artocarpus chaplasha</i> and <i>rigida</i> .
Toung-sa-gā . . . . .	<i>Myristica</i> , sp. (Mason).
Toung-su-ka-pān . . . . .	<i>Hiptage candicans</i> .
Toung-ta-mā . . . . .	<i>Cedrela multijuga</i> .
Toung-ta-mya . . . . .	<i>Desmodium pulchellum</i> .
Toung-tha-leh . . . . .	<i>Garcinia Kydia</i> .
Toung-thau-gyi . . . . .	<i>Premna integrifolia</i> .
Tsat-tha-pu . . . . .	<i>Pandanus odoratissimus</i> (Kurz).
Tsa-tha-khwā . . . . .	<i>Coccinea grandis</i> .
Tseik-chē . . . . .	<i>Pancoria rubiginosa</i> .
Tseik-gyi . . . . .	<i>Briedelia retusa</i> .
Twōt-ta-bat . . . . .	<i>Achras sapota</i> .
Tyn-wā . . . . .	<i>Cephalostachyum pergracile</i> .
Tyn-yu . . . . .	<i>Pinus Khasya</i> .
U-myn . . . . .	<i>Ipomœa xanthantha</i> .
Wā . . . . .	Generic for Bamboos.
Wā-bō . . . . .	<i>Dendrocalamus Brandisii</i> and <i>giganteus</i> .
Wā-hpyu-ga-lē . . . . .	<i>Gigantochloa albociliata</i> .
Wā-net . . . . .	<i>G. macrostachya</i> .
Wā-ni . . . . .	<i>Bambusa marginata</i> .
Wā-nweh . . . . .	<i>Dinorchloa MacClellandii</i> .
Wā-tha-hpwōt . . . . .	<i>Pseudostachyum Helferi</i> .
Wā-thaing . . . . .	<i>Phrynium macrostachyum</i> .
Wā-tsō-ban . . . . .	<i>Elæocarpus</i> , sp. (Mason).
Wā-yā . . . . .	<i>Dendrocalamus longispathus</i> .
Wā yeh . . . . .	<i>D. membranaceus</i> .
Weh . . . . .	<i>Amorphophallus campanulatus</i> .
Wet-che-pa-neh . . . . .	<i>Urena</i> , sp.
Wet-kyōt-pen . . . . .	<i>Zollingria macrocarpa</i> .
Wet-shor . . . . .	<i>Stereulia colorata</i> .
Wet-thyt-chē (or khyā) . . . . .	<i>Castanea tribuloides</i> .
Wun-u-nweh . . . . .	<i>Vitis erythroclada</i> .
Yan-ma-hēt (or htā) . . . . .	<i>Calamus latifolius</i> .

Yau-wa-htē-kyen . . . . .	<i>C. paradoxus.</i>
Yē-chyn (or Yē-ga'n) . . . . .	<i>Hymenocardia Wallichii</i> and <i>plicata.</i>
Yē-chyn-yā . . . . .	<i>Dalbergia spinosa.</i>
Yē-hmy-ōk. . . . .	<i>Treoria nudiflora.</i>
Yē-ka-dāt . . . . .	<i>Cratara hygrophila.</i>
Yē-ka-thyt . . . . .	<i>Erythrina lithosperma.</i>
Yē-kha-ōng . . . . .	<i>Ficus cunia.</i>
Yem-a-nē . . . . .	<i>Gmelina arborea</i> (Kurz).
Yem-a-nen ? . . . . .	
Yē-mein . . . . .	<i>Aporosa villosa.</i>
Yen-byā . . . . .	<i>Ancistrolobus mollis.</i>
Yen-daik . . . . .	<i>Dalbergia cultrata.</i>
Yen-doung . . . . .	<i>Vitis Indica.</i>
Yeng-yē . . . . .	<i>Lumnitzera racemosa.</i>
Yen-hnoung-nweh . . . . .	<i>Vitis Linnei.</i>
Yen-hnoung-peing-nweh . . . . .	<i>V. auriculata.</i>
Yen-kān . . . . .	<i>Zalacca Wallichii</i> (Kurz).
Yen-gan-khyo } . . . . .	<i>Zalacca edulis</i> . . . . . Sweet (Mason).
Yen-kan-chō } . . . . .	
Yen-kan-chyn . . . . .	<i>Z. edulis</i> . . . . . Souf (Mason).
Yen-mā (or Yi-mā) . . . . .	<i>Chickrassia velutina</i> and <i>tabularis.</i>
Yen-yē-myok-myi . . . . .	<i>Ehretia</i> , sp.
Yē-pa-daing . . . . .	<i>Crinum</i> , sp.
Yē-tha-byē . . . . .	<i>Eugenia operculata.</i>
Yē-thē-pau . . . . .	<i>Ficus glomerata</i> and <i>lanceolata.</i>
Yē-thu-gyi . . . . .	<i>Sesbania Egyptica.</i>
Yē-wun . . . . .	<i>Hibiscus macrophyllus.</i>
Yē-yō . . . . .	<i>Morinda angustifolia.</i>
Yin-gāt (or Yen-khāt) . . . . .	<i>Gardenia obtusifolia</i> and <i>coronaria.</i>
Yin-hnoung-nweh . . . . .	<i>Vitis auriculata</i> and <i>vitiginea.</i>
Yō-da-yā . . . . .	<i>Ochna Wallichii</i> (Kurz).
Yō-ka-dāt . . . . .	<i>Cratara hygrophila</i> (Kurz).
Yō-mā-hon-yō . . . . .	<i>Sarcopus albicans.</i>
Yōn . . . . .	<i>Phrynum.</i>
Yōng . . . . .	<i>Anogeissus acuminatus.</i>
Yōng-ma-di . . . . .	<i>Abelmoschus esculentus.</i>
Yūē-wun . . . . .	<i>Hibiscus macrophyllum.</i>
Yū-ē-gyi . . . . .	<i>Adinanthera paronina.</i>
Yū-ē-ngeh . . . . .	<i>Abrus precatorius.</i>
Ywet-kya-hyn-pouk . . . . .	<i>Semprevivum tectorum.</i>
Ywē-ti-thi . . . . .	<i>Ficus.</i>
Za-deip-hpyu } . . . . .	<i>Myristica longifolia.</i>
Za-dēk-hpyu } . . . . .	
Za-noung . . . . .	{ <i>Wallichia caryotoides.</i>
	{ <i>W. Yomæ.</i>
Za-yat . . . . .	<i>Lasia.</i>
Zi . . . . .	<i>Zizyphus jujuba.</i>
Zi-hpyu . . . . .	<i>Cicca macrocarpa.</i>
Zi-yā . . . . .	<i>Cuminum cyminum.</i>
Zoung-ga-lē . . . . .	<i>Ancistrolobus carnea.</i>
Zoung-ka-lā . . . . .	<i>Lagerstrœmia villosa</i> (Kurz).
Zoung-yā . . . . .	<i>Averrhoa carambola.</i>
Zym-byun (or by-wōn) . . . . .	<i>Dillenia pentagyna.</i>

## APPENDIX C.

## A SHORT GLOSSARY OF BOTANICAL TERMS.

Acerose.	Needle-shaped.
Achlamydeous.	A flower which has neither <i>calyx</i> nor <i>corolla</i> .
Achene.	A dry indehiscent fruit, with a single free seed not adhering to the <i>pericarp</i> , such as in the strawberry (seeds) and rose.
Acini.	Small fleshy drupes, as the fruit of the raspberry.
Acotyledonous.	Cryptogamous plants, which produce no cotyledons in germinating.
Acrogens.	Cryptogams, which grow at the extremity only, as ferns and mosses.
Aculeate.	Prickly.
Aulei.	Prickles.
Adnate.	The <i>anther</i> is so, when its cells are confluent with the connective throughout their length.
Æstivation.	The arrangement of the floral organs in the bud.
Alate.	Winged.
Albumen.	A vegetable product, tinged yellow or brown by iodine.
Alc.	See Papilionaceous.
Alternate.	See Leaf.
Amphigens.	Thallogens, which see.
Anatropous.	See Ovule.
Anisogynous.	See Isogynous.
Anisostemonous.	A plant with more or fewer <i>stamens</i> than <i>petals</i> .
Annulus.	In mosses, the separable border of the peristome of the fruit.
Andræcium.	The whorl within or above the <i>corolla</i> .
Anther.	The blade of a stamen containing the pollen.
Antheridium. }	{ Microscopic closed sacs, which when ripe open at some point and discharge a cloud of flattened thread-like bodies, very active, and the essential elements of fertilization.
Antheridia. }	
Antherozoa. }	{ The active filamentous bodies discharged from the <i>antheridium</i> .
Antherozoids. }	
Apiculate.	Ending in a point.
Apocarpous.	See Fruit.
Apetalous.	A flower when it has a <i>monochlamydeous perianth</i> .
Apothecia.	The organs of fructification in Lichens. Composed of <i>sporangia</i> or sacs containing spores.
Archegonia.	Microscopic sacs, open at one end, and containing a vesicle, which is fertilized by contact with one or more <i>antherozoa</i> .
Arillus.	An accessory development which covers the seed, generally after fertilization, without adhering to the <i>testa</i> .

Awn.	The beard or bristle of grasses.
Bark.	The external layer of woody plants, the inner portion of which is known as the <i>liber</i> or fibrous layer.
Basidia.	Rounded cells in <i>Fungi</i> , which terminate in <i>sterigmata</i> , which support the spores. Basidia may be either external or inclosed.
Basifixed.	An <i>anther</i> when attached to the filament by its base.
Braets.	Altered leaves, whence the flower axes spring.
Calyceoid.	A dichlamydeous flower, when both whorls are green or foliaceous.
Calyenle.	<i>Braets</i> simulating an accessory calyx.
Calyx.	The outer or lower whorl of the <i>flower</i> .
Calyx-tube.	The receptacular cup enveloping the carpels.
Capsule.	A syncarpous fruit.
Carpel.	One of the floral leaves constituting the pistil, and on the edges of which the ovules are developed.
Caryopsis.	A dry indehiscent fruit with a single seed adhering to the pericarp, as rice, wheat, maize, etc.
Catkin.	A <i>spica</i> , in which the flowers are incomplete, wanting either <i>stamen</i> or <i>pistil</i> .
Caudex.	The rhizome of an <i>aerogen</i> when enveloped by fronds. The stem of a tree-fern.
Cambium.	The growing layer, in Exogenous woody plants, interposed between the bark and the wood, and which is structurally related to both, the cambium layer of one year becoming the annual ring of wood in the next.
Campanulate.	Bell-shaped.
Carpel.	A leaf of the central or last whorl of the flower forming the pistil, and which bears on its edge the ovules.
Cellulose.	An insoluble substance, the common basis of the cell-walls, fibres, vessels, and wood.
Chalaza.	The thickened or discoloured part of the seed marking the place where the nutrient juices penetrate the internal coat.
Chlorophyll.	The vegetable substance to which the green colour of plants is due.
Clavate.	Club-shaped.
Clinode.	The fructiferous layer on the inner wall of a <i>conceptacle</i> in <i>Fungi</i> , analogous to the <i>Hymenium</i> .
Circinate.	Curled round.
Circumsciss.	A capsule is so, when it dehiscs transversely, as though fitted with a lid.
Conceptacle.	A closed spore-bearing cavity.
Conc.	A catkin shielded by thick scales, usually woody, but occasionally membranous, as in the hop.
Conidia.	Simple cells in <i>Fungi</i> , probably connected with the reproductive function.
Cortina.	In fungi the membranous veil, extending from the margin of the pileus, and protecting, when young, the organ of fructification, as in the common mushroom.
Corolla.	The inner whorl next to the <i>calyx</i> .
Corpuscule.	A microscopic cell-like body in either animals or plants.
Corymb.	A raceme of which the lower <i>pedicels</i> are so long that the flowers are nearly on a level. In the <i>Stock</i> the inflorescence is at first a <i>corymb</i> , changing to a <i>raceme</i> as the primary axis lengthens.
Cotyledon.	The leaf of the <i>embryo</i> .
Culm.	The stem of the <i>Gramineæ</i> .
Cyme.	In a cyme the primary axis terminates in a flower, and the flower-pedicels are nearly equal in length.

- Cytoblast. The granular nucleus of a cell, which acts as a cell-germ in producing a new cell, becoming less distinct as the cell develops.
- Decussate. See Leaf.
- Definite inflorescence. A *cyme*.
- Dehiscient. Fruits whose ripe pericarp gapes to permit the escape of the mature seeds.
- Dextrine. A vegetable product, analogous to starch, but soluble in cold water, and not turned blue by iodine.
- Di- or Triadelphous. *Stamens* are so when united into two or three bundles or columns.
- Dichlamydeous. A flower with a *double perianth*.
- Didynamous. *Stamens* are so when, of four, two are largest.
- Dielinous. A comprehensive term for monœcious, dioecious, and polygamous flowers.
- Diplostemonous. A plant with more than twice as many *stamens* as *petals*.
- Disk. A tumid ring, which in hypogynous flowers surrounds the base of the ovary, and the thickening round the base of the style.
- Dissepiments. The *septa* or partitions of a compound *ovary*.
- Distichous. Leaves which spring from alternate nodes, placed on two lines to right and left.
- Dioecious. A plant on which flowers of one sex only grow.
- Dorsifixed. An anther when attached to the filament by its back.
- Drupe. An indehiscent, usually one-seeded fruit, with a fleshy *mesocarp*, and usually a bony *endocarp*, as a cherry or peach.
- Duramen. The inner, denser, and more deeply coloured heart-wood.
- Elaters. Filiform appendages to the spores of *Equisetacea*, dilated at each end into a spirally coiled blade, very hygrometric, and which uncoils when subjected to moisture. Before expansion the *elaters* are coiled round the spore, their common point of attachment being on its equator, and the spatulate ends on its poles.
- Embryo. A very young and miniature plant composed of stem, root, bud, and one or two leaves.
- Endocarp. The inner layer of the pericarp.
- Endosmosis. The current of any fluid through a membrane from without, in opposition to *exosmosis*, which is a passage of a fluid from within.
- Endospore. The inner layer of the spore-wall of a *Lichen*.
- Epicarp. The outer layer of the *pericarp*.
- Epigynous. The *stamens* and *corolla* are so when inserted on the *pistil* itself.
- Epispore. The outer layer of the spore-wall of a *Lichen*.
- Epithallus. The superficial crust of *Lichens*.
- Exalbuminous. Without albumen.
- Extorse. The *anther* is so called when the sutures are turned towards the circumference of the flower.
- Exosmosis. See *Endosmosis*.
- Falcate. Curved like a scythe or sickle.
- Fasciculate, Fascieled. See Leaf.
- Faux. The throat; a point of junction of the *tube* and free *limb* of a monosepalous calyx.
- Fecula. Starch. A vegetable product insoluble in cold water and coloured blue by iodine. It occurs in the form of grains, which vary in shape with the species, furnishing thereby valuable evidence to the analyst and microscopist.
- Female. A flower possessing a *pistil*, but no *andracium*.
- Fertilization. The effect produced on the *ovules* by the deposition of pollen grains on the *stigma*.
- Filament. The petiole or stalk of a stamen.

Flower.	That part of a plant which shelters the reproductive organs.
Follicle.	A dry many-seeded fruit, opening along its ventral suture.
Fovilla.	The matter inclosed in the pollen-grains and the essential element in fertilization.
Free.	<i>Stamens</i> are so when completely separated.
Fruit.	The fertilized and ripe pistil, inclosing the seeds. It is <i>apocarpous</i> : 1. when its carpels are separate, as in the rose, in which each carpel is a fruit ; 2. the pistil forms a single carpel, as in the pea, wheat, or apricot. It is <i>syncarpous</i> when its carpels are united, as in the poppy. The ripe ovary is the <i>pericarp</i> , and it is composed of three layers, the <i>epicarp</i> , <i>endocarp</i> , and <i>mesocarp</i> or <i>sarcocarp</i> .
Funicle.	The cord uniting the ovule to the placenta, the homologue of the umbilicus in animals.
Gamopetalous.	See Monopetalous.
Glucose.	Grape sugar ; differs from cane sugar in containing three more molecules of water.
Glumelles.	The sub-opposite bracts of the fertile flowers of grasses, whereof the lower and outer is largest, and sheathes the upper, and is either armed with an awn or muticous.
Glumes, or empty glume.	The involucre of the sterile flowers of grasses, composed of two scaly, opposite bracts.
Gluten.	A vegetable product, present in most seeds, analogous to <i>albumen</i> , <i>fibrine</i> , and <i>casein</i> , but devoid of sulphur and phosphorus. It is obtained by washing flour in water, till the water ceases to be rendered turbid by the starch.
Gonidia.	Olive-green granules present in Lichens, and which distinguish these from <i>Fungi</i> , in which they are absent.
Goniotheca.	See <i>Micro-sporangia</i> .
Gymnosperms.	Plants with naked ovules, as in Conifers and Cycads.
Gynæcium.	The <i>pistil</i> .
Gynandrous.	<i>Stamens</i> are so when united for their entire length with the <i>pistil</i> .
Gynobase.	The dilated base of several confluent styles extending below the ovaries and surface of the receptacle.
Gynophore.	An elongated support to the <i>pistil</i> .
Head.	In a head the primary axis is vertically contracted, so as to gain in thickness what is lost in length.
Herbaceous.	Soft, like herbs.
Hermaphrodite.	A flower possessing both <i>andræcium</i> and <i>pistil</i> .
Hilum.	That part of the <i>testa</i> homologous to the 'navel' of animals, whereby the seed was attached by its <i>funicle</i> to the <i>placenta</i> .
Hymenium.	The proligerous layer of <i>Fungi</i> .
Hypogynous.	The <i>stamens</i> and <i>corolla</i> are so when they do not adhere to the <i>pistil</i> or <i>calyx</i> , but to the receptacle below the base of the pistil.
Hypothallus.	See Thallus.
Incomplete.	A flower deficient in either <i>calyx</i> , <i>corolla</i> , <i>andræcium</i> , or <i>pistil</i> .
Indehiscent.	Fruits which liberate their seeds by decaying, as the apple, or whose pericarp is pierced by the embryo, as in grasses.
Indefinite inflorescence.	Embraces <i>raceme</i> , <i>corymb</i> , <i>umbel</i> , <i>spike</i> , and <i>head</i> .
Indusium.	The involucre or pellicle investing the <i>sori</i> of Ferns.
Inflorescence.	A flowering branch complete.
Intorse.	The <i>anther</i> is so called when the sutures are turned towards the centre of the flower.
Involucre.	The <i>bracts</i> at the base of the <i>umbel</i> .
Isogynous.	A flower in which the <i>carpels</i> of the pistil equal the <i>sepals</i> in number ; <i>anisogynous</i> when the <i>carpels</i> are fewer ; and <i>polygynous</i> when they are more numerous than the <i>sepals</i> .

- Isostemonous. A plant whose *stamens* equal the *petals*.  
 Laciniate. A leaf when cut up into numerous acute divisions, called *laciniæ*.  
 Lageniform. Shaped like a flask.  
 Lanceolate. Leaves are lanceolate when broadest at the centre and gradually tapering each way.  
 Leaf. A leaf is *opposite* when two spring from the same node or opposite sides of the stem; *whorled* or *verticillate*, when several proceed from the same node; *alternate*, when but one proceeds from a node, and the next leaf is on the opposite side of the stem; *decussate*, when in opposite pairs, each pair at right angles to the next; *secund*, when all start from, or are turned to one side of the stem; *peltate*, when the petiole is not centrally or non-marginally attached below.  
 Legume. A follicle which opens along both its ventral and dorsal sutures into two valves.  
 Liber. See Bark.  
 Linear. Leaves are linear when with nearly parallel sides and more than five times longer than broad.  
 Lodicules. Minute scales surrounding the reproductive organs of some grasses.  
 Macro-sporangia. The true germinating spores of *Lycopodiaceæ*, termed also *oophoridia* and *spherotheca*.  
 Male. A flower which has an *andræcium*, but no *pistil*.  
 Mesocarp. The middle layer of the pericarp.  
 Micropyle. The minute hole whereby the pollen gains access to the ovule and effects its fertilization.  
 Micro-sporangia. The *goniotheca* of *Lycopodiaceæ*, containing the *antheridia*.  
 Monadelphous, Didelphous, etc. *Stamens* are so termed when united into one or more clusters.  
 Monandrous. See Polyandrous.  
 Monœcious. A plant on which grow both male and female flowers.  
 Monogynous, Digynous, etc. A flower is so called when the *pistil* consists of one or more parts.  
 Monosepalous. A *calyx* whose *sepals* more or less cohere.  
 Monopetalous or Gamopetalous. The corolla whose leaves unite to form a single piece.  
 Mucous. Unarmed, as the glumelle of a grass unprovided with an awn.  
 Mycelium. That portion of a fungus from which under favourable conditions the reproductive organs are developed. It is tenacious of vitality and can remain dormant for long periods, till stimulated into vigorous growth by light and moisture. It may exist in a filamentous, membranous, pulpy, or tubercular form, and is comparable with the *sarcode* of the *Protozoa*.  
 Neuter. A flower devoid of *pistil* and *andræcium*.  
 Orthotropous. See Ovule.  
 Obovate. Leaves are obovate when egg-shaped, with the broader end towards the apex.  
 Opposite. See Leaf.  
 Oogonia. Globose bodies wherein are developed the reproductive globules termed *oospores*.  
 Oophoridia. See Macro-sporangia.  
 Ovary. The blade of the carpel which protects the *ovules*.  
 Ovate. Leaves are ovate when egg-shaped, with the broader end towards the base.  
 Ovule. Small bodies (eggs) produced on the *carpels*. An ovule is *straight* or *orthotropous* when it is uniformly developed, and the *micropyle* remains opposite to the *hilum*. Should, however, the ovule be developed unequally, and the *micropyle* curve round in the direction of the *hilum*, it is then termed *reversed anatropous*. When the *hilum* and *chalaza* are united, and the

	<i>micropyle</i> bent round to them, then the ovule is termed <i>cam-pylotropous</i> .
Papilionaceous.	A flower when composed of 5 <i>petals</i> , of which the upper is next the axis, and incloses in bud the other 4, whereof the lateral pair, or <i>ale</i> , inclose the lower, which are often adherent by their lower margins.
Pappus.	The calyx-limb, when reduced to a tuft of bristles or silky hairs, as in the <i>Dandelion</i> .
Panicle.	A compound <i>raceme</i> with branched secondary axes.
Parenchyma.	The cellular tissue of plants.
Peduncle. } Pedicel. }	The supports of the flowers.
Peltate.	See Leaf.
Perianth.	The single or double whorl surrounding the <i>androeium</i> and <i>pistil</i> .
Pericarp.	The ripe ovary.
Perigynous.	The <i>stamens</i> and <i>corolla</i> are so when they are inserted on the calyx above the base of the <i>pistil</i> .
Petaloid.	A dichlamydeous flower when both whorls are coloured.
Phyllode.	A dilated petiole, which may replace the true blade.
Petals.	The leaves or segments which go to form the <i>corolla</i> .
Petiole.	The stalk of a <i>leaf</i> .
Pileus.	The dilated portion of <i>fungus</i> , bearing beneath it the organs of fructification in the form of gills, tubes, or processes.
Pistil.	The ovuligerous whorl within or above the <i>androeium</i> .
Placenta.	The fibro-vascular attachment between the <i>ovule</i> and <i>carpel</i> .
Pollen.	The dusty or granular parenchyma contained in the <i>anther</i> . The pollen-grains are the receptacles of the <i>Forilla</i> , which is the fertilizing agent.
Polyandrous.	A flower with more stamens than ten. Mon, di, tri, tetr. pent, hex, oct, enne, dec(androus), when the stamens are 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, respectively.
Polygamous.	A plant which has <i>hermaphrodite</i> flowers scattered among <i>male</i> or <i>female</i> ones.
Polygynous.	See Isogynous.
Polyssepalous.	A calyx whose <i>sepals</i> are wholly separate.
Prothallus.	The first stage of cellular development of the spore, on the lower surface of which ( <i>prothallus</i> ) are further developed the <i>antheridia</i> and <i>archegonia</i> .
Protein.	The basic constituent of all substances designated <i>albuminous</i> .
Putamen.	The stone or bony endocarp of a succulent fruit, as a peach.
Pycnidia.	Small conceptacles in Lichens, of obscure origin and function, perhaps supplementary to reproduction.
Raceme.	An inflorescence of which the nearly equal secondary axes rise along the primary axis.
Rachis.	The petiole or stalk; also the axis bearing the inflorescence of grasses.
Radical.	Leaves are so called, which spring from the root, and not, as is usually the case, the stem of a plant.
Receptacle.	In <i>Phanerogams</i> the swollen extremity of a branch, wherein the whorls of a flower are grouped. In the strawberry it forms the (so-called) fruit. In <i>Cryptogams</i> the <i>pileus</i> of a mushroom, or like fungus, being the dilated portion, on the under surface of which the reproductive organs are developed.
Regular.	When the parts of a whorl are equal and similar.
Retinacula.	Viscous bodies connected with the <i>stamens</i> of <i>Asclepias</i> , which secrete a viscid fluid which cements together the pollen-masses of two adjacent <i>anthers</i> .
Rhizome.	The root-stock or subterranean prolongation of the stem.

- Ruminate. When the *albumen* of a seed is traversed by septa or folds of the *testa*, simulating the folds in the stomach of a ruminant.
- Runcinate. A leaf when the points of its *laciniae* are directed downwards.
- Samara. A dry one- or two-seeded fruit, of which the pericarp forms a membranous wing above or round the cell.
- Sap. The blood of plants. A colourless fluid holding in solution all materials of plant-growth.
- Sap-wood. The newest or outer layers of wood in Exogenous trees.
- Sarcocarp. The *mesocarp*.
- Scape. A leafless peduncle attached to the stem.
- Secund. See Leaf.
- Seed. An ovule which has been fertilized by the pollen, and made capable of germination.
- Sepals. The leaves or segments which go to form the *calyx*.
- Sessile. With a broad base. A leaf is so called when it is directly attached without the intervention of a *stalk*.
- Silicle. A fruit or pod, whose length is less than three times its breadth.
- Siliquose. Pod-shaped, when the fruit or pod is more than three times as long as broad.
- Sori. A group of *sporangia*.
- Spadix. A spike of incomplete flowers, which, when young, is enveloped in a large bract or spathe.
- Spathe. A large bract enveloping the young *spadix*.
- Spatulate. Leaves are spatulate when narrow at the base and broader at the tip.
- Spermatia. See Spermatogonia.
- Spermatogonia. The organs of fertilization of Lichens, composed of conceptacles, immersed in the *thallus*, containing jointed filaments termed *sterigmata*, which produces minute corpuscles, or *spermatia*, the supposed fertilizing agents.
- Spherotheca. See Macro-sporangia.
- Spika. In a *spika* the flowers are sessile on the primary axis or spike.
- Sporangium. An organ or cavity wherein *spores* are developed, within the cellular mass constituting the organ.
- Spores. Minute membranous sacs, full of liquid from which a miniature plant is produced. They are developed freely within the sporangium, and never adhere to its walls.
- Squarrose. Leaves or bracts, with tips pointed and much spread or recurved.
- Stamens. The leaves or segments of the *androeium*.
- Staminodes. Rudimentary organs, which in female flowers represent analogically the stamens in male flowers.
- Standard or *Vexillum*. In a papilionaceous flower, the upper petal, which incloses the four others in bud.
- Starch. A vegetable product, tinged blue in solution by iodine, and whose component grains are of different shapes and sizes in different species.
- Stem. That portion of the vegetable axis which grows in an opposite direction to the root. It may be annual, biennial or perennial, as it lasts one, two, or many years.
- Sterigmata. See Spermatogonia.
- Sterile. A flower which is *neuter*.
- Stigma. The apical and spongy termination of the *style*.
- Stipe. The stalk of a *fungus*.
- Stipules. Appendages at the base of a *leaf*. Also its *tendrils*.
- Stoloniferous. A stem is so termed when creeping shoots are produced from the axils of its lower leaves, which give rise to tufts of leaves with corresponding roots to each tuft.
- Strobilus. A fir cone.

Strophiole (Strophiolate). }	Exerescences of the <i>testa</i> , independent of the <i>panicle</i> or <i>micropyle</i> .
Style.	The terminal prolongation of a <i>carpel</i> .
Suber.	A layer of the bark interposed between the <i>epidermis</i> and the <i>liber</i> .
Suffruticose.	Having a persistent stem, but the leaves and twigs renewed annually.
Sugar.	A vegetable product analogous to starch, but containing one more molecule of water.
Symmetrical.	When the parts of successive whorls are isometric or equal in number.
Syncarpous.	See Fruit.
Testa.	The external coat of a seed.
Tetradynamous.	Stamens are so, when, of six, four are large and paired.
Thallogens.	Cryptogams, whose growth is at the periphery, as Fungi and Lichens.
Thallus.	The vegetative apparatus of a Lichen, usually composed of three layers, the <i>cortical</i> , <i>gonidial</i> , and <i>medullary</i> , and sometimes a basal one, termed the <i>hypothallus</i> .
Theca.	See Urn.
Tigellus.	The cuticle or stem of the embryo.
Tomentum.	The downy covering of some plants.
Torus.	The part whereon the <i>corolla</i> and <i>androeceum</i> are inserted.
Trichogyne.	A tubular organ of fertilization in certain <i>Algae</i> ( <i>Floridæe</i> ).
Tuber.	The dilated extremities of underground roots, usually containing starch.
Umbel.	A <i>raceme</i> with the primary axis reduced to a point, and the secondary axis equal and radiating. When the secondary axes bear others, it is called compound.
Umbilicus.	The hilum.
Urecolate.	Pitcher-shaped.
Urn or Theca.	The capsular fruit of mosses (inclosing the <i>sporangium</i> ) borne on a pedicel ( <i>seta</i> ), usually furnished with cover ( <i>operculum</i> ); a central axis ( <i>columella</i> ); the margin ( <i>peristome</i> ); sometimes encircled by a separable border ( <i>annulus</i> ).
Utricle.	An <i>achene</i> with a thin and almost membranous <i>pericarp</i> .
Valves.	The segments of the ripe pistil which dehisce to allow the seeds to escape.
Vernation.	The arrangement of the petals and sepals in bud.
Verticillate.	See Leaf.
Volva.	In fungi the pouch enveloping the young plant.
Whorled.	See Leaf.
Zoospore.	A spore furnished with vibrating hairs and gifted with motion.

# ERRATA.

---

## VOL. I.

Page 280, line 27, *for or, read but rather.*

## VOL. II.

- Page 6, lines 3 and 4 from bottom, *for Myoung read Nyoung.*  
 „ 104, line 15, *for PULCHILLA read PULCHELLA.*  
 „ 111. Erase line 14.  
 „ 119, 8 lines from bottom, *for SUBULALUS read SUBULATUS.*  
 „ 142, line 40, *for Tan- read Tor-.*  
 „ 143, lines 3 and 7, *for Kwam read Kwön. Kamorta. Kar Nicobar.*  
 „ 221, 8 lines from bottom, *insert C. GNETOCARPA, Kz.*  
 „ 234, line 6, *for FUGIFOLIUM read FAGIFOLIUM.*  
 „ 269, line 8, *for Pyu-moung read Pyi-nyoung.*  
 „ 274. To end of note at bottom, *add pure.*  
 „ 290, lines 27 and 31, *for BASILLEÆ and BASILLI read BASELLEÆ and BASELLA.*  
 „ 304. *Below V. PUBESCENS add V. arborea, Roxb.*  
 „ 305, line 15 from bottom, *for LONGIPLEA read LONGIFOLIA.*  
 „ 335, line 27, *for CAUSCORA read CANSORA.*  
 „ 405, 4 lines from bottom, *for PARVIFLORA read PARVIFOLIA.*  
 „ 425, 14 lines from bottom *for SESSIFOLIA read SESSIFLORA.*  
 „ 501, *for GEISSAPIS read GEISAPSIS.*  
 „ 532, line 24 from bottom, *for MIMUSOIDES read MIMOSOIDES.*  
 „ 560, line 7, *for GLABRATUS read GLABRATA.*  
 „ 578, *remove LEPIONURUS and CHAMPEREIA to SANTALACEÆ, p. 221.*  
 „ 605, line 22, *for JAVANICUM read JAVANICUS.*  
 „ 627, line 10, *for G. read D.*  
 „ 638, 6 lines from bottom, *for JAPONIA read JAPONICA.*  
 „ 639, line 21, *before OLERACEA insert PORTULACA.*  
 „ 641, line 15, *for TELEPHIODES read TELEPHOIDES.*  
 „ 676, Order SAMYDACEÆ *transfer to page 675.*

## INDEX.

## PART I.—GENERA AND SPECIES.

- a.**
- abelmoschus, 614.  
 abildgaardia, 120.  
 abroma, 625.  
 abrotanum, 382.  
 abrus, 503, 676.  
 absus, 677.  
 abutilifolia, 604.  
 abutilon, 610.  
 acacia, 541.  
 acanthocoma, 52.  
 acanthopodium, 591.  
 acanthus, 312.  
 acarifera, 110.  
 acalypha, 250.  
 acaulis, 142, 403, 674.  
 acer, 555.  
 aceras, 183, 200.  
 acerifolium, 622.  
 aceroides, 622.  
 acerosum, 192.  
 acerosus, 125.  
 acervata, 194.  
 achras, 361.  
 achyranthes, 292.  
 acicularis, 517.  
 aciculatus, 112.  
 acida, 458.  
 acidissima, 593.  
 acidula, 456.  
 acinosum, 47.  
 acmella, 380.  
 acorus, 133.  
 acoroides, 144, 209.  
 acranthera, 429.  
 acriopsis, 183.  
 acrocarpus, 29, 540.  
 acrocephalus, 297.  
 acronychia, 591.  
 acroporium, 52.  
 acrostichoides, 72, 82.  
 acrostichum, 75, 80.  
 acrotrema, 669.  
 actephila, 232.  
 acnifera, 201.  
 aculeata, 294, 306, 538, 568.  
 aculeatum, 70, 83.  
 acuminata, 120, 229, 244, 258, 260, 265, 309, 321, 343, 479, 500, 505, 533, 551, 576, 631, 670.  
 acuminatissima, 470.  
 acuminatissimum, 353.  
 acuminatum, 307, 337, 349, 372, 486.  
 acuminatus, 314, 572.  
 acuta, 82.  
 acutata, 45, 52.  
 acutangula, 446, 473, 675.  
 acutangulus, 606.  
 acutiflora, 484.  
 acutifolia, 347.  
 acutirameum, 52.  
 acutirameus, 45.  
 acutissima, 50.  
 adenanthera, 540.  
 adenanthus, 509.  
 adenosacme, 429.  
 adenophylla, 320, 416, 560.  
 adenosma, 316.  
 adenostemma, 395.  
 adhatoda, 310.  
 adherens, 29.  
 adiantoides, 597.  
 adiantum, 46, 51, 66, 67, 84.  
 adinandra, 634.  
 adnascens, 82.  
 adnata, 21, 84, 384, 561.  
 adplanata, 48.  
 adustum, 34.  
 advena, 195.  
 ægialitis, 370.  
 ægiceras, 368.  
 æginetia, 321.  
 ægle, 596.  
 ægyptiacum, 105, 392.  
 æquata, 568.  
 æquifolium, 26.  
 aerides, 178, 189, 198, 680.  
 aeriopsis, 200.  
 æruginæa, 22, 24.  
 æruginosa, 21, 205.  
 ærva, 291.  
 æschynanthus, 321.  
 æschynomene, 501.  
 æsculus, 561, 677.  
 æstivalis, 120.  
 affine, 178, 198, 643.  
 affinis, 33, 98, 194, 201, 270, 322, 674.  
 afflatus, 119.  
 afra, 639.  
 africanus, 674.  
 afzelia, 535, 677.  
 agallocha, 254, 281.  
 aganosma, 349.  
 agapetes, 673.  
 agaricus, 31.  
 agave, 147.  
 ageratum, 294.  
 aggregata, 333.  
 aggregatum, 156, 192.  
 aglaia, 583, 677.  
 aglaonema, 131.  
 aglaophyllum, 28.  
 agnus-castus, 304.  
 agrostistachys, 242.  
 agrostophyllum, 164, 196.  
 ailanthus, 589.  
 ainsliea, 400.  
 ajacis, 670.  
 ajuga, 295.  
 alangium, 432.  
 alata, 145, 172, 197, 304, 389, 402, 476, 517, 532, 621.  
 alatus, 627.  
 alba, 167, 189, 196, 290, 294, 306, 379, 459, 520, 675.  
 albescens, 45, 53, 550.  
 albicans, 235, 286.  
 albida, 24, 32, 517.  
 albido-purpureum, 197.

- albidum, 41, 43, 49.  
 albiflora, 471.  
 albizzia, 543.  
 albizzioides, 235.  
 albo-ciliata, 99.  
 albo-lineatus, 202.  
 albo-sanguineum, 158, 192.  
 albo-setacea, 86.  
 album, 221, 223, 308.  
 alchornea, 247.  
 alcicorne, 190.  
 aleurites, 242.  
 alisma, 144.  
 allamanda, 344.  
 allium, 128.  
 allomorpha, 462.  
 allophyllus, 557, 677.  
 allughas, 207.  
 alnus, 258.  
 aloe, 128.  
 aloides, 42, 46, 54.  
 alceioidea, 674.  
 aloi-folium, 171, 197, 203.  
 alopecuroides, 45, 52, 500.  
 alopecurum, 188.  
 alpestris, 489.  
 alphonsea, 661.  
 alpinia, 207.  
 alseodaphne, 284.  
 alsinoides, 332.  
 alsodeia, 647.  
 alsomitra, 499, 675.  
 alsophila, 64, 85.  
 alstonia, 347.  
 alternanthera, 291.  
 alternifolia, 345.  
 althæa, 609.  
 altingia, 482.  
 altissima, 269.  
 alysicarpus, 498.  
 amæna, 240, 319, 530, 636.  
 amænum, 146.  
 amara, 285.  
 amaracarpus, 418.  
 amarantus, 291.  
 amboinensis, 33, 81, 147, 208.  
 ambrosinia, 130.  
 amentacea, 577.  
 americana, 147, 576, 624.  
 amherstiana, 260, 367, 536.  
 ammania, 454, 675.  
 ammanioides, 639.  
 amomum, 206.  
 amoora, 583, 677.  
 amorphophallus, 131.  
 amphidonax, 106.  
 amphiroa, 30.  
 amplexens, 301, 386.  
 amplexicaule, 466, 675.  
 amplexicanlis, 471.  
 amylum, 21.  
 ampullaceus, 222.  
 ampullaceum, 18, 180, 198.  
 amonilla, 602.  
 amygdalina, 289.  
 anabaina, 23.  
 anabaptista, 512.  
 anabus, 33.  
 anacardium, 550, 551.  
 anaccolosa, 577.  
 anæctochilus, 202.  
 anamirta, 656.  
 ananassa, 203.  
 anaphalis, 384.  
 anastamozans, 272, 352.  
 anceps, 190, 192, 366.  
 ancistrocladus, 625, 679.  
 anaxogorea, 663.  
 andamanensis, 197, 624.  
 andamanensium, 134.  
 andamania, 583.  
 andamanica, 99, 102, 225, 239, 248, 357, 364, 366, 411, 417, 578, 588.  
 andamanicum, 234, 252, 591.  
 andamanicus, 138.  
 andersonii, 202.  
 andrographis, 312.  
 andrographoides, 311.  
 andromeda, 373.  
 andropogon, 111.  
 ancilema, 124.  
 anerincleistus, 462.  
 angiopteris, 78, 80, 86.  
 anguillaria, 127.  
 anguina, 145, 414, 535.  
 angulata, 593.  
 angulatum, 156, 192, 371.  
 angulosa, 674.  
 angusta, 51, 473, 625.  
 angustifolia, 126, 184, 200, 287, 317, 410, 422, 423, 620.  
 angustifolius, 627.  
 angustissima, 430.  
 ania, 194.  
 anisochilus, 297.  
 anisoptera, 625.  
 annesleya, 630.  
 annua, 605.  
 annulata, 269, 370.  
 annuum, 326.  
 anodendron, 348.  
 anogeissus, 478.  
 anomala, 634.  
 anomalus, 46, 51.  
 anona, 664.  
 anosmodon, 54.  
 anosporum, 120.  
 anplectrum, 463, 675.  
 ansatum, 18.  
 anthemoides, 382.  
 anthelmintica, 398.  
 anthelminticus, 33.  
 anthistiria, 114.  
 antiaris, 275.  
 antidesma, 237.  
 antidysenterica, 349.  
 anthraceros, 48.  
 anthrophyllum, 434.  
 anthropophora, 184, 190.  
 antillarum, 24.  
 antiquorum, 131, 255.  
 antitaxis, 659.  
 antrophyum, 74, 81.  
 apetala, 459.  
 apetalum, 476.  
 aphanocapsa, 24.  
 apiculata, 196.  
 apium, 436.  
 apodytes, 578.  
 aponogeton, 672.  
 apophysatum, 27.  
 aporeticus, 557.  
 aporoides, 172, 197.  
 aporosa, 238.  
 aporum, 191, 192.  
 appendicula, 182, 183, 200, 203.  
 appendiculata, 383, 480.  
 appendiculatum, 76, 81, 181.  
 appendiculatus, 32.  
 applanata, 35.  
 applanatus, 33.  
 appressus, 45.  
 approximata, 412.  
 apteron, 570.  
 aquatica, 107, 291.  
 aquea, 472.  
 aquilina, 68, 84.  
 aquillaria, 281.  
 arabica, 418.  
 arachis, 500.  
 arachne, 105.  
 arachnites, 199.  
 arakana, 27.  
 aralia, 433.  
 arborea, 280, 302, 305, 398, 474, 592.  
 arboreum, 20, 361, 373, 486.  
 arbor-tristis, 351.  
 arborescens, 137, 551, 638.  
 arbuscula, 83.  
 arbusculum, 45, 51.  
 archidium, 48.  
 arcyna, 34.  
 ardisia, 366.  
 areca, 142.  
 arenarium, 24.  
 arenga, 141.  
 areolatus, 46, 54.  
 argemone, 654.  
 argentea, 68, 84, 121, 259, 288, 292, 329, 408, 583.  
 argostemma, 409.  
 arguta, 598, 676.  
 argutus, 47.  
 argyratus, 240.

argyreia, 333.  
 argyrophyllus, 205.  
 argyrostachya, 310.  
 ariadne, 47.  
 arietinum, 502.  
 arillaria, 493.  
 arillata, 642.  
 aristata, 109, 111.  
 aristatum, 83.  
 aristolochia, 229.  
 armata, 433, 631.  
 arnottiana, 336.  
 aromatica, 389.  
 aromaticum, 132.  
 aromaticus, 297.  
 artabotrys, 664, 679.  
 artemisia, 381, 674.  
 articulata, 162, 195.  
 articulatum, 224.  
 artocarpus, 267.  
 arum, 130.  
 arundina, 166, 196.  
 arundinacea, 98, 114, 208.  
 arundinaria, 97.  
 arundo, 106.  
 arvensis, 402.  
 ascalonicum, 128.  
 asclepias, 338.  
 asiatica, 302, 303, 323,  
 417, 435, 472, 570, 591,  
 604.  
 asiaticum, 146.  
 asoclada, 45.  
 asparagus, 125.  
 asper, 402.  
 aspera, 276, 292, 328, 396,  
 501, 567, 624.  
 asperifolium, 430.  
 asperum, 306.  
 aspidioides, 63.  
 aspidium, 61, 70, 83.  
 aspidioides, 85.  
 aspidocarya, 656.  
 aspidopterys, 599.  
 aspleniifolius, 403.  
 asplenium, 69, 83.  
 assa, 669.  
 assamica, 281, 518, 561.  
 assamicum, 53.  
 assimilis, 562.  
 asystasia, 308.  
 atalantia, 591.  
 athroisma, 385.  
 atota, 256.  
 atro-purpurea, 524.  
 atro-purpureum, 191.  
 atro-viridis, 58, 344.  
 attenuata, 205, 397.  
 attenuatum, 352, 361.  
 attenuatus, 679.  
 atylosia, 513.  
 aurantea, 31.  
 aurantiacus, 25.  
 aurantium, 595.

auratum, 68, 84.  
 aurea, 119, 668.  
 aureo-nitens, 48.  
 aureum, 22, 77, 80.  
 auricans, 495.  
 auricomum, 154, 191.  
 auricula-canis, 34.  
 auricula-judæ, 34.  
 auricularia, 297, 334, 412.  
 auriculata, 99, 456, 531,  
 563, 677.  
 auriculatum, 371.  
 auriculatus, 54, 314.  
 aurita, 389.  
 australis, 111.  
 avicennia, 298.  
 avenis, 365.  
 averrhoa, 597.  
 axanthes, 408.  
 axillare, 80.  
 axillaris, 123, 384.  
 azadiracht, 581.  
 azadirachta, 581.  
 azima, 354.  
 azurea, 300.

## b.

babylonica, 256.  
 baccatum, 254.  
 baccaurea, 236.  
 baccifera, 101, 455, 582,  
 675.  
 baculum, 18.  
 bæa, 673.  
 bæobotryoides, 234.  
 balanites, 590.  
 balanophora, 220.  
 balanostreblus, 276.  
 baliospermum, 251.  
 balsamea, 469.  
 balsamifera, 389.  
 balsamina, 598, 675.  
 bambusa, 97.  
 bambusifolia, 166, 195.  
 bambusifolium, 192.  
 bancana, 264, 633.  
 bancanum, 234, 673.  
 bantamense, 83.  
 barbadense, 617.  
 barbata, 105, 120, 169,  
 331, 388, 421, 513, 565,  
 675.  
 barbatum, 110, 113, 207,  
 293, 463.  
 barbatus, 243.  
 barclaya, 654.  
 barleria, 313.  
 barometz, 61, 85.  
 bartramia, 51.  
 barringtonia, 472.  
 basilla, 290.  
 basilicum, 297.  
 bassia, 362.  
 batatas, 332.  
 batrachospermum, 27.  
 batrathierium, 115.  
 baulinea, 532, 677.  
 beaumontia, 347.  
 beckia, 676.  
 begonia, 442, 674.  
 begoniæfolia, 432.  
 begoniæfolium, 371.  
 beilschmiedia, 284.  
 belangeri, 57.  
 belerica, 475.  
 benicasa, 446.  
 benjamina, 270.  
 bengalense, 28, 587.  
 bengalensis, 106, 118, 121,  
 269, 336, 418, 599, 647.  
 bennetii, 590.  
 bensonæ, 193.  
 bensoni, 174, 198.  
 bensoniæ, 160, 167, 188,  
 196.  
 benthamiana, 133.  
 berberis, 655, 679.  
 berchemia, 570.  
 bergia, 639.  
 berkleyi, 680.  
 berrya, 602.  
 betle, 231.  
 betula, 258.  
 bialata, 475.  
 biarticulatum, 498.  
 biaurita, 84.  
 bicalyculata, 309.  
 bicameratum, 192.  
 biceps, 344.  
 bicolor, 45, 52, 333, 392,  
 666.  
 bidaria, 337.  
 bidens, 378.  
 bifaria, 106.  
 bifarium, 253.  
 bifida, 322, 408.  
 biflora, 379, 410.  
 biflorus, 510.  
 bifolia, 185.  
 bitoliata, 386.  
 biforme, 77, 80.  
 biformis, 52.  
 bigeminum, 677.  
 bigibbum, 199.  
 biglandulosa, 677.  
 biglandulosus, 182.  
 bignonia, 320.  
 bijuga, 535.  
 bilabiatus, 323.  
 bilimbi, 597.  
 bilinguis, 198.  
 billardieri, 385, 674.  
 biloba, 190, 196.  
 biloculare, 429.  
 binectariferum, 582.  
 binoculare, 193.

biophytum, 597.  
 bipinnata, 378.  
 bipinnatum, 81.  
 bispicata, 316.  
 bipunctatum, 199.  
 birmanica, 435, 581.  
 birmanicum, 48, 394, 437.  
 birmanicus, 676.  
 birmense, 54.  
 birmensis, 50, 51.  
 bischoffia, 236.  
 bispinosa, 427, 454.  
 bis-striata, 190.  
 bivalvis, 572.  
 bixa, 644.  
 bladhi, 112.  
 blanda, 297, 397.  
 blechnoides, 74, 81.  
 blechnum, 84.  
 blepharis, 312.  
 blepharistes, 191.  
 bletia, 165.  
 blinkworthia, 333.  
 blumea, 386.  
 blumei, 167, 180, 196, 198.  
 blumeodendron, 248.  
 blyxa, 210.  
 bocagea, 661.  
 boehmeria, 264.  
 boerhaavia, 294.  
 boerhaaviefolia, 311, 312.  
 boltonia, 391.  
 bombax, 617.  
 bombycina, 20.  
 bombycis, 26.  
 bona-nox, 331.  
 bonariensis, 306.  
 boncerosia, 336.  
 bonduc, 539.  
 bonnaya, 323.  
 bootanense, 191.  
 boottia, 209.  
 borassus, 140.  
 borbonica, 673.  
 borongensis, 50, 54.  
 bostrychia, 28.  
 botryoides, 19.  
 bouea, 552.  
 boxallii, 158, 189, 193, 680.  
 brachycarpa, 508, 512, 533.  
 brachymenium, 51.  
 brachyphylla, 126.  
 brachyptera, 188, 680.  
 brachystachys, 190, 197.  
 brachystemma, 640.  
 brachytome, 428.  
 bracteata, 207, 217, 291,  
 300, 323, 348, 396, 444,  
 461, 507, 514, 515, 520,  
 579, 661, 669, 673, 677.  
 bracteatus, 607.  
 bracteolata, 208, 396, 468.  
 bracteosa, 196.  
 bragantia, 230.

brainea, 73, 81.  
 brandisia, 307.  
 brandisii, 100, 310, 314,  
 571, 579, 667.  
 brandisiana, 261, 360, 367,  
 400, 420, 443, 463, 524.  
 brandisianus, 222.  
 brasiliense, 34.  
 brassica, 648.  
 brassiopsis, 433.  
 brathys, 638.  
 braunii, 27.  
 brevicaudatus, 350.  
 breviflorum, 346.  
 brevifolium, 110, 113, 327.  
 brevifolius, 112.  
 brevipes, 678.  
 brevis, 24.  
 breweria, 333.  
 breynia, 235.  
 briedelia, 239.  
 brizoides, 110.  
 bromheadia, 172, 197.  
 broussonetia, 275.  
 brownei, 103.  
 brownlowia, 602.  
 brucea, 589.  
 bruguiera, 481.  
 brunneo-pictus, 33.  
 brunnescens, 419.  
 brunoniana, 190.  
 brunonianum, 213, 322,  
 522, 655.  
 brunonis, 419.  
 bryoides, 46.  
 brymerianum, 193.  
 bryonia, 448.  
 bryophyllum, 481.  
 bryopsis, 28.  
 bryum, 44, 51.  
 bubalina, 545.  
 buccosum, 199.  
 buehanani, 339.  
 buehanania, 551.  
 buehananiana, 670.  
 bucklandia, 482.  
 buddleia, 308.  
 budruna, 591.  
 buettneria, 624.  
 buitenzorgii, 45, 53.  
 bulbiferum, 264.  
 bulbochaete, 27.  
 bulbophyllum, 154, 188,  
 190, 202, 680.  
 bulbosus, 507.  
 bullata, 85.  
 bullosa, 23.  
 bunias, 237.  
 burmanica, 20, 197, 208,  
 250, 359, 467, 552, 556,  
 602.  
 burmaicum, 52.  
 burmanicus, 23, 315, 665.  
 burmanni, 109, 483.

burmannia, 147.  
 burmensis, 32.  
 bupleurifolius, 499.  
 bupleurum, 436.  
 bursera, 587.  
 butea, 504.  
 buxifolia, 357.

## C.

cadamba, 405.  
 caelogyne, 163, 188, 191.  
 caerulea, 175, 525.  
 caerulescens, 175, 198, 464.  
 caeruleum, 464.  
 caesalpinia, 538.  
 caesia, 543, 646.  
 caespitosa, 124, 333, 408.  
 caespitosus, 32.  
 caespitosulus, 52.  
 caespitosus, 45.  
 caesulia, 384.  
 cainito, 361.  
 cajanus, 514.  
 calamaria, 190.  
 calamicola, 19.  
 calamus, 133, 137.  
 calanthe, 165, 196.  
 calcarata, 508.  
 calcaratum, 83.  
 calcaratus, 676.  
 calceolare, 180, 199.  
 calceolaria, 157, 193.  
 calcicola, 24.  
 calendulacea, 379.  
 calicostella, 46, 51.  
 callicarpa, 305.  
 callicoma, 20.  
 callidura, 677.  
 callistephus, 392.  
 callosa, 200, 272.  
 calocarpa, 416, 659.  
 calocarpum, 233.  
 calocarpus, 571.  
 calococcus, 242.  
 caloneura, 271, 311, 362,  
 452, 522, 553.  
 calonyction, 332.  
 calophylla, 200, 267, 344,  
 603.  
 calophyllum, 185, 636, 679.  
 calophyllus, 547.  
 calosanthus, 320.  
 calosera, 34.  
 calostachyus, 100.  
 calotropis, 338.  
 calpicarpa, 569.  
 calpicarpum, 345.  
 calycina, 105, 346, 349,  
 398, 414, 429, 518, 612.  
 calycinum, 640.  
 calycopteris, 479.  
 calyculata, 457, 569.

- calymperes, 44, 50.  
 calymperoideum, 44, 50.  
 calyptratus, 435.  
 calystegia, 673.  
 camarotis, 182, 199.  
 camellia, 633.  
 camelliaeflora, 633.  
 campanulata, 331, 425,  
     499, 620, 673, 676, 679.  
 campanulatum, 371.  
 campanulatus, 131.  
 campanumæa, 374.  
 campestris, 31, 648.  
 campylum, 53.  
 campylopus, 49.  
 cana, 521, 527.  
 canaliculatum, 115.  
 canarium, 587.  
 cananga, 662.  
 canavalia, 510.  
 cancellatus, 615.  
 canceolatum, 253.  
 candicans, 599.  
 candida, 206, 523.  
 candidum, 197.  
 candidus, 25.  
 candolleana, 285, 481.  
 candollei, 511, 623, 659.  
 canescens, 44, 49, 304, 374,  
     556, 560.  
 canna, 209.  
 cannabinus, 614.  
 cannabis, 262.  
 cansjera, 577.  
 cantoniensis, 348, 642.  
 canum, 297.  
 canziana, 450, 675.  
 capensis, 370.  
 capillacea, 52.  
 capillaceus, 45.  
 capillaris, 313, 428.  
 capillipes, 190, 192, 598.  
 capillus-veneris, 67, 84.  
 capitata, 333, 516, 578.  
 capitatus, 119, 297, 314.  
 capitellata, 365, 411, 464.  
 capitellatum, 676.  
 capitulata, 117.  
 cappa, 383.  
 capparid, 650, 679.  
 capronatus, 32.  
 capsicum, 326.  
 capsularis, 605.  
 carallia, 481.  
 caralluma, 336.  
 caranibola, 597.  
 carandas, 344.  
 carapa, 585.  
 cardamine, 618.  
 cardamomum, 206, 207.  
 cardiocarpa, 641.  
 cardiopteris, 580.  
 cardiospermum, 560.  
 careya, 473.  
 careyana, 208.  
 careyanum, 154, 191.  
 carex, 118.  
 carica, 452.  
 carinata, 200.  
 carinatus, 337.  
 carissa, 344, 673.  
 carnosa, 298, 334, 336.  
 carnosum, 321.  
 carnosus, 297.  
 carota, 438.  
 carpacanthus, 27.  
 carpinifolia, 609.  
 carpinus, 259.  
 carthamus, 398.  
 caruifolia, 674.  
 carum, 436.  
 caryophylloides, 481.  
 caryota, 141.  
 caryotoides, 141.  
 casearia, 450, 675.  
 caseariaefolia, 253.  
 cassia, 283, 530, 677.  
 cassytha, 288.  
 castanea, 259.  
 castaneocarpus, 253.  
 castaneus, 646.  
 casuarina, 257.  
 catappa, 475.  
 cataphracta, 644.  
 catechu, 143, 542.  
 catenella, 29.  
 cathartica, 314.  
 caudata, 58, 356, 526, 595,  
     633.  
 caudatum, 45, 53, 84, 128,  
     283, 287.  
 caudatus, 241, 350, 378.  
 candicans, 296, 515.  
 caudiformis, 81.  
 caulescens, 58.  
 cauliflora, 535.  
 cauliflorum, 582.  
 causecora, 335.  
 cedrela, 586.  
 celastrifolia, 631.  
 celastrinum, 465.  
 celastrinus, 573.  
 celastroides, 677.  
 celastrus, 572, 677.  
 celebica, 674.  
 celosia, 292.  
 celtis, 278.  
 centipeda, 382.  
 centotlieca, 103.  
 centranthera, 322.  
 centrostachys, 291.  
 cepa, 125.  
 cephaelis, 415.  
 cephalandra, 447.  
 cephalanthus, 414.  
 cephalostachyum, 100.  
 cephalostigma, 374.  
 cephalotis, 120, 498.  
 cerasoides, 469, 663.  
 cerasiforme, 465.  
 ceratina, 35.  
 ceratochilus, 182.  
 ceratodon, 49.  
 ceratophyllum, 672.  
 ceratopteris, 69, 84.  
 cerbera, 345.  
 cercocoma, 349.  
 cerifera, 446.  
 ceriops, 480.  
 cernua, 462.  
 cernuum, 57.  
 cerropegia, 336.  
 chælophora, 19.  
 chærophylla, 85.  
 chætaria, 106.  
 chætocarpus, 253.  
 chætomorpha, 20.  
 chailletia, 580, 678.  
 chalybea, 24.  
 chamælocladon, 132.  
 chamærops, 139.  
 champaca, 600.  
 champerica, 221.  
 champereya, 578.  
 championi, 172, 197.  
 chantransia, 27.  
 chaplasha, 267.  
 chappar, 515.  
 chara, 55.  
 charantia, 446.  
 chartacea, 358.  
 chasalia, 417.  
 chavica, 231.  
 chebula, 475.  
 cheilanthes, 67, 84.  
 cheilosa, 253.  
 cheirostylis, 201.  
 chelenoides, 318.  
 chelidonii, 650.  
 chickrassia, 585.  
 chiloscyphus, 47.  
 chinense, 144, 293, 478,  
     638.  
 chinensis, 104, 105, 118,  
     119, 146, 392, 394, 396,  
     399, 460, 518, 597, 633,  
     641.  
 chionachne, 107.  
 chionanthus, 353.  
 chionostomum, 52.  
 chirita, 321.  
 chittagonga, 273, 583, 678.  
 chlorantha, 201.  
 chloranthus, 230.  
 chlorinus, 25.  
 chloris, 105.  
 chlorostachya, 312.  
 choetomitrium, 55.  
 chondrococcus, 29.  
 chonomorpha, 349.  
 chrocococcus, 24.  
 chroolepus, 19.

- chrysanthemum, 380.  
 chrysocarpa, 271.  
 chrysocaulon, 57.  
 chrysocrepis, 192.  
 chrysophyllum, 361.  
 chrysopogon, 112.  
 chrysotoxon, 156, 192.  
 chthonoblastus, 23.  
 cibotium, 63.  
 cicca, 235.  
 cicer, 502.  
 cichorium, 401.  
 cicutarium, 82.  
 ciliata, 109, 114, 315, 501.  
 ciliatum, 193.  
 cinerea, 396, 469, 674.  
 cinereum, 22.  
 cinereo-fuscus, 33.  
 cinnabarinum, 309.  
 cinnabarinus, 33.  
 cinnamomea, 278.  
 cinnamomeum, 623.  
 cinnamomum, 282.  
 cipadessa, 582.  
 circaeoides, 597, 678.  
 circinalis, 54, 211, 513.  
 circumscissus, 570.  
 cirrhopetalum, 191.  
 cissampelos, 638.  
 cistoides, 600.  
 citrifolia, 422, 593.  
 citriua, 475.  
 citrinum, 34, 197.  
 citrullus, 447, 675.  
 citrus, 595, 678.  
 cladium, 119.  
 cladonia, 35.  
 cladophora, 20.  
 clausena, 594.  
 claviflora, 468.  
 clavata, 27.  
 clavatum, 57.  
 clavigera, 675.  
 clayoxylon, 249.  
 cleidion, 248.  
 cleistostoma, 182, 199, 203.  
 cleistanthus, 240.  
 clematis, 669.  
 cleome, 650.  
 clerodendron, 302.  
 clitoria, 503.  
 clivorum, 674.  
 closterium, 18.  
 clypearia, 545.  
 enemidia, 201.  
 cnesmone, 250.  
 cnestis, 547.  
 cnicus, 399.  
 coadunatus, 32.  
 coalitus, 47.  
 coarctatum, 352.  
 coccigera, 598.  
 coccinea, 177, 198, 204,  
 350, 420, 567, 620.  
 coccineo-bracteatum, 587.  
 coccineum, 233.  
 coccineus, 223.  
 coccocarpia, 35.  
 cocculus, 656.  
 cochillinifera, 441.  
 cochlin-chinense, 445.  
 cochlin-chinensis, 279, 447,  
 523.  
 cochleare, 189.  
 cochlospermum, 644.  
 cocos, 143.  
 codiaëum, 252.  
 codiola, 20.  
 codonopsis, 374, 674.  
 cœlachne, 104.  
 cœlodiscus, 248.  
 cœlogyne, 680.  
 coetsa, 297.  
 coffea, 418.  
 coix, 107.  
 colebrookia, 296.  
 colebrookianum, 431.  
 colocasia, 131.  
 colocynthis, 675.  
 colonum, 109.  
 colorata, 620.  
 colquhounia, 295.  
 colubrina, 570.  
 columbia, 602.  
 columnaris, 234.  
 combretum, 476.  
 commeliæfolia, 201.  
 commelyna, 124.  
 commune, 32.  
 communis, 124, 251, 309,  
 520, 677.  
 commutata, 545.  
 commutatum, 109.  
 comosa, 86, 205.  
 compactiflora, 418, 567.  
 compactiflorum, 101.  
 complanata, 20, 120.  
 composita, 511.  
 compositum, 109.  
 compressa, 20, 97.  
 compressifolium, 53.  
 compressifolius, 45.  
 compso-pogon, 19.  
 concava, 599.  
 concavula, 47.  
 concinnum, 496.  
 concentricum, 35.  
 concolor, 187, 194, 202, 287.  
 condensata, 27.  
 condylo-bulbon, 190.  
 conferta, 280, 501.  
 conferva, 20.  
 confervoides, 29.  
 conforme, 81.  
 conformis, 49.  
 congesta, 515.  
 conjugata, 480.  
 conjugatum, 82, 110.  
 conjugatus, 112.  
 connarus, 546.  
 connata, 416.  
 conocephalus, 266.  
 conoidea, 472.  
 consimile, 418.  
 conspersa, 513.  
 constrictus, 184, 200, 415.  
 contaminans, 86.  
 continuus, 31.  
 contorta, 20.  
 contortus, 113.  
 contracta, 468.  
 convallaria, 195.  
 convallarioides, 194.  
 conyza, 390, 674.  
 conyzoides, 395.  
 corchorus, 605.  
 corchorifolia, 623.  
 cordata, 75, 81, 205, 209,  
 230, 264, 444, 564, 640.  
 cordatum, 45, 52.  
 cordatus, 405.  
 cordia, 328.  
 cordifolia, 82, 323, 405,  
 430, 435, 452, 461, 499,  
 610, 656, 677.  
 cordyline, 127.  
 coriacea, 290, 330.  
 coriaceum, 81.  
 coriandrum, 438.  
 coriaria, 600.  
 cornea, 634.  
 corneus, 54.  
 corniculata, 368, 597, 678.  
 cornu-cervi, 173, 197.  
 cornus, 433.  
 coronans, 73.  
 coronaria, 321, 425.  
 coronarium, 207, 381, 412.  
 coronatum, 44, 51.  
 corticosa, 290.  
 corticum, 34.  
 corumbium, 254.  
 corylifolia, 520, 610.  
 corymbosa, 291, 408, 413,  
 429, 640, 673.  
 corymbostachyum, 207.  
 corymbosum, 109.  
 corymbosus, 97.  
 corypha, 139.  
 coryzoides, 395.  
 cosmos, 378.  
 costata, 142, 412, 564, 663.  
 costatum, 76, 81, 478, 669,  
 676.  
 costatus, 627.  
 costus, 205.  
 cotoides, 440.  
 cottonia, 172, 197.  
 cotula, 382.  
 cowa, 634.  
 crabro, 169, 196.  
 craspidophyllus, 54.

crassa, 21, 335.  
 crassans, 52.  
 crassifolia, 335, 651.  
 crassifolium, 198.  
 crassifolius, 664.  
 crassinervia, 583.  
 crassinode, 159, 163, 188,  
 193.  
 crassipes, 32, 577, 678.  
 crassissima, 393.  
 crassiuscula, 612.  
 cratægifolius, 314.  
 cratægoides, 356.  
 crataeva, 652.  
 cratoxylon, 638.  
 crenata, 653, 675, 679.  
 crenulata, 263, 336, 476,  
 625.  
 crenulatum, 308.  
 crepidatum, 194.  
 crepis, 401, 674.  
 crepusculum, 25.  
 cretaceum, 194.  
 crinita, 460, 500.  
 crinitum, 52, 295.  
 crinum, 146.  
 crispa, 321, 347, 368, 567.  
 crispata, 48, 145.  
 crispatum, 385.  
 crispatulus, 45, 52.  
 crispum, 198.  
 crispus, 314.  
 cristata, 292, 313, 501.  
 cristatum, 122.  
 criticus, 100.  
 crocatus, 54.  
 crotalaria, 517, 677.  
 crotalarioides, 611.  
 croton, 240.  
 crumenatum, 155, 192, 202.  
 crustacea, 323.  
 crus-galli, 109.  
 crypteronia, 457.  
 cryptocarpus, 50.  
 cryptocarya, 284.  
 crytochilus, 160, 194.  
 cryptolepis, 339.  
 cryptostachya, 118.  
 crystallina, 410.  
 csystallinum, 193.  
 cucullata, 58, 584.  
 cucullatum, 43, 49, 539.  
 cucumis, 447.  
 cucumerina, 444.  
 cucurbita, 448, 675.  
 eudrania, 268.  
 caltrata, 85, 183, 200, 528.  
 cuminum, 438.  
 cumingii, 71.  
 cumingii, 527.  
 eumulatum, 193.  
 cuneata, 28, 425.  
 cuneatum, 604.  
 cuneatus, 608, 678.

cuneifolia, 336, 421.  
 cuneifolium, 639.  
 cunia, 273.  
 cupania, 559.  
 cupanioides, 561.  
 cuprea, 201.  
 cupreum, 191, 680.  
 curassavica, 338.  
 curcas, 252.  
 curculigo, 146.  
 curculigoides, 202, 203.  
 cureuma, 205.  
 curreyi, 33.  
 curvata, 427, 461.  
 curvatiramenum, 55.  
 curvatum, 109.  
 curviflora, 417.  
 curvifolia, 382.  
 curvifolium, 180, 198.  
 curvirostris, 45.  
 cuscuta, 329.  
 cuspidata, 278, 657.  
 cuspidatum, 41, 46, 81, 192.  
 cyamopsis, 520.  
 cyanens, 25.  
 cyanocarpa, 415, 592.  
 cyanocarpum, 463.  
 cyanotis, 123.  
 cyathiforme, 34.  
 cyathocalyx, 663.  
 cyathocline, 391.  
 cyathophorum, 46, 51.  
 cyathostemma, 662.  
 cyathula, 292.  
 cycas, 211.  
 cyclea, 658.  
 cyclodon, 374.  
 cyclostemon, 238.  
 cynoches, 195.  
 cylindrica, 44, 50, 114, 446.  
 cylindrospermum, 22.  
 cylindrothecium, 54.  
 cylista, 514.  
 cymaria, 295.  
 cymbidium, 166, 174, 189,  
 197, 203.  
 cymbifolia, 46.  
 cymbifolium, 54.  
 cyminum, 438.  
 cymodocea, 141.  
 cymosa, 470, 575.  
 cymosus, 316.  
 cynoctonum, 339.  
 cynometra, 535.  
 cynomorium, 220.  
 cynosuroides, 104.  
 cythus, 34.  
 cyperoides, 45, 53.  
 cyperus, 121.  
 cypripedium, 187, 189,  
 202.  
 cyrtandra, 321.  
 cyrtopera, 170, 197.  
 cystacanthus, 316.

cystopteris, 85.  
 cytisoides, 520.

## d.

dacrydium, 216.  
 dactylon, 104.  
 dactyloctenium, 105.  
 dædalacanthus, 313.  
 dædalia, 33.  
 dæmonum, 34, 145.  
 dæmonorops, 138.  
 dalbergia, 527, 677.  
 dalechampia, 250.  
 dalbousianum, 157, 193,  
 680.  
 daltoni, 233.  
 damascena, 488.  
 danura, 557.  
 daphne, 281.  
 daphnephyllopsis, 578.  
 daphnidium, 287.  
 daphniphyllum, 575.  
 dareæforme, 72, 82.  
 dasyanthum, 451.  
 dasycalyx, 240.  
 dasycarpa, 311, 425, 658.  
 dasymaschala, 662.  
 dasyphylla, 195, 360.  
 dasypogon, 35.  
 dasypus, 194.  
 dasysperma, 315.  
 dasystylum, 233.  
 dasystachyum, 478.  
 datura, 326.  
 daucus, 438.  
 davallia, 65, 85.  
 dawsoniana, 197.  
 dawsonianus, 202.  
 dayanum, 190.  
 dearei, 680.  
 debile, 56.  
 debilis, 57.  
 decandra, 439, 480.  
 decandrum, 284.  
 decapetalum, 432.  
 decaschistia, 612.  
 decaspermum, 467.  
 decimina, 21.  
 decipiens, 213.  
 decolorata, 55.  
 decora, 400, 493.  
 decorticata, 35.  
 decumana, 595.  
 decurrens, 82, 85.  
 decussata, 310.  
 decussatum, 352.  
 deeringia, 292.  
 delicatula, 675.  
 delima, 669.  
 delphinium, 670.  
 deltoidea, 399, 449.  
 demersum, 672.

- dendrobium, 155, 188, 191,  
     202.  
 dendrocalamus, 99.  
 dendrochilum, 162, 195.  
 denisoniana, 174, 198.  
 densiflora, 141, 359, 514.  
 densiflorum, 192, 199.  
 densiflorus, 393, 674.  
 densum, 50.  
 dentata, 331, 354.  
 dentella, 409.  
 dentelloides, 455.  
 denticulata, 247, 331.  
 denticulatum, 85, 199.  
 depressum, 640.  
 derris, 529, 677.  
 descendens, 32.  
 desmodium, 494, 676.  
 desmos, 662.  
 devouianum, 193.  
 diacalpe, 63, 85.  
 diander, 106.  
 diandrum, 238.  
 diantha, 321.  
 diarrhena, 104.  
 diatripe, 35.  
 dichondra, 329.  
 dichotoma, 62, 86, 208,  
     295, 501.  
 dicksonia, 63, 85.  
 didlidocarpus, 605.  
 dicliptera, 309.  
 dicoma, 400.  
 dicrana, 47.  
 dicranella, 49.  
 dicranodontium, 49.  
 dicranum, 43, 49.  
 microcephala, 674.  
 dictyopteron, 54.  
 didyma, 123.  
 didymochlena, 70, 83.  
 didymodon, 43.  
 didymogyne, 264.  
 didymum, 423.  
 difforme, 82, 178, 198.  
 diffusa, 264, 310, 335, 344,  
     387, 646.  
 diffusum, 497, 648.  
 diffusus, 670.  
 digera, 291.  
 digitata, 35, 78, 80, 201.  
 digyna, 539.  
 dilatata, 125.  
 dilatatum, 81.  
 dillenia, 668, 680.  
 dilleni, 441.  
 dilutus, 122.  
 dimeria, 114.  
 dinochloa, 102.  
 dioclea, 511.  
 dioica, 354, 447, 639.  
 dioscorea, 144.  
 diospyricarpa, 633.  
 diospyros, 358.  
 diphtheriticus, 26.  
 diphylla, 120, 534.  
 diphyllum, 500.  
 diplospora, 427.  
 diptostromium, 20.  
 dipsacus, 404.  
 dipterocarpus, 626.  
 dischema, 207.  
 dischidea, 336.  
 discoidea, 28.  
 discolor, 33, 194, 202, 296,  
     307, 564, 662.  
 distachyum, 109.  
 distans, 122.  
 disticha, 129, 236.  
 distichaceum, 53.  
 distichophyllum, 57.  
 dittelasma, 556, 677.  
 divaricata, 29, 346, 386,  
     391.  
 divaricatum, 130.  
 divaricatus, 53.  
 divergens, 45, 52, 417, 677.  
 diversifolia, 259, 421.  
 diversifolius, 54, 613.  
 dixanthum, 194.  
 docynia, 676.  
 dodecadenia, 287.  
 dodonæa, 555.  
 dolichoides, 507.  
 dolichos, 509, 676.  
 doliolum, 51.  
 donianum, 372.  
 dopatrium, 323.  
 dorstenia, 275.  
 dracena, 126.  
 draconis, 193.  
 dracontomelum, 553.  
 dracunculus, 381.  
 drepanocarpus, 526.  
 drepano-hypnum, 55.  
 drimycarpus, 549.  
 drosera, 483, 676.  
 drupifera, 633.  
 drymoda, 155.  
 drymodes, 191.  
 drymaria, 640.  
 drymoglossum, 74, 81.  
 duabanga, 458.  
 dubia, 447, 487, 518, 663,  
     675, 678.  
 dulcis, 312, 322, 545, 635.  
 dumasia, 504.  
 dumontia, 29.  
 dumortiera, 48.  
 dumosus, 29.  
 dunalii, 662.  
 dunbaria, 513.  
 durio, 618, 679.  
 dux, 674.  
 dysophylla, 297.  
 dysoxylifolius, 582.  
 dysoxylodes, 584.  
 dysoxylon, 582.  
 e.  
 ebermaiera, 316.  
 ebermeria, 673.  
 ebracteatus, 312.  
 eburneum, 172, 193.  
 ecdysanthera, 348.  
 echinata, 446, 624.  
 echinocarpus, 606.  
 echioides, 312.  
 eclipta, 379.  
 ectropothecium, 53.  
 edule, 212, 466, 579, 675.  
 edulis, 332, 343, 423.  
 eglandulosum, 239, 642.  
 ehretia, 328.  
 ehretioides, 358.  
 eleagnifolia, 398.  
 elæagnus, 280.  
 elæocarpus, 606, 678.  
 elastica, 269, 604.  
 elata, 205, 612.  
 elatostemma, 263.  
 elatum, 216.  
 elegans, 34, 85, 97, 146,  
     205, 206, 208, 295, 315,  
     333, 335, 411, 465, 529,  
     544, 552.  
 elegantula, 104.  
 elegantulum, 52.  
 elengi, 363.  
 elephantopus, 395.  
 elephantum, 596.  
 eletaria, 207.  
 elensine, 105.  
 eleutherandra, 592.  
 eleutheropetalus, 223.  
 elliptanthus, 547.  
 ellipsosporum, 23.  
 elliptica, 81, 126, 289, 522,  
     530, 635, 661.  
 ellipticum, 50, 434.  
 ellipticus, 53.  
 elodeoides, 638.  
 elongata, 21, 194, 202, 295,  
     534, 622, 678.  
 elongatum, 19.  
 elongatus, 311.  
 emblica, 235.  
 embryopteris, 358.  
 emercii, 680.  
 emilia, 393.  
 endecaphylla, 521.  
 engelhardtia, 227.  
 enhalus, 209.  
 enhydra, 379.  
 enneaphylla, 521.  
 ensifolia, 66, 85, 126, 621.  
 ensifolium, 124, 146.  
 ensiforme, 83.  
 ensiformis, 190, 510.  
 entada, 540.  
 enteromorpha, 20.

entodon, 53.  
 entosthodon, 44, 50.  
 epaltes, 386.  
 epicranthes, 155, 191.  
 epigynium, 372.  
 epigynum, 349.  
 epiphylloides, 255.  
 epithema, 321.  
 equisetifolia, 257.  
 equisetum, 56.  
 eragrostis, 103, 120, 121.  
 eranthemum, 308.  
 erecta, 380, 675.  
 erectum, 83.  
 erectus, 137.  
 eria, 160, 188, 194, 202.  
 eriachne, 101.  
 ericoides, 49.  
 erigeron, 302.  
 erinaceum, 181, 199.  
 erinaceus, 45, 53.  
 erinus, 323.  
 eriobotrya, 487, 676.  
 eriocarpoides, 249.  
 eriocaulon, 122.  
 eriodendron, 618.  
 eriolaena, 623, 679.  
 eriophorus, 399.  
 eriopsidobulon, 194.  
 erioptera, 611.  
 eriosema, 516, 676.  
 erosa, 52.  
 erosum, 43, 49.  
 erraticus, 45, 53.  
 erubescens, 409.  
 erycibe, 330.  
 erythrina, 505.  
 erythrocarpa, 221.  
 erythrocephalum, 34.  
 erythrorchis, 185.  
 erythroclada, 425, 563.  
 erythropetalum, 577.  
 erythrophyllum, 146.  
 erythroxydon, 601, 678.  
 escharoides, 35.  
 esculenta, 301, 502, 676.  
 esculentum, 83, 325, 338.  
 esculentus, 112, 615.  
 etaria, 202, 203.  
 ethulia, 395.  
 eu-astrum, 18.  
 eu-chrysanthemum, 380.  
 eudiana, 285.  
 eugenia, 468.  
 eugenie, 35.  
 eugeniaefolia, 366.  
 eulophia, 170, 196.  
 eulophotum, 192.  
 eumorpha, 261.  
 eupalus, 141.  
 eupatorioides, 674.  
 eupatorium, 391.  
 euphorbia, 255.  
 euphylla, 270.

euphyllum, 587.  
 europea, 435.  
 eurya, 631.  
 euryale, 654.  
 eurycles, 147.  
 eurycoma, 589.  
 erecta, 78, 80, 86.  
 evoidia, 590.  
 evolulus, 332.  
 evonymus, 571.  
 excæcaria, 254.  
 exæcum, 335.  
 exaltata, 82, 96, 426.  
 exaristatum, 372.  
 excavata, 591.  
 excelsa, 84, 271, 279, 405,  
 482, 581, 603.  
 excurrens, 110.  
 exigua, 20.  
 exilis, 32.  
 expansa, 208.  
 exsertum, 49, 85.  
 exstipulata, 583.  
 extensa, 525.  
 extensum, 83, 339, 352,  
 478.  
 extensus, 679.  
 extinctoria, 161, 195.  
 elsholtzia, 297.

## f.

faginea, 679.  
 fagraea, 334.  
 falcata, 312.  
 falcatum, 54, 83.  
 falconeri, 193, 260, 314.  
 farinosa, 67, 84.  
 farmeri, 158, 192.  
 farmeri aureo-flavum, 192.  
 farnesiana, 542.  
 fascicularis, 606.  
 fasciculata, 97, 123, 145,  
 312, 321, 427, 545.  
 fasciculatus, 137.  
 fastigiata, 29.  
 fastigiatus, 44, 50.  
 fastuosa, 326.  
 febrifuga, 585.  
 feci, 33.  
 fenestrata, 260.  
 feronia, 596.  
 ferox, 127, 325, 489, 654.  
 ferrea, 284, 637.  
 ferruginea, 120, 406, 515,  
 517, 534, 542, 660, 677.  
 ferrugineum, 540, 643.  
 fibraurea, 656.  
 fibrosa, 675.  
 ficulneus, 614.  
 ficus, 268.  
 filicaulis, 322, 504, 673.  
 filicula, 85.  
 filiforme, 41, 51, 110, 182,  
 199, 677.  
 filiformis, 288, 331, 517.  
 filosa, 269.  
 filix-mas, 83.  
 fimbriata, 52, 196, 315, 320,  
 336.  
 fimbriatum, 157, 193, 318,  
 574.  
 fimbristylis, 120.  
 findlayanum, 159, 193.  
 finlaysonia, 339.  
 fissidens, 46, 54.  
 fissum, 83.  
 fistula, 530.  
 fistulosa, 273, 388.  
 flabellata, 45, 47, 58, 201.  
 flabelliformis, 33, 140, 201.  
 flabellulata, 84.  
 flabellulatum, 81.  
 flaccida, 195, 296, 315.  
 flaccidifolium, 314.  
 flaccidissima, 443.  
 flaccidum, 30, 83, 293, 284.  
 flaccidus, 43, 50.  
 flacourtia, 644, 679.  
 flagellaria, 123.  
 flagelliferum, 80.  
 flagelliformis, 35.  
 flava, 311, 314, 323, 490,  
 676.  
 flavescens, 101, 190, 333,  
 424, 573, 643.  
 flavicans, 359, 651.  
 flavidum, 51.  
 flavum, 19, 201.  
 flavus, 33.  
 flemingia, 515, 676.  
 flexilis, 512.  
 flexuosa, 47, 48, 198, 673.  
 flexuosum, 110, 497.  
 flocculosus, 241.  
 floribunda, 191, 323, 365,  
 458, 546, 570, 602, 637.  
 floribundum, 497, 574.  
 floribundus, 607.  
 florida, 35.  
 florideus, 32.  
 flos-aquæ, 23.  
 floscopa, 123.  
 flos-reginæ, 458.  
 fluctuans, 379.  
 fluitans, 110.  
 foniculaceum, 381.  
 foniculum, 437.  
 fetida, 414, 451, 553, 619,  
 675.  
 fetidissima, 315.  
 fetidum, 431, 451.  
 fetidus, 134.  
 foliacea, 34, 528.  
 fomes, 679.  
 foliosa, 202, 287.  
 fontanum, 20.

formicarum, 416.  
 formosa, 471.  
 formosum, 156, 193, 373, 638.  
 formosus, 222.  
 fornicata, 665.  
 fragaria, 490.  
 fragile, 21.  
 fragilis, 67, 84, 309.  
 fragilissima, 30.  
 fragrans, 194, 199, 289, 303, 317, 335, 339, 434, 630, 678.  
 fragrantissima, 528.  
 fraseri, 27.  
 fraxinifolius, 540.  
 freycinetia, 135.  
 frondosa, 504.  
 frullania, 48.  
 frumentaceum, 109.  
 frutescens, 349, 676.  
 fruticans, 143.  
 fruticosa, 47, 234, 250, 268, 284, 457, 469, 526.  
 fruticosum, 433.  
 fruticulosa, 588.  
 fruticulosum, 237.  
 frutiger, 271.  
 fugacissima, 20.  
 fugax, 192.  
 fugifolium, 234.  
 fuirena, 119.  
 fulgens, 620.  
 fulva, 129.  
 fulvum, 22.  
 fulvus, 25.  
 fumago, 35.  
 funalis, 33.  
 funaria, 42, 44, 50.  
 funiculare, 212.  
 funiculosa, 569.  
 funkii, 20.  
 furcata, 29.  
 furcatus, 134, 613.  
 furcigera, 26.  
 furfurosus, 32.  
 fuscens, 45, 52, 114, 163, 195, 574.  
 fusca, 120, 195, 513.  
 fuscipes, 34.  
 fuscum, 22, 115.  
 fuscus, 24, 676.  
 fuscidula, 560.  
 fuscinervis, 54.  
 fusco-atrum, 19.  
 fulvo-nitens, 55.  
 fytchianum, 160, 193.

## g.

gæotrichia, 22.  
 galactia, 504, 676.  
 galanga, 206.

galaxaura, 26.  
 galearia, 253.  
 galeola, 185, 201.  
 galium, 430.  
 gallegoides, 522.  
 gallica, 639.  
 gangetica, 50, 331.  
 gangeticum, 496.  
 gangeticus, 291.  
 ganitrus, 608.  
 gango, 583.  
 garcinia, 634, 679.  
 garcinifolius, 572.  
 garcke, 43, 49.  
 gardenia, 424.  
 gardneria, 325, 624.  
 gardneri, 82.  
 gardnerianum, 41, 43, 89.  
 garuga, 587.  
 gastrochilus, 208.  
 gaultheria, 372.  
 gaultheriaefolia, 575.  
 gebanga, 139.  
 geissaspis, 501.  
 gelatinosum, 33.  
 gelesmium, 335.  
 gelonioides, 580.  
 gelonium, 253.  
 geminiflora, 676.  
 gemmatum, 34.  
 gendarussa, 310.  
 geniculata, 114, 201, 270.  
 geniosporum, 297.  
 gentiana, 335.  
 geodorum, 170, 197.  
 georchis, 202.  
 gerbera, 401.  
 ghesembilla, 237.  
 gibbosa, 274.  
 gibbosum, 264.  
 gibbosus, 546.  
 gigantea, 107, 132, 174, 197, 220, 248, 338, 506, 567, 579.  
 giganteum, 82, 100, 179, 198.  
 gigantochloa, 99.  
 gigartina, 29.  
 ginalloa, 225.  
 gironniera, 279.  
 gisekia, 293, 440.  
 glaber, 112, 571.  
 glabra, 63, 86, 96, 127, 145, 329, 412, 423, 428, 519, 551, 569, 624, 626, 658.  
 glabrata, 407, 450, 560.  
 glabrifolia, 238, 677.  
 glabriuscula, 622.  
 glabriusculus, 249.  
 glabrum, 293, 429, 539.  
 glabratus, 32.  
 glæocapsa, 21.  
 glandulifera, 252, 348.  
 glandulosa, 387.

glandulosus, 315.  
 glauca, 204, 209, 240, 286, 317, 528, 531, 534, 652.  
 glaucescens, 63, 314, 330, 383, 525, 641, 657.  
 glaucum, 109, 207, 434, 643, 675.  
 glaucifolium, 234.  
 glaucina, 420.  
 glaucinum, 54.  
 glaucocarpum, 53.  
 glaucocarpus, 45.  
 glaucum, 675.  
 gleichenia, 62, 86.  
 globba, 208.  
 globosa, 145, 291, 335.  
 globosus, 222, 337.  
 globularia, 284.  
 globulosa, 120.  
 glochidion, 233.  
 glomerata, 120, 273, 330, 450, 641.  
 glomeratus, 314.  
 glomeriflora, 427, 527, 544, 677.  
 glomerulata, 407.  
 glossocarya, 300.  
 glossophyllum, 52.  
 gluta, 552.  
 glutinosa, 294, 610.  
 glycine, 513, 676.  
 glycosmis, 591.  
 gmelina, 302.  
 gnaphalium, 384, 674.  
 gnemon, 212.  
 gnetum, 212.  
 godayam, 575.  
 gomeziana, 268.  
 gomphandra, 678.  
 gomphia, 588.  
 gomphogyne, 449.  
 gomphostemma, 295.  
 gomphrena, 291.  
 gongsira, 19.  
 gongroceras, 30.  
 goniotalamus, 665.  
 goniotis, 675.  
 gonocaryum, 578.  
 gonostegia, 265.  
 gonyanthes, 148.  
 gonystylus, 281.  
 gooderyoides, 200.  
 gossypium, 616, 644.  
 gouania, 570.  
 goughii, 49.  
 gouriana, 670.  
 gracile, 22, 27, 50, 104, 191.  
 gracilescens, 83.  
 gracilipes, 423.  
 graciliflora, 347.  
 gracilis, 43, 138, 142, 317, 374, 408, 410, 578.  
 gracillima, 119.  
 grahamii, 503, 504, 523.

graminea, 197.  
 graminifolia, 195.  
 graminifolius, 131.  
 grammatophyllum, 177,  
 198.  
 granatum, 459.  
 grandiflora, 287, 311, 326,  
 347, 458, 522, 573, 593,  
 679.  
 grandiflorum, 353.  
 grandiflorus, 313, 5-2, 607.  
 grandifolia, 310, 367, 368.  
 grandifolium, 361.  
 grandifolius, 607.  
 grande, 498, 675.  
 grandibracteata, 444.  
 grandinia, 33.  
 grandis, 139, 284, 285, 301,  
 328, 448, 471, 501, 510,  
 546, 652.  
 grandulosa, 487.  
 grangea, 391.  
 granulare, 23.  
 granularis, 96.  
 granulosa, 24, 33.  
 granulosus, 24.  
 graphiola, 35.  
 graptophyllum, 309.  
 grata, 468.  
 grateloupia, 24, 29.  
 gratissima, 406, 629.  
 gratiosissimum, 193.  
 gratum, 303.  
 grimmia, 44, 49.  
 graveolens, 436, 446, 610,  
 675.  
 gregaria, 190.  
 grevillea, 673.  
 grevillei, 70, 83.  
 grewia, 602, 678.  
 griffithiana, 85, 100, 128,  
 190, 275, 284, 315, 363,  
 560, 578.  
 griffithianum, 191, 349,  
 465, 558, 379, 676.  
 griffithii, 82, 101, 126, 191,  
 199, 202, 221, 350, 375,  
 393, 459, 462, 467, 546,  
 519, 571, 577, 593, 625,  
 627, 629, 617, 666.  
 grona, 501.  
 grossum, 299.  
 guazuma, 624.  
 guerpinia, 34.  
 guettarda, 424.  
 guianense, 27.  
 guidonia, 450.  
 gunisanthus, 358.  
 guruba, 138.  
 guyanensis, 35.  
 guyava, 168.  
 gymnadenia, 181, 200.  
 gymnema, 337.  
 gymnogongrus, 28.

gymnogramme, 73, 81.  
 gymnopetalum, 445.  
 gymnophyllum, 46, 54.  
 gymnopitys, 55.  
 gymnopogon, 346.  
 gymnorrhiza, 181.  
 gymnostachyum, 311.  
 gynandropsis, 650.  
 gynocardia, 645.  
 gynochtodes, 422.  
 gynotroches, 481.  
 gynura, 392, 674.  
 gypsophila, 640.  
 gyrans, 494.  
 gyrocarpus, 480.  
 gyróides, 494.

## h.

habenaria, 185, 200.  
 haemaria, 202.  
 halicacabum, 560.  
 halimeda, 28.  
 halophila, 114.  
 halymenia, 29.  
 hamiltoniana, 264, 301,  
 679.  
 hamiltonianum, 81, 591.  
 hamiltonii, 278.  
 hamosa, 321, 500.  
 hampeana, 54.  
 hapaline, 133.  
 haplanthoides, 314.  
 haplanthus, 311.  
 hardingiana, 164, 196.  
 harpullia, 560.  
 harrissonia, 589.  
 harveyana, 50.  
 haspan, 121.  
 hasseltiana, 652.  
 hasseltii, 627.  
 hastatus, 615.  
 hedychium, 207.  
 hedyotis, 409.  
 hedysarifolia, 669.  
 hedysaroides, 494.  
 helferi, 101, 184, 200, 225,  
 241, 252, 264, 314, 317,  
 421, 462, 517, 549, 550,  
 560, 565, 590, 628, 665,  
 674, 676, 679.  
 helferiana, 126, 367, 416,  
 580, 599.  
 helferianus, 138.  
 helicia, 279.  
 helicteres, 621, 679.  
 heliotropium, 327.  
 helminthostachys, 79, 80.  
 helopus, 109.  
 helvolum, 110.  
 hemarthria, 97.  
 hemerocallis, 129.  
 hemicychia, 239.  
 hemidesmus, 340.  
 hemigraphis, 315.  
 hemigyrosa, 556.  
 hemionitideum, 82.  
 hemionitis, 75, 81.  
 hemiorchis, 208.  
 hemipilia, 185, 200.  
 henslowia, 221, 673.  
 heuzaianum, 85.  
 heptaphylla, 331, 591.  
 heptapleurum, 434.  
 heracleum, 437.  
 herbacea, 410, 415.  
 herbaceum, 121, 616.  
 herbertianum, 146.  
 heritiera, 621, 679.  
 hermoceras, 30.  
 hernandia, 288.  
 hernandifolia, 658.  
 herpestis, 323.  
 herpeticum, 579.  
 heterantha, 221.  
 heteranthum, 252.  
 heterocarpum, 83, 193,  
 494.  
 heteroclita, 107, 114, 444,  
 624, 647.  
 heteromorpha, 84.  
 heteropanax, 434.  
 heterophragma, 320.  
 heterophylla, 132, 272,  
 304, 338, 541.  
 hexasticha, 142.  
 heterophyllum, 445, 498.  
 heterophyllus, 550, 646.  
 heteropleurum, 675.  
 heteropogon, 113.  
 heterosperma, 499.  
 heterothrix, 23.  
 hewitia, 333.  
 hexagonia, 33.  
 hexagynus, 676.  
 hexandra, 667.  
 hexastichon, 96.  
 heyneana, 436.  
 heynei, 348, 673.  
 hibiscus, 612, 679.  
 hieracium, 401.  
 hildenbrandtia, 27.  
 himalayana, 52.  
 himalayense, 575.  
 hincksianum, 189.  
 hinneola, 34.  
 hippocratia, 574, 677.  
 hiptage, 599, 678.  
 hirsuta, 322, 323, 344, 512,  
 521, 548, 600, 603, 622,  
 618, 661.  
 hirsutulus, 249.  
 hirsutum, 316, 352, 429,  
 594.  
 hirsutus, 657.  
 hirta, 265, 271.  
 hirtella, 47.

hirtipes, 83.  
 hirtum, 83.  
 hirtus, 385.  
 hispida, 273, 322, 331, 413, 462.  
 hispidulum, 110.  
 hispidum, 413.  
 hodgsonia, 444.  
 holarrhena, 349.  
 holigarna, 550.  
 holmskioldia, 300.  
 hologlossa, 194.  
 holomitrium, 43, 49.  
 holophylla, 255.  
 holosclerus, 33.  
 holosericea, 505.  
 holostemma, 339.  
 homalia, 52.  
 homalium, 450.  
 homalonema, 132.  
 homomalla, 51.  
 homonoya, 251.  
 hookeri, 19, 20, 336, 674.  
 hookeriana, 348, 448, 523, 580, 673.  
 hopea, 629.  
 hordeum, 96.  
 horrida, 424, 651.  
 horsfieldii, 359, 667.  
 hortense, 309.  
 hortensis, 320.  
 hospita, 679.  
 hostilis, 615.  
 hothæ, 402, 670.  
 houtteanum, 461.  
 houttuynia, 230.  
 hoya, 336.  
 humicola, 22.  
 humile, 46, 54, 85.  
 humilis, 101, 109, 317, 367, 604, 610.  
 hunteria, 346, 673.  
 hyalina, 312.  
 hydnocarpus, 646.  
 hydnophytum, 416.  
 hydnum, 33.  
 hydra, 185, 201.  
 hydrobryum, 672.  
 hydrocera, 598.  
 hydrocoleum, 23.  
 hydrocotyle, 435.  
 hydrolea, 334.  
 hydrophyllacea, 431.  
 hygrometica, 42.  
 hygrometrica, 44, 50.  
 hygrophila, 316, 425, 653, 669.  
 hygrophiloides, 311.  
 hygrophilus, 607.  
 hygroryza, 109.  
 hymenocardia, 249.  
 hymenodictyon, 407.  
 hymenophylla, 65, 85.  
 hymenophyllum, 65, 85.

hymenopogon, 407.  
 hymenopyramis, 300.  
 hymenostylium, 44, 50.  
 hyophila, 50.  
 hypericum, 637.  
 hypheothrix, 24.  
 hypnea, 29.  
 hypnum, 44, 55.  
 hypobathrum, 428.  
 hypocrea, 35.  
 hypoblastus, 32.  
 hypogrea, 500.  
 hypoglaucus, 222.  
 hypoglossum, 28.  
 hypoleuca, 458, 585.  
 hypoleucum, 384, 434, 559.  
 hypoleucus, 138.  
 hypolytrum, 119.  
 hyposticta, 621.  
 hypoxylon, 35.  
 hyptis, 298.  
 hystrix, 106, 199, 302, 595.

## i.

ichnocarpus, 349.  
 ichnopoda, 272.  
 igneum, 319.  
 ilex, 575.  
 ilicifolia, 276.  
 ilicifolius, 27, 312.  
 illicium, 659.  
 illigera, 480.  
 imbricata, 162, 195, 202, 576.  
 imbricatus, 314.  
 immersa, 85.  
 impatiens, 597, 678.  
 imperata, 114.  
 impex, 33.  
 inæqualis, 20.  
 inappendiculata, 642.  
 incana, 677.  
 incanus, 627.  
 incertus, 33.  
 incisa, 208, 297.  
 inconspicuum, 34.  
 incurva, 296.  
 incurvus, 297.  
 incurvum, 192.  
 indica, 20, 23, 44, 51, 105, 123, 127, 128, 131, 183, 200, 209, 248, 254, 259, 265, 269, 284, 292, 306, 320, 321, 364, 383, 390, 392, 419, 448, 457, 479, 483, 487, 488, 490, 501, 506, 536, 537, 553, 574, 589, 599, 601, 624, 668, 673, 675, 676, 677.  
 indicum, 23, 48, 110, 276, 307, 320, 325, 327, 374,

381, 385, 582, 601, 610, 648, 677.  
 indicus, 24, 106, 144, 385, 514, 528.  
 indigofera, 521, 677.  
 indurata, 44, 50.  
 inermis, 302.  
 inermis, 260, 456, 645.  
 iners, 283.  
 infectoria, 270.  
 inflexum, 53.  
 inflexus, 45.  
 infortunatum, 303.  
 infundibulum, 156, 193.  
 inga, 545.  
 inguinans, 32.  
 inophyllum, 636.  
 insectifer, 199.  
 insigne, 254, 618.  
 insignis, 73, 81, 135, 230, 270, 311, 541, 548, 660.  
 integrifolia, 267, 279, 445, 487, 675.  
 integrifolium, 263.  
 intermedia, 27, 321.  
 intermedium, 189, 321, 675.  
 intermedius, 34.  
 interruptum, 44, 50, 110.  
 intestinalis, 20.  
 intricata, 28.  
 intricatum, 44, 50.  
 intricatus, 21, 29.  
 intsia, 543.  
 intybus, 401.  
 inula, 383, 671.  
 inunctum, 283.  
 inundatum, 21.  
 investe, 54.  
 investis, 46.  
 involuclata, 534.  
 involuclata, 250, 436, 488, 674.  
 involuclatum, 299.  
 involuclatus, 222.  
 involuta, 81.  
 involvens, 57.  
 iodes, 579.  
 ionopus, 680.  
 ipomæa, 331, 673.  
 iria, 121.  
 irias, 190.  
 iridescens, 312.  
 iridifolia, 190.  
 irioides, 73, 82.  
 irregularis, 21, 32.  
 irya, 289.  
 isachne, 111.  
 ischemum, 113.  
 ischnopoda, 272.  
 isocalpe, 52.  
 isoderma, 20.  
 isolepis, 120.  
 isolobum, 555.

isopterygium, 53.  
isora, 622.  
ixora, 418.

## j.

jackiana, 560.  
jackianum, 299.  
jaquini, 480.  
jalapa, 294.  
jambolana, 470.  
jambos, 472.  
jamesianum, 193.  
janua, 29.  
japonica, 401, 431, 487,  
563, 630, 631, 638.  
japonicum, 83, 638.  
jasminum, 351.  
jatropa, 251.  
javanica, 20, 43, 49, 74,  
77, 80, 81, 191, 200, 232,  
236, 237, 247, 250, 259,  
291, 356, 374, 435, 462,  
472, 548, 577, 589, 676.  
javanicum, 52, 85, 109,  
248, 434, 623, 676.  
javanicus, 571, 578, 605.  
jelinekii, 428, 635.  
jenkinsii, 663.  
jiringa, 544.  
jonidium, 617.  
joufra, 241.  
jovis-pluvii, 190.  
jugalis, 21.  
juglandifolium, 81.  
juglans, 226.  
jujuba, 569.  
julaceum, 53.  
juliformis, 45.  
jumentosum, 109.  
juncea, 147, 323, 519, 648.  
junceum, 323.  
juncoides, 119.  
juncus, 125.  
jungermannia, 47.  
juiperina, 47.  
jussiaea, 453.  
justicia, 309.

## k.

kaki, 360.  
kalanchoe, 484.  
kamstchadalis, 35.  
kandelia, 481.  
karenensium, 315, 398,  
497, 611.  
kasya, 213.  
katschallica, 667.  
kayea, 637.  
khasiana, 49, 110, 339,  
548.

khasyanum, 190.  
kibara, 290.  
kleinhovia, 679.  
knoxia, 413.  
kæmpferia, 206.  
kenigii, 107, 376, 592, 594.  
korthalsia, 137.  
korthalsiana, 420.  
kunthianum, 601, 678.  
kurrii, 102.  
kurrinia, 572, 677.  
kurziana, 22, 23, 35, 422,  
475.  
kurzianum, 22, 23, 49, 51.  
kurzianus, 32.  
kurzii, 18, 19, 21, 23, 27,  
33, 49, 50, 202, 359, 397,  
398, 471, 518, 664, 675.  
kydia, 611, 635.  
kyllingia, 121.

## l.

labialis, 512.  
lablab, 510.  
labrosa, 188.  
laburnifolium, 497.  
laccifera, 269.  
ladera, 387.  
laceridens, 52.  
laceritifera, 201.  
lachnocladium, 34.  
lachryma, 107.  
laciniata, 387, 442, 484.  
laciniatum, 385.  
laciniosa, 137, 448.  
lactescens, 584.  
lactuca, 402, 674.  
lactucefolia, 387.  
lacuna, 336.  
lacunosus, 608.  
læta, 567.  
lætum, 253.  
lavicaulis, 415.  
lævigata, 35, 276, 406, 603.  
lævigatum, 34, 461, 555,  
675.  
lævigatus, 503, 676.  
lævis, 48, 118, 134, 147,  
328, 626.  
lagenaria, 445.  
lageniferum, 19.  
lagenophora, 674.  
lagerstrœmia, 457.  
laggera, 674.  
lagopoides, 500.  
lagopus, 500.  
lakoocha, 268.  
lamellatum, 192.  
lamioides, 315.  
lampas, 616.  
lamponga, 271.  
lanata, 194, 291, 565.  
lanatum, 190.  
lanceolium, 623.  
lanceæfolia, 127, 260, 360,  
471, 481, 630, 635.  
lanceæfolius, 607.  
lanceifolius, 314.  
lanceolaria, 309, 562.  
lanceolarium, 233.  
lanceolata, 238, 273, 283,  
308, 317, 316, 463, 602,  
675.  
lanceolatum, 51, 80, 109,  
115, 570.  
lanceolatus, 510.  
lanceifolia, 279, 286, 552.  
lanceifolium, 374.  
landsboroughii, 27.  
langsdorfia, 673.  
lantana, 306.  
lanuginosa, 66, 84, 414.  
lanuginosus, 600.  
laportea, 263.  
lappacea, 103, 260.  
lappaceum, 558.  
lappaceus, 249.  
larpentæ, 189.  
lasia, 132.  
lasianthus, 415.  
lasiobotrys, 317.  
lasiocarpa, 489.  
lasiochilum, 191.  
lasioglossum, 193.  
laskea, 46.  
latebrosa, 85.  
lateriflora, 118.  
laterifolia, 663.  
lathyrus, 502.  
latifolia, 113, 216, 451,  
516, 527, 551, 565, 566,  
662, 674, 676.  
latifolium, 83, 119, 337,  
497.  
latifolius, 138, 546.  
latissima, 35.  
latteri, 213.  
laurencia, 28.  
laurifolia, 285, 317, 591,  
670.  
laurifolium, 352.  
laurifolius, 339.  
laurina, 343.  
lavendula, 298.  
lawsonia, 456.  
laxa, 119.  
laxiflora, 551.  
laxum, 57, 181, 199.  
lebbek, 514.  
leca, 566.  
lehmanni, 81.  
leiantha, 286, 422, 431.  
leiocarpa, 501, 569.  
leiocarpum, 239.  
leio gynæ, 525.  
leiophylla, 287, 541.

leiostachya, 356.  
 leiostylum, 233.  
 lejennia, 48.  
 lemania, 29.  
 lemma, 130.  
 lemniscatum, 190.  
 lentiginosa, 195.  
 lentinus, 32.  
 lens, 502.  
 leonotis, 296.  
 leonurus, 296.  
 leopardinum, 199.  
 lepidagathis, 312.  
 lepidium, 649.  
 lepidosa, 271.  
 lepidozia, 47.  
 leptionurus, 221, 578.  
 lepisanthes, 556.  
 lepistemon, 333.  
 leprieurii, 28.  
 leptalea, 641.  
 leptantha, 468.  
 leptochloa, 105.  
 leptohymenium, 53.  
 leptonychia, 624.  
 leptopoda, 50.  
 leptospermum, 676.  
 leptostachya, 570, 608.  
 leptothrix, 24.  
 leptotrichum, 43.  
 leram, 134.  
 leschenaultii, 125, 637.  
 lespedeza, 493.  
 lessertiana, 560.  
 lettsonia, 333.  
 leucantha, 356.  
 leucas, 296.  
 leucobotrys, 673.  
 leucobryum, 43, 49.  
 leucocarpum, 270.  
 leucolonia, 43, 49.  
 leucomeris, 400.  
 leucophlœa, 542.  
 leucopogon, 370.  
 leucopyrus, 236.  
 leucoxydon, 305.  
 leucymmaea, 474.  
 leuzeum, 82.  
 leuzites, 32.  
 levicaudatum, 323.  
 lichenoides, 29, 672.  
 licaula, 140.  
 lignicola, 45, 53.  
 ligustrina, 407.  
 liliifera, 659.  
 limacia, 657.  
 limatodes, 166, 188, 196.  
 limbatum, 191.  
 limnophila, 323.  
 limodorum, 167.  
 limonia, 593.  
 limoniaceae, 554.  
 limonifolia, 304.  
 limosum, 23.

linaria, 323.  
 lindenbergia, 323.  
 lindera, 286.  
 lindleyana, 261.  
 lindleyanum, 191.  
 lindsaya, 66, 84.  
 lineare, 82.  
 linearifolia, 126, 369.  
 linearis, 312, 462.  
 lineata, 81, 515.  
 lingua, 82.  
 linguifolia, 621.  
 lingulatus, 33.  
 linifolia, 331, 518, 521.  
 linifolius, 332.  
 linoides, 410.  
 liuostoma, 281.  
 linsia, 172, 189, 197.  
 liparis, 153, 190, 202, 680.  
 lipeocercis, 115.  
 lipocarpa, 121.  
 litchi, 558.  
 lithosperma, 118, 505.  
 litssea, 287.  
 littorale, 574.  
 littoralis, 363, 367, 545,  
 557, 606, 621.  
 littoreus, 479.  
 lituiflorum, 194.  
 livistona, 139.  
 lobata, 20, 444, 580, 611.  
 lobatum, 34.  
 lobatus, 33.  
 lobbiana, 85, 675, 677.  
 lobbii, 165, 178, 190, 196,  
 198, 319, 574, 674, 677.  
 lobelia, 375, 674.  
 lobelioides, 369.  
 lomaria, 84.  
 longa, 205.  
 longana, 559.  
 longiaristata, 118.  
 longicaudatus, 350.  
 longiciliata, 642.  
 longicollis, 51.  
 longiflora, 427.  
 longiflorus, 208, 223.  
 longifolia, 68, 84, 197, 242,  
 266, 285, 290, 408, 421,  
 429, 550, 572, 573, 589,  
 620, 654, 662.  
 longifolium, 82, 122, 249,  
 252, 645.  
 longipes, 82, 140, 190, 249,  
 553.  
 longipetiolata, 552.  
 longipetiolatum, 249.  
 longipinnula, 84.  
 longiplea, 305.  
 longiracemosa, 647.  
 longispathus, 100.  
 longispina, 426.  
 longissima, 62, 86.  
 longissimum, 81, 83.

longum, 231.  
 lonicera, 431.  
 lophatherum, 104.  
 lophopetalum, 574, 676.  
 lophosperma, 652.  
 loranthus, 222.  
 lorifolium, 146.  
 loriforme, 199.  
 lotus, 654.  
 lourea, 499, 676.  
 lowianum, 171, 197.  
 lowii, 173, 197.  
 loxotis, 321.  
 lubbersianum, 188, 680.  
 lucens, 510, 676.  
 lucescens, 183, 200.  
 lucida, 201, 278, 336, 348,  
 356, 362, 481, 544, 641.  
 lucidum, 295.  
 lucidus, 33, 415, 608.  
 lucidula, 302.  
 lucinerve, 43.  
 luculia, 406.  
 ludens, 69, 81, 84.  
 ludwigia, 453.  
 luffa, 445, 675.  
 lummitzera, 479.  
 lunarifolius, 613.  
 lunatus, 508.  
 luniferum, 199.  
 lunulata, 70, 83.  
 lunulatum, 67, 84.  
 lutea, 508, 661.  
 luteo-album, 384.  
 luteo-fusca, 21.  
 luteola, 190, 508.  
 luteolum, 193.  
 lutescens, 23, 54, 252.  
 lutens, 25.  
 lubunga, 592.  
 luzonensis, 663.  
 lycioides, 333.  
 lycoperdon, 34.  
 lycopersicum, 325.  
 lycopodium, 56.  
 lyngbei, 23.  
 lyngbya, 23.  
 lygodium, 78, 80.  
 lyrata, 391.  
 lysimachia, 369.

### m.

maba, 357.  
 macaranga, 247.  
 machilus, 284.  
 maclellandii, 102, 316,  
 655.  
 macraei, 192.  
 macrantea, 643.  
 macranthum, 190, 574,  
 666.  
 macrobulbon, 197.

- macrocarpa, 235, 458, 471,  
 487, 506, 551, 653.  
 macrocarpum, 146.  
 macrocarpus, 45, 53, 529.  
 macromitrium, 44, 50.  
 macropanax, 434.  
 macropetala, 580.  
 macrophylla, 238, 242,  
 264, 284, 287, 301, 305,  
 347, 349, 389, 422, 429,  
 518, 525, 566, 570, 575,  
 594, 595, 621, 661.  
 macrophyllum, 83, 238.  
 macrophyllus, 313, 354,  
 615.  
 macropoda, 139, 273.  
 macropodium, 213.  
 macropterum, 539.  
 macrosiphon, 316, 419, 445.  
 macrosporum, 22, 295.  
 macrostachya, 99, 137,  
 175, 223, 231, 473, 534.  
 macrostachyum, 208.  
 macrostemon, 371, 673.  
 macrostomum, 54.  
 macrotricha, 632.  
 maculata, 201, 463, 675.  
 madagascariensis, 106,  
 204.  
 maderaspatana, 391, 568.  
 maderaspatanus, 448.  
 mæsa, 364.  
 magnolia, 659.  
 maingayi, 546, 569.  
 major, 369.  
 majus, 575, 659.  
 majuscula, 21, 23.  
 malabarica, 264, 296, 533,  
 656.  
 malabaricum, 616.  
 malabaricus, 589.  
 malabathricum, 461.  
 malaccensis, 207, 282, 472,  
 679.  
 malaisia, 277.  
 malaxis, 153, 190.  
 malayanus, 370.  
 malleifera, 202.  
 mallotus, 243.  
 malpighia, 598.  
 malva, 609.  
 malvastrum, 609, 678.  
 manghas, 345.  
 mangifera, 552, 553.  
 mangiferum, 553.  
 manglietia, 660.  
 mangostana, 634.  
 manihot, 251, 645.  
 manisuris, 96.  
 maoutia, 266.  
 maranta, 208.  
 marantina, 208.  
 marasmius, 32.  
 marcidulum, 55.  
 marginalis, 21.  
 marginata, 26, 98, 206.  
 marginatulus, 50.  
 marginatum, 35, 349.  
 marginatus, 33.  
 marginellus, 121.  
 mariscus, 119.  
 maritima, 121.  
 marlea, 432.  
 marmelos, 596.  
 marmoratum, 188.  
 marsdenia, 337.  
 marshalli, 189.  
 martabanica, 286, 343, 442,  
 486.  
 martabanicum, 237.  
 martabanicus, 604.  
 martini, 112.  
 martinicensis, 296.  
 mastigobryum, 47.  
 mastigothrix, 22.  
 maumainensis, 674.  
 maxima, 675.  
 mayodendron, 319.  
 mays, 107.  
 mecopus, 499.  
 medica, 595.  
 medicaginea, 519.  
 medicum, 34.  
 medium, 45, 52.  
 megablastum, 55.  
 megaptera, 442.  
 meiothecium, 52.  
 meirax, 169, 194.  
 melaleuca, 466.  
 melanorrhœa, 549.  
 melanthesopsis, 234.  
 melastoma, 461.  
 melhania, 623, 679.  
 melia, 581, 678.  
 melicope, 590.  
 meliosma, 554.  
 melissefolium, 295.  
 melilotus, 520.  
 melo, 447.  
 melocanna, 101.  
 melochia, 623, 679.  
 melodorum, 666.  
 meloneurum, 677.  
 melongena, 325.  
 melothria, 448, 675.  
 membranacea, 248, 368.  
 membranaceum, 82.  
 membranaceus, 100.  
 membranifolia, 346, 651.  
 membranifolium, 83, 263.  
 memecylifolia, 420.  
 memecylon, 464, 675.  
 menasu, 237.  
 meneghianum, 23.  
 meniscium, 74, 81.  
 mentha, 297.  
 merguense, 191.  
 merguensis, 195, 634, 677.  
 merguensis, 317, 357, 467,  
 602.  
 mesocarpus, 21.  
 mespilifolia, 251.  
 mesua, 637.  
 meteorium, 45, 51.  
 metel, 326.  
 methonica, 127.  
 mexicana, 651.  
 mezoneurum, 539.  
 michelia, 660.  
 micrantha, 348, 651, 661.  
 micranthum, 199, 563.  
 micranthus, 613.  
 microcalyx, 366.  
 microcarpa, 236, 347, 413,  
 673, 674.  
 microcarpum, 45, 52.  
 microcarpus, 314, 558.  
 microchites, 673.  
 microcladium, 53.  
 micrococcus, 25.  
 microchloa, 105.  
 microcos, 603.  
 microcystis, 21.  
 microcystum, 26.  
 microglochla, 55.  
 microglossa, 390.  
 microdesmis, 253.  
 microdonta, 47.  
 micromelum, 594.  
 micropeltis, 35.  
 microphylla, 488.  
 microphyllum, 495.  
 microphyllus, 200.  
 microrhynchus, 403.  
 microstachya, 238.  
 microstachyus, 313.  
 microstemma, 604.  
 microstigma, 635.  
 microstylis, 153, 189, 202,  
 680.  
 microtropis, 572.  
 mikania, 391.  
 mildea, 51.  
 miliacea, 120.  
 miliaceum, 110.  
 miliusa, 667.  
 millettia, 524.  
 millingtonia, 320.  
 mimosa, 541.  
 mimosoides, 539.  
 mimosoides, 532.  
 minusops, 362.  
 minutum, 371.  
 minima, 81, 514.  
 minor, 24, 621.  
 minuta, 382.  
 minutiflora, 248.  
 minutiflorum, 451.  
 minutiflorus, 353.  
 minutus, 54.  
 minutissima, 20.  
 miquelianus, 281.

mirabilis, 294.  
 mitis, 276, 526.  
 mitragyne, 343.  
 mitreola, 343.  
 mitrephora, 666.  
 mixta, 306.  
 mniadelphus, 46.  
 mnium, 46, 51.  
 modecca, 452.  
 modestiflora, 443, 674.  
 modestus, 33.  
 mœstus, 121.  
 molineria, 147.  
 molle, 51, 83, 250, 337.  
 mollicula, 51.  
 mollis, 46, 202, 278, 300,  
 358, 359, 512, 513, 589,  
 632, 645, 647.  
 mollissima, 296, 350, 364.  
 mollissimum, 45, 52.  
 mollugo, 440.  
 moluccana, 242, 489, 675.  
 moluccensis, 50, 585.  
 molybdæa, 35.  
 momordica, 446, 675.  
 monandra, 533.  
 monilifer, 498.  
 moniliforme, 27, 154, 190,  
 224.  
 monnieria, 323.  
 monocephala, 121.  
 monochilus, 187, 201.  
 monochoria, 124.  
 monoclea, 48.  
 monoicum, 224.  
 monolophus, 205, 208.  
 monomeria, 168, 196.  
 monopetala, 285.  
 monophylla, 593, 595.  
 monosperma, 506, 526,  
 572.  
 monostachya, 120.  
 monscera, 678.  
 monsoniæ, 291.  
 montana, 253, 359, 556.  
 montanum, 100, 251.  
 montanus, 112, 313, 354,  
 558, 572.  
 monticola, 416, 525, 630,  
 632.  
 moorcroftii, 44, 50.  
 morinda, 422, 648.  
 morindopsis, 428.  
 morocarpus, 266.  
 morus, 276.  
 moschata, 448.  
 moschatum, 157, 193.  
 moschosma, 297.  
 mougeotii, 34.  
 moulmeinense, 373.  
 moulmeinensis, 202.  
 mucronata, 480.  
 mucuna, 506.  
 mukia, 448.

multifida, 252.  
 multiflora, 369, 455, 651,  
 675.  
 multiflorum, 192, 253.  
 multijuga, 320, 586.  
 multiloba, 675.  
 multiloculare, 233.  
 multipartitum, 28.  
 multipartitus, 29.  
 mungos, 408.  
 munja, 115.  
 muuronia, 581.  
 murale, 22.  
 muricata, 291, 664.  
 muricatus, 112, 244.  
 murraya, 592, 678.  
 musa, 204.  
 muscicola, 195.  
 musciformis, 29.  
 muscoides, 85.  
 muscosa, 361.  
 mussenda, 428.  
 mutabile, 677.  
 mutabilis, 35, 306, 613.  
 mutica, 114.  
 muticum, 113.  
 myoporum, 307.  
 myosotis, 111.  
 myosurus, 190.  
 myriactis, 391.  
 myrianthus, 240.  
 myrica, 258.  
 myriocarpa, 476.  
 myriogyne, 382.  
 myrioneuron, 429.  
 myriophylla, 513.  
 myriopteron, 340.  
 myristica, 289.  
 myristicæfolia, 286.  
 myristicæformis, 195.  
 myrsine, 364.  
 myrtifolia, 427, 470.  
 myrtillus, 366.  
 mysorensis, 269.  
 myrus, 96, 110.  
 myxa, 328.  
 myxopyrum, 354.

## n.

nageia, 216.  
 nagi, 258.  
 najas, 143.  
 nana, 98, 518.  
 naravelia, 670.  
 narvala, 652.  
 nasturtium, 648.  
 nasutum, 190.  
 natans, 541, 598.  
 natsiatopsis, 577.  
 natsiatum, 579.  
 nattoungensis, 53.  
 nauclea, 405.  
 naucleiflora, 419.  
 naucleoides, 414.  
 neckera, 45, 52.  
 nectria, 35.  
 neesiana, 287.  
 neesii, 315.  
 neglectum, 212.  
 negundo, 305.  
 nelsonia, 317.  
 nelumbo, 655.  
 nematosum, 52.  
 nemophila, 442, 674.  
 nemorale, 53.  
 nepalense, 233.  
 nepalensis, 258, 392, 461,  
 555, 600, 655.  
 nepenthes, 230.  
 nephelium, 558, 667.  
 nephrodium, 70, 82.  
 nephrolepis, 70, 82.  
 neptunia, 541.  
 neriifolia, 255, 344, 366,  
 519.  
 neriifolium, 638.  
 neriiformis, 71, 82.  
 nerium, 349.  
 nervosa, 272, 278, 287, 637.  
 neuracanthus, 313.  
 neuranthum, 318.  
 neuropeltis, 332.  
 nicobarensis, 463, 675.  
 nicobarica, 143, 417, 452,  
 574.  
 nicotiana, 326.  
 nidulans, 499.  
 nidus-avis, 69, 83.  
 niebuhria, 650.  
 nigella, 670.  
 nigrescens, 81, 527.  
 nigricans, 421.  
 nigro-ciliata, 99.  
 nigrum, 231.  
 nipa, 143.  
 nipalense, 44, 50, 51, 53,  
 677, 679.  
 nipalensis, 45, 47, 48.  
 niruri, 234.  
 nitella, 55.  
 nitida, 21, 286, 663.  
 nitidum, 83, 248, 413.  
 nivea, 443, 507, 514.  
 niveum, 188, 535.  
 nivulia, 255.  
 nobilis, 536, 595.  
 nodatum, 159, 193.  
 nodiflora, 378.  
 nodosa, 530.  
 nodosum, 110.  
 nomaphila, 316.  
 normale, 82, 83, 203, 461.  
 noronhee, 632.  
 noronhianum, 558.  
 nostoc, 23.  
 notonia, 293.

novarræ, 263.  
 nucifera, 143, 655.  
 nuculanea, 286.  
 nuda, 270.  
 nudicaule, 79, 80.  
 nudicaulis, 335.  
 nudiflora, 243, 441, C56.  
 nudiscape, 675.  
 nuga, 375, 538.  
 nummularia, 336.  
 nutans, 103, 120, 207, 296,  
 303, 426, 429, 479, 599.  
 nux-vomica, 342.  
 nummulariæfolia, 317.  
 nummulariæfolium, 73,  
 82.  
 nyctanthes, 351.  
 nymphæa, 654.

## O.

obcordata, 439, 676.  
 obcordatum, 496.  
 oberonia, 154.  
 obesa, 161, 194.  
 oblata, 470.  
 oblatum, 495.  
 obliquivalvis, 113.  
 oblonga, 367, 383, 433,  
 626.  
 oblongata, 26.  
 oblongifolia, 235, 629, 642.  
 oblongifolius, 241.  
 oblongum, 154, 190, 295,  
 495.  
 oblongus, 608, 678.  
 obovata, 236, 237, 335,  
 339, 362, 469, 585, 531.  
 obscura, 331.  
 obscurum, 72, 82.  
 obtecta, 562.  
 obtusa, 28, 182, 199, 317,  
 622, 628.  
 obtusata, 166.  
 obtusatus, 393.  
 obtusifolia, 269, 425, 510,  
 599, 653, 677.  
 obtusifolium, 57, 283.  
 obtusifolius, 627.  
 occidentale, 20, 551.  
 occidentalis, 33, 532.  
 ocellusa, 470.  
 ochna, 588, 678.  
 ochracea, 24, 195.  
 ochrobryum, 49.  
 ochrocarpus, 636.  
 ochrosia, 345, 673.  
 ochrophylla, 32.  
 ochthocharis, 462.  
 ocimum, 497.  
 octandra, 456.  
 octoblepharum, 41, 43, 49.  
 odallam, 345.  
 odenlandioides, 343.  
 odina, 518.  
 odora, 131.  
 odorata, 306, 626, 629, 645,  
 647, 662.  
 odoratissima, 337, 541.  
 odoratissimum, 191.  
 odoratissimus, 131, 661.  
 odoratum, 83.  
 odorifera, 658.  
 odorum, 350.  
 œceoclades, 198.  
 œdogonia, 27.  
 œnanthe, 437.  
 œnophia, 569.  
 officinale, 207.  
 officinalis, 296, 298, 305.  
 officinarum, 115.  
 olax, 576, 677.  
 olea, 354.  
 oleandra, 71, 82.  
 oleifolia, 359.  
 oleracea, 639, 649.  
 oleraceus, 291, 402.  
 oligandra, 652.  
 oligantha, 409.  
 oligophylla, 583.  
 oligospira, 55.  
 olitorius, 605.  
 olivacea, 190.  
 olivaceum, 22.  
 onusta, 19, 269.  
 onychium, 68, 84.  
 operculata, 469.  
 ophioglossum, 79, 80.  
 ophiorhiza, 498.  
 ophiorrhizoides, 346.  
 ophiurus, 96.  
 opilia, 577.  
 oppositifolia, 145, 255, 296,  
 427, 552.  
 oppressum, 53.  
 opuntia, 29, 441.  
 opuntia, 28.  
 orania, 143.  
 orbicularis, 382.  
 orbiculata, 322, 336, 652.  
 orchoides, 146.  
 orellana, 641.  
 oreocnide, 265.  
 oreophilum, 434.  
 orientale, 50, 84, 224.  
 orientalis, 277, 278, 379.  
 ormocarpum, 502.  
 ornata, 194, 205, 534, 619.  
 ornatum, 116.  
 ornithogalum, 128.  
 oropetium, 97.  
 orophia, 666.  
 oroxylum, 320.  
 orthomnium, 51.  
 orthosiphon, 297.  
 orthothecius, 45, 53.  
 oryza, 107.

oryzatorum, 24.  
 osbeckia, 460.  
 oscillaria, 24.  
 osmunda, 77, 80.  
 ostodes, 252.  
 ostrea, 34.  
 otanthera, 461, 463, 675.  
 otochilus, 162.  
 ovale, 476.  
 ovalifolia, 127, 373, 505,  
 525.  
 ovalifolium, 109, 191, 224.  
 ovalifolius, 319.  
 ovalis, 120, 144, 196.  
 ovata, 240, 296, 325, 329,  
 332, 528.  
 ovatum, 132, 465.  
 oxalis, 596, 678.  
 oxycarpa, 585.  
 oxymitra, 665.  
 oxydonta, 386.  
 oxyphylla, 513, 562, 651,  
 676.  
 oxyphyllum, 199.  
 oxyspora, 461, 675.  
 oxystophyllum, 191.

## p.

pachycarpa, 525.  
 pachyglossum, 192.  
 pachygone, 658.  
 pachynema, 28.  
 pachyphylla, 126, 471.  
 pachypus, 190.  
 pachyrrhizus, 507.  
 pæderia, 414.  
 paleacea, 443.  
 palembanica, 677.  
 palembanicus, 353.  
 palisoti, 32.  
 pallescens, 33.  
 pallida, 23, 199, 337, 677.  
 pallide-flavens, 162, 195.  
 pallidum, 83, 100.  
 pallidus, 297.  
 palmata, 33, 433, 134.  
 palmatum, 81.  
 palmella, 21.  
 palpebra, 192.  
 paludosa, 140, 142.  
 palustris, 172, 511.  
 panamonja, 286.  
 panax, 433.  
 pancovia, 557.  
 pandanus, 133.  
 panduratum, 207.  
 panduratus, 559.  
 panduriformis, 613.  
 paniala, 409.  
 paniculata, 124, 252, 308,  
 330, 332, 354, 366, 380,  
 411, 457, 499, 515, 516,

- 525, 527, 548, 583, 592, 635.  
*paniculatum*, 199, 303, 340, 348, 374, 467.  
*paniculatus*, 243, 297, 316, 546, 572, 582.  
*panicum*, 109.  
*pannea*, 194.  
*papaver*, 653.  
*papaya*, 452.  
*papillata*, 46, 51.  
*papillosum*, 199.  
*papillosus*, 54.  
*papyrifera*, 276.  
*papyrinum*, 24, 34.  
*parabæna*, 655.  
*paradoxa*, 190.  
*paradoxum*, 34.  
*paradoxus*, 128.  
*parallela*, 85, 567.  
*paralleloneura*, 362.  
*parameria*, 348, 673.  
*paramignya*, 593.  
*paranephelium*, 559.  
*parashorea*, 628.  
*parasiticus*, 22, 321, 407.  
*parastemon*, 485.  
*parcum*, 192.  
*pardanthus*, 146.  
*parodocheilum*, 207.  
*pareira*, 658.  
*parietinus*, 22.  
*parinarium*, 485, 676.  
*parishia*, 548.  
*parishiana*, 436.  
*parishii*, 32, 33, 44, 45, 50, 52, 66, 70, 83, 84, 160, 164, 171, 173, 174, 185, 188, 193, 195, 196, 197, 198, 199, 200, 201, 202, 206, 308, 311, 313, 316, 335, 598, 673, 674, 675, 678, 680.  
*parkia*, 541, 677.  
*parkinsonia*, 538.  
*parmelia*, 35.  
*parochetus*, 520.  
*parsonsia*, 348.  
*parthenoxylon*, 283.  
*parvatia*, 655.  
*parviflora*, 175, 198, 205, 206, 237, 315, 323, 336, 381, 405, 421, 424, 453, 457, 481, 493, 505, 612, 620, 665, 668.  
*parviflorum*, 191.  
*parvifolia*, 47, 424, 577.  
*parvifolium*, 85.  
*parvuliflora*, 443.  
*parvulum*, 22.  
*pashia*, 487.  
*paspalum*, 110.  
*passiflora*, 451.  
*patens*, 234.  
*patula*, 380.  
*paucicostata*, 130.  
*pauciflora*, 123.  
*pauciflorum*, 281, 465.  
*pavetta*, 422.  
*pavettæfolia*, 428.  
*pavonia*, 611.  
*pavonina*, 540.  
*payanelia*, 320.  
*payena*, 362.  
*pectinata*, 211, 309.  
*pedata*, 69, 84, 85, 563, 677.  
*pedicellata*, 356.  
*pedilanthus*, 256.  
*peduncularis*, 268, 369.  
*pedunculata*, 274.  
*pegophyllum*, 49.  
*peguana*, 22, 27, 673.  
*peguanum*, 22, 192.  
*peguanus*, 33.  
*peguensis*, 385, 400.  
*pellacens*, 84.  
*pellionia*, 264.  
*pellucida*, 84.  
*pelorioides*, 200.  
*peltata*, 140, 288, 483, 602, 658.  
*peltophorum*, 540.  
*peltophorus*, 96.  
*pemphis*, 456.  
*penangiana*, 630.  
*penangianum*, 72, 82.  
*penangianus*, 578.  
*pendula*, 281, 473, 524.  
*pendulum*, 79, 80.  
*penecillium*, 190.  
*pennata*, 543.  
*pennatula*, 52.  
*pennatum*, 332.  
*pennatus*, 121.  
*penstemon*, 323.  
*pentace*, 602.  
*pentacme*, 628.  
*pentagona*, 489, 564.  
*pentagyna*, 668.  
*pentandra*, 455.  
*pentandrum*, 299, 618.  
*pentandrus*, 223.  
*pentanura*, 339.  
*pentapetalus*, 223.  
*pentapetes*, 623.  
*pantaphragma*, 374.  
*pentaphylla*, 592, 650.  
*peplodes*, 455.  
*perennis*, 32.  
*perfoliatum*, 293, 327.  
*perforatum*, 97.  
*pergracile*, 100.  
*pergularia*, 337.  
*perilla*, 297.  
*peristrophe*, 309.  
*peristylus*, 184, 200.  
*perotis*, 113.  
*perpusilla*, 195.  
*perpusillus*, 54.  
*persica*, 486.  
*persicæfolia*, 422.  
*persimile*, 486.  
*persimilis*, 238.  
*personii*, 33.  
*pertusus*, 112.  
*peruviana*, 325.  
*peruvianum*, 327.  
*pes-capræ*, 331.  
*pes-tigridis*, 331.  
*petaloides*, 331.  
*petiolata*, 205.  
*petiolatus*, 606.  
*petroselinum*, 436.  
*peucedanum*, 437.  
*peziza*, 34.  
*phaius*, 166, 167, 196.  
*phalenopsis*, 173, 197.  
*phallus*, 34.  
*pharmaceoides*, 293, 440.  
*phascooides*, 43, 49.  
*phaselina*, 35.  
*phaseoloides*, 512.  
*phaseolus*, 508, 676.  
*phayloopsis*, 315.  
*phlegmaria*, 57.  
*phlogacanthus*, 311.  
*phoebe*, 283.  
*phenicea*, 207, 623.  
*phœnicis*, 35.  
*phoenix*, 142.  
*pholidota*, 162, 202.  
*phormidium*, 24.  
*phragmites*, 106.  
*phrynium*, 208.  
*phycoseris*, 20.  
*phyllagathis*, 675.  
*phyllanthus*, 234.  
*phyllocyclus*, 335.  
*phymatodes*, 81.  
*physalis*, 325.  
*physcomitrium*, 50.  
*physiotium*, 47.  
*phytocrene*, 579.  
*picipes*, 33.  
*picrasma*, 589.  
*picta*, 183, 191, 463.  
*pictorius*, 635.  
*pictum*, 190.  
*picturatum*, 191.  
*pierardii*, 156, 193.  
*pileiformis*, 35.  
*pilosa*, 103, 378, 406, 507, 514, 605, 624, 668.  
*pilosoides*, 81.  
*piloselloides*, 74, 401.  
*pilosulus*, 52, 358.  
*pilosum*, 476.  
*pilosus*, 121, 627.  
*pilulifera*, 256.  
*pimpinella*, 436, 674.  
*pinanga*, 142.  
*pinetorum*, 51, 493.

- pinnata, 85, 484, 580, 581.  
 pinnatifida, 132, 147, 390.  
 pinnatifidum, 80.  
 pinsitus, 33.  
 pinus, 213.  
 piper, 231.  
 piperifolia, 531.  
 pipturus, 265.  
 pisiformis, 19.  
 pisonia, 291.  
 pistia, 130.  
 pisum, 503.  
 pithecolobium, 677.  
 pittosporum, 643.  
 plagiochila, 47.  
 plagiopteron, 600.  
 planicaule, 164, 196.  
 planifolia, 185.  
 planifolius, 54.  
 plantaginea, 125, 414.  
 plantago, 369.  
 platantha, 547.  
 platanthera, 184, 200.  
 platycerium, 77, 80.  
 platyglossa, 197.  
 platyhypnum, 55.  
 platyneura, 416, 552.  
 platyphylla, 573.  
 platypus, 83.  
 plebeium, 293, 464.  
 plectocomia, 137.  
 plectranthus, 297.  
 plectronia, 423.  
 pleione, 162.  
 pleniflora, 659.  
 pleurococcus, 21.  
 pleurotanium, 18.  
 pleurothallis, 195.  
 plicata, 26, 189, 205, 249.  
 plicatum, 110.  
 plicatus, 45, 53.  
 pluchea, 389.  
 plumbago, 370.  
 plumieria, 347.  
 plumosa, 103.  
 picta, 500.  
 podocarpa, 120, 513.  
 podocarpum, 496.  
 podocarpus, 216.  
 podochilus, 183, 200.  
 podosira, 18.  
 poecilophyllum, 19.  
 pogonatum, 12, 46, 51.  
 pogonia, 186, 201.  
 pogostemon, 297.  
 poinciana, 538.  
 polita, 565.  
 pollia, 123.  
 polyacantha, 127.  
 polyalthia, 663, 679.  
 polyandrum, 610.  
 polyantha, 286, 362, 673.  
 polyanthos, 85.  
 polyanthum, 192, 461, 636, 638.  
 polycarpa, 356, 533, 606.  
 polycarpæa, 610.  
 polycarpon, 610.  
 polycarpum, 498.  
 polycephala, 367, 402, 405, 671.  
 polyclados, 20.  
 polygala, 641, 679.  
 polygama, 328, 678.  
 polygamus, 291.  
 polygonata, 383.  
 polygonum, 292.  
 polygramma, 33.  
 polymorpha, 35, 98, 651.  
 polymorphum, 82.  
 polynema, 673.  
 polyneura, 116.  
 polyosma, 483.  
 polypetala, 472.  
 polyphragmon, 121.  
 polyphylla, 522.  
 polypodioides, 83.  
 polypodium, 71, 81.  
 polyporus, 32.  
 polyrhiza, 47.  
 polysiphonia, 28.  
 polysperma, 316, 126.  
 polystachya, 114, 261, 565.  
 polystachyum, 80, 297.  
 polystachyus, 121.  
 polytrideia, 313.  
 pometia, 559.  
 pomifera, 272, 555.  
 pomiformis, 268.  
 pongamia, 526.  
 pongatium, 374.  
 popowia, 665, 679.  
 populifolia, 248.  
 populnea, 616.  
 porana, 332.  
 poronia, 35.  
 porotrichum, 52.  
 porrecta, 195.  
 porrum, 128.  
 portulaca, 639.  
 portulacaria, 639.  
 portulacastrum, 439.  
 potamogeton, 141.  
 potatorum, 312.  
 potentilla, 490.  
 pothos, 132.  
 pottsia, 348.  
 pourthkea, 676.  
 pouzolzia, 265.  
 precox, 163, 195, 469.  
 præmollis, 45, 52.  
 præruptum, 47.  
 pratense, 146.  
 pratia, 375.  
 precatorius, 503.  
 premna, 301.  
 prenanthes, 402, 674.  
 prenanthoidea, 393.  
 preslii, 83.  
 primulifolia, 616.  
 primulina, 197.  
 priniodes, 573.  
 prionophyllum, 54.  
 prionotrichum, 55.  
 proboscidiæ, 44.  
 procera, 338, 475, 514.  
 procerum, 115, 146, 582.  
 procerus, 613.  
 proceridifolia, 264, 112.  
 procumbens, 310, 378, 611.  
 prodigiosus, 25.  
 profundifolia, 51.  
 prolifera, 195, 443.  
 proliferum, 82.  
 prolixum, 83.  
 promensis, 197, 201.  
 prostrata, 292, 315, 454, 516, 517.  
 pruinescens, 513.  
 pruniflora, 638.  
 prunus, 486.  
 prurita, 507.  
 pseudo-china, 674.  
 pseudarthria, 491.  
 pseudostachyum, 101.  
 psidium, 467.  
 psilocarpæa, 378.  
 psilotum, 56, 58.  
 psittacoglossum, 190.  
 psophocarpus, 511.  
 psoralea, 520.  
 psoralioides, 521.  
 psyche, 197.  
 psychotria, 416.  
 pteranthum, 335.  
 pteris, 68, 84.  
 pternandra, 464.  
 pterocarpa, 473.  
 pterocarpus, 528.  
 pterocaulis, 315.  
 pterocaulon, 385.  
 pterodonta, 389.  
 pterogonium, 53.  
 pteroides, 83.  
 pterolobium, 539.  
 pteropoda, 400.  
 pteropodus, 132.  
 pteropus, 81.  
 pterospermum, 622, 679.  
 pterygosperma, 618.  
 ptycanthus, 18.  
 ptychocalyx, 661.  
 puberulum, 82, 233, 577.  
 pubescens, 58, 165, 196, 212, 239, 268, 283, 304, 418, 423, 579, 594.  
 pubinervis, 525.  
 pudica, 541.  
 puddum, 486.  
 pueraria, 511.  
 pulchella, 50, 104, 111, 186.

194, 201, 338, 498, 522, 545.  
*pulcherrima*, 114, 255, 265, 425, 538, 668, 677.  
*pulcherrimum*, 287.  
*pulcherrimus*, 208, 311.  
*pulchra*, 524.  
*pulchrum*, 465.  
*pulicaria*, 383.  
*pulverulentus*, 223.  
*pulvinata*, 194.  
*pulvinatum*, 674.  
*pumila*, 195, 532, 567, 678.  
*pumilis*, 191.  
*pumilum*, 192, 372.  
*punctata*, 104, 321, 372.  
*puncticulatum*, 238.  
*punctulatum*, 55, 82, 465.  
*punduana*, 632, 677.  
*punduanum*, 394.  
*pungens*, 114, 615.  
*punica*, 459.  
*purpurascens*, 23, 53.  
*purpurea*, 182, 190, 199, 523, 527, 533, 661.  
*purpuricaulis*, 312.  
*pusilla*, 33.  
*pusillum*, 34, 85.  
*pusillus*, 29.  
*putranjiva*, 239.  
*puya*, 266.  
*pycnarrhena*, 659.  
*pycnospora*, 493.  
*pycnostachyum*, 192.  
*pygæum*, 676.  
*pygeum*, 486.  
*pygmæa*, 19, 200, 455.  
*pygmæum*, 192.  
*pygmæus*, 28, 122.  
*pyrenaria*, 633.  
*pyrethrum*, 381.  
*pyrifolia*, 476, 489.  
*pyrifolium*, 478.  
*pyriformis*, 34.  
*pyrrhobrya*, 279.  
*pyrrhocarpa*, 273, 360.  
*pyrus*, 487.  
*pyxidiferum*, 85.

## q.

*quadrangulare*, 478.  
*quadrangularis*, 235, 451, 564.  
*quadriaurita*, 84.  
*quadrifaria*, 310, 315.  
*quadrifarum*, 295.  
*quadrifida*, 639.  
*quadrifolia*, 297.  
*quamoclit*, 332.  
*quercifolium*, 73, 82.  
*quercus*, 260.  
*quinina*, 21.

*quinquefolia*, 519.  
*quinquelocularis*, 679.  
*quisqualis*, 479.

## r.

*racemosa*, 235, 302, 322, 332, 335, 356, 428, 473, 479, 533, 549, 657.  
*radermachera*, 319.  
*radicans*, 19, 121.  
*radiatum*, 191.  
*radiatus*, 509, 614, 679.  
*radicans*, 30, 271.  
*radicata*, 58.  
*rafflesia*, 228.  
*ramentacea*, 272, 364.  
*ramiflora*, 358, 535, 547.  
*ramiflorum*, 559.  
*ramontchi*, 679.  
*ramosa*, 34.  
*ramosissima*, 323, 410.  
*ramosum*, 199.  
*randia*, 426.  
*rangia*, 309.  
*rangoonensis*, 285.  
*rangoonicum*, 19.  
*ranunculus*, 670.  
*raphanus*, 649.  
*raphistemma*, 338.  
*rapiforme*, 130.  
*rarak*, 556, 677.  
*ratzeburgia*, 114.  
*rauwolfia*, 345, 673.  
*ravenala*, 204.  
*recedens*, 83, 99.  
*rectifolia*, 45.  
*rectinervis*, 255.  
*recursiva*, 132, 346, 418.  
*recurvatum*, 496.  
*reduplicata*, 200.  
*reflexa*, 511.  
*reflexulum*, 55.  
*regia*, 226, 273, 538.  
*reichenbachiana*, 163, 195.  
*reidioides*, 254.  
*reinwardtii*, 43, 49, 597, 601.  
*religiosa*, 271, 351.  
*remirea*, 121.  
*remotus*, 314.  
*renanthera*, 177, 198.  
*reniforme*, 495.  
*reniformis*, 444, 499, 526.  
*renigera*, 530.  
*repanda*, 676.  
*repandus*, 243.  
*repens*, 109, 316, 329, 409, 453, 508, 564.  
*repleta*, 48.  
*reptans*, 495.  
*resectum*, 83.  
*reseda*, 467.

*resinifera*, 425.  
*reticulata*, 236, 597, 664, 666, 675.  
*reticulatum*, 53, 191.  
*retroflexum*, 494.  
*retsa*, 678.  
*retusa*, 240, 270, 519, 535.  
*retusum*, 679.  
*revoluta*, 211.  
*revolutum*, 128, 192.  
*rhabdia*, 329.  
*rhagrothecium*, 53.  
*rhamnifolia*, 260.  
*rhamnoides*, 235.  
*rhamnus*, 677.  
*rhapidorhynchum*, 52.  
*rhedei*, 189, 319, 418, 577.  
*rhinacanthus*, 309.  
*rhizocinium*, 20.  
*rhizogonium*, 46, 51.  
*rhizogonoidea*, 51.  
*rhizophora*, 480.  
*rhizophoræ*, 22.  
*rhodamia*, 467.  
*rhododendrifolia*, 270.  
*rhododendron*, 373, 673.  
*rhodopterygium*, 193.  
*rhombifolia*, 610.  
*rhomboidea*, 605.  
*rhopalocarpus*, 223.  
*rhus*, 548.  
*rhynchocarpa*, 448, 675.  
*rhynchoglossum*, 321.  
*rhynchonema*, 21.  
*rhynchophorum*, 46, 51.  
*rhynchosisia*, 511.  
*rhynchospermum*, 391.  
*rhynchospora*, 118.  
*rhynchostegium*, 54.  
*rhyncophyllum*, 73, 82.  
*rhypophila*, 20.  
*ribes*, 273, 365.  
*ribesoides*, 231.  
*ricinoides*, 243.  
*ricinus*, 250.  
*rigida*, 163, 195, 267, 366, 413, 611.  
*rigidissimum*, 49.  
*rigidum*, 85, 146.  
*rimosa*, 284.  
*ringens*, 194.  
*riparia*, 251, 309, 389.  
*rivulare*, 23.  
*rivularia*, 22.  
*rivularis*, 28, 296.  
*robusta*, 29, 200, 279, 354, 365, 493, 529, 568, 572, 584, 628.  
*robusti-pinnatum*, 55.  
*robustus*, 241, 608.  
*rohituka*, 584.  
*rosa*, 488.  
*rosæfolia*, 490.  
*rosa-sinensis*, 613.

roscoeana, 205, 206.  
 rosea, 166, 196, 345, 370,  
 376, 534, 609.  
 rosella, 419.  
 roseola, 27.  
 rosenum, 44, 51, 297, 314.  
 rostrata, 201, 346, 448,  
 460, 631.  
 rostratum, 52, 82.  
 rostratus, 45.  
 rothboellia, 96.  
 rothii, 27.  
 rottlera, 241.  
 rottleri, 676.  
 rottlerianum, 352.  
 rotunda, 206.  
 rotundata, 52.  
 rotundifolia, 406, 455, 605,  
 645, 675.  
 rotundus, 122.  
 rourua, 545.  
 roysdia, 653.  
 roysdiaefolia, 651.  
 royleana, 384.  
 roylei, 371.  
 roxburghiana, 104, 284,  
 590, 667, 678.  
 roxburghianus, 112, 213,  
 436.  
 roxburghii, 55, 106, 125,  
 174, 198, 210, 238, 239,  
 259, 273, 332, 333, 345,  
 361, 396, 412, 476, 573,  
 590, 620, 632, 644, 653,  
 677.  
 rozia, 55.  
 rubella, 145, 305.  
 rubens, 14, 470.  
 ruber, 558.  
 rubescens, 204, 559.  
 rubia, 430.  
 rubicundus, 297.  
 rubidus, 33.  
 rubiginosa, 557, 620, 679.  
 rubiginosum, 666.  
 rubra, 204, 568, 654.  
 rubrum, 325.  
 rubus, 489, 676.  
 ruderales, 609.  
 ruellia, 315.  
 rufa, 84.  
 rugicuspdatum, 52.  
 rugicuspdatum, 45.  
 rufescens, 267, 314, 514.  
 rutilabre, 190, 191.  
 rufisetum, 54.  
 rufo-kanosa, 28.  
 rugata, 542.  
 rugosa, 35, 217, 570.  
 rugosum, 355, 499, 607.  
 rugosula, 420.  
 rugosum, 113.  
 rukam, 679.  
 rumphii, 211, 270.

russelia, 323.  
 rutilans, 34, 199.  
 ryparia, 616.

## S.

sabia, 554.  
 saccharatum, 115.  
 saccharifera, 141.  
 saccharum, 115.  
 saccolabium, 179, 189,  
 198.  
 saccopetalum, 667, 680.  
 sagenioides, 83.  
 sageretia, 570.  
 sagittifolia, 674.  
 sagittata, 125, 656.  
 sagittifolius, 614.  
 sajor-caju, 32.  
 salacia, 573, 677.  
 salicifolia, 124, 279, 316,  
 474.  
 salicina, 35.  
 saligna, 673.  
 salix, 256.  
 salubris, 345.  
 salvia, 206.  
 salvinia, 58.  
 samadera, 589, 678.  
 samara, 365.  
 sambac, 352.  
 sambucina, 301, 567.  
 sambucus, 431.  
 sancta, 24.  
 sanctum, 298.  
 sandalifolia, 675.  
 sandoricum, 582.  
 sanguinale, 109.  
 sanguinea, 300, 568.  
 sanguineus, 33.  
 sanicula, 435.  
 santalum, 221.  
 sapida, 237, 645.  
 sapientum, 204.  
 sapindus, 557.  
 sapota, 361.  
 sapotoides, 360.  
 sappan, 538.  
 saprosmia, 417.  
 sara, 115.  
 saraca, 537, 677.  
 sarcanthus, 180, 182, 189,  
 199.  
 sarcocephalus, 404.  
 sarcochlamys, 265.  
 sarcolobus, 337.  
 sarcophylla, 499.  
 sarcopyramis, 463, 675.  
 sarcosperma, 361.  
 sarcostigma, 579, 678.  
 sargassum, 26.  
 sarmentosa, 111, 417, 669.  
 sarmentosum, 109.  
 sativa, 107, 203, 262, 437,  
 502, 670.  
 sativum, 96, 128, 438, 503,  
 649.  
 sativus, 417, 502, 649.  
 sauloma, 45.  
 sauranja, 631.  
 sauropus, 235.  
 saussurea, 399, 671.  
 saxatile, 23.  
 saxatilis, 393.  
 saxophilum, 53.  
 scaber, 313, 314, 395, 627.  
 scaberifolium, 679.  
 scabra, 323, 407, 412, 413.  
 scabrella, 272, 668.  
 scabrida, 603.  
 scabrilingua, 193.  
 scabriusculum, 51, 55.  
 scævola, 376.  
 scularis, 21.  
 scalpe, 496.  
 scandens, 80, 81, 112, 114,  
 132, 133, 213, 250, 272,  
 281, 291, 302, 352, 391,  
 397, 411, 529, 540, 576,  
 577, 592, 615, 666, 674.  
 scaphigera, 137, 620.  
 scaphula, 626.  
 scarabæoides, 513.  
 scariola, 402.  
 scariosa, 164, 196, 514.  
 secleratus, 670.  
 schænoides, 120.  
 schilleriana, 162, 163, 195.  
 schima, 632, 679.  
 schistomitrium, 11, 43.  
 schizachyrium, 113.  
 schizæa, 78, 80.  
 schizochiton, 582.  
 schizogonium, 19.  
 schizophyllum, 32.  
 schizosiphon, 22.  
 schizostachyoides, 101.  
 schleicheria, 556.  
 schlichii, 151.  
 scholaris, 347.  
 schomburgkii, 208.  
 schrebera, 353.  
 schultesii, 335.  
 schwenckii, 549.  
 scilla, 128.  
 scindapsus, 132.  
 scirpus, 119.  
 scitula, 20.  
 scleria, 118.  
 sclerocarpa, 667.  
 sclerocarpum, 680.  
 sclerocarpus, 572.  
 scleromitrium, 412.  
 sclerophylla, 604.  
 scolopia, 644.  
 scoparia, 322.  
 scottianum, 55.

- scrobiculatum, 110.  
 scruposus, 33.  
 scurrula, 223.  
 scutata, 443.  
 scutatum, 27.  
 scutellaria, 296.  
 scutellatum, 465.  
 scutia, 570.  
 scuticosa, 524.  
 scymoides, 297.  
 scyphiphora, 431.  
 scyphopetalum, 559.  
 scytale, 34.  
 scytonema, 22.  
 secunda, 407, 463.  
 secundum, 193, 680.  
 securidaca, 642.  
 securinaga, 237.  
 selaginella, 57.  
 selenocarpa, 50.  
 selignea, 397.  
 selinum, 437.  
 semecarpus, 550.  
 semecarpifolia, 286.  
 semialata, 516.  
 semicordata, 562.  
 semicordatum, 83.  
 semidecandrus, 546.  
 semierectus, 509.  
 semilibera, 201.  
 semiliberum, 44, 50.  
 semipinnata, 69, 84.  
 semipinnatifida, 390.  
 semisagittatum, 622.  
 semiserrata, 261, 364.  
 semitrida, 677.  
 semitriloba, 678.  
 semperflorens, 677.  
 sempervivum, 484.  
 sendtnera, 47.  
 senecio, 393, 674.  
 senecioides, 390.  
 senile, 158, 198.  
 sennoides, 502.  
 sensitiva, 501.  
 sensitivum, 597.  
 sepiaria, 331, 539, 625, 645.  
 septicus, 26.  
 sequax, 497.  
 sericans, 515.  
 sericea, 493, 519, 525.  
 serpens, 647.  
 serpentina, 345.  
 serra, 191.  
 serrata, 115, 329, 586, 587,  
 631, 633.  
 serratifolia, 302.  
 serratum, 43, 303.  
 serratus, 557.  
 serrulata, 366, 562.  
 serrulatum, 318, 355.  
 sesamoides, 184, 200.  
 sesamum, 307.  
 sesban, 522.  
 sesbania, 522.  
 sesquipedalis, 665.  
 sessiflora, 255, 420, 518.  
 sessifolia, 389, 405, 406,  
 425.  
 sessiliflora, 365.  
 sessilifructus, 406.  
 sessilis, 27, 291.  
 sesuvium, 439.  
 setacea, 105.  
 setaceum, 122.  
 setaceus, 202.  
 setifera, 254.  
 setigerum, 83.  
 setosa, 85, 333.  
 shorea, 628.  
 shuteria, 504.  
 siamea, 531.  
 siamensis, 211, 223, 281,  
 427, 629, 636, 650, 652.  
 sicaria, 194.  
 sicyobulbou, 191.  
 sida, 609.  
 sideroxylon, 361.  
 siegesbeckia, 379.  
 sigum, 606.  
 silhetana, 242.  
 silhetense, 401.  
 silhetensis, 674.  
 simiarum, 204.  
 simillimum, 191.  
 simonsii, 315.  
 simplex, 131, 312, 607.  
 simplicifolia, 554.  
 simpliciuscula, 455.  
 sinesis, 508.  
 singularis, 427.  
 sinuata, 392, 442, 529, 603,  
 678.  
 sinuosum, 73, 82.  
 siphonanthus, 303.  
 siphonodon, 572.  
 sirocoleum, 23.  
 sirosiphon, 22.  
 skinneria, 333.  
 sladenia, 630.  
 smilacifolia, 317, 669.  
 smilacifolium, 354.  
 smilax, 127.  
 smithia, 501, 567.  
 smythea, 569.  
 sobolifera, 141.  
 soboliferum, 84.  
 socotrina, 128.  
 soja, 513.  
 solandra, 326, 612.  
 solanifolia, 674.  
 solanum, 324.  
 solenostigma, 278.  
 solida, 85.  
 solomonina, 642.  
 somniferum, 653.  
 somnifolia, 393.  
 sonchus, 402.  
 sonerila, 462, 675.  
 soneriloides, 409.  
 sonneratia, 458, 675.  
 sophora, 493.  
 sorbifolium, 75, 81.  
 sorghum, 115.  
 sowa, 437.  
 soymida, 585.  
 sparsum, 45, 52, 83.  
 spathium, 144.  
 spathodea, 319.  
 spathoglottis, 164, 189, 196.  
 spathoidea, 321.  
 spatulæfolia, 201.  
 spatulata, 190.  
 speciosa, 139, 423, 424, 611,  
 634.  
 speciosum, 193, 332.  
 speciosus, 205, 679.  
 spectabile, 636.  
 spectabilis, 332, 347, 421,  
 584.  
 spelancæ, 85.  
 spergula, 440.  
 spergulacea, 411.  
 spermacoce, 413.  
 sphacelaria, 26.  
 sphagnoides, 47.  
 sphagnum, 41, 46, 54.  
 sphæranthus, 385, 674.  
 sphæria, 35.  
 sphærica, 474.  
 sphærococcus, 29.  
 sphærogynum, 231.  
 sphegidoglossum, 192.  
 spheocarpa, 660.  
 spheoclea, 374.  
 spicata, 126, 208, 227, 261,  
 356, 679.  
 spicatum, 77, 80, 678.  
 spilanthus, 389.  
 spinarum, 673.  
 spinella, 29.  
 spinellosa, 386.  
 spinifex, 111.  
 spiniforme, 46, 51.  
 spinosa, 29, 99, 316, 423.  
 spinosus, 291, 526.  
 spinulosus, 29.  
 spiradiclis, 408.  
 spirale, 325.  
 spiralis, 348.  
 spirogyra, 21.  
 splendens, 296.  
 splitgerberi, 33.  
 spodiopogon, 113.  
 spondias, 553.  
 sponia, 277.  
 sporobolus, 106.  
 squalida, 170, 197.  
 squammatum, 303.  
 squamosa, 664.  
 squamosum, 478.  
 squarrosa, 120, 488.

- squarrosus, 45, 57, 207.  
 squarrosus, 111.  
 stachytarpheta, 306.  
 stagnalis, 23.  
 stans, 318.  
 staurospermum, 21.  
 stellata, 628, 654.  
 stellatum, 346.  
 stemona, 128.  
 stemonurus, 578.  
 stenobulbon, 191.  
 stenocarpus, 49.  
 stenoglossa, 190.  
 stenolobium, 318.  
 stenopetala, 546, 662, 665.  
 stenophylla, 313.  
 stenophyllus, 240.  
 stenosepalum, 191.  
 stenostachya, 200.  
 stephania, 658.  
 stercorarius, 415.  
 sterculia, 619, 679.  
 sterculiaceus, 606.  
 stereodon, 45.  
 stereophyllum, 53.  
 stereospermum, 318.  
 sterileum, 34.  
 stictophyllus, 546.  
 stigeocinium, 19.  
 stigmatosum, 82.  
 stilbum, 34.  
 stillinum, 21.  
 stipulacea, 527.  
 stipularis, 249, 415, 608.  
 stipulata, 319, 543.  
 stocksii, 517.  
 stolonifera, 437.  
 stoloniferum, 205.  
 straminea, 334.  
 stramineus, 297.  
 stratiotes, 130.  
 streblus, 276.  
 strepens, 20.  
 streptocaulon, 339.  
 striata, 331, 520.  
 striatiflora, 679.  
 striatum, 23.  
 striatus, 48.  
 stricta, 19, 105, 360, 413,  
 420, 410, 462, 506, 511,  
 516, 674.  
 strictum, 109, 128.  
 strictus, 100, 404.  
 striga, 322.  
 strigosa, 35, 85, 296, 306.  
 strigosum, 429.  
 striolatum, 18.  
 strobilanthes, 313.  
 strobilifera, 515.  
 strobiliferum, 297.  
 strobilina, 205, 312.  
 strobilinum, 205.  
 strombosia, 577.  
 strongyle, 192.  
 strophanthus, 350, 673.  
 strumarium, 377.  
 strychnos, 312.  
 stylidium, 376.  
 stylosa, 677.  
 styracifolius, 499.  
 styrax, 355.  
 suaveolens, 266, 298, 318,  
 600, 665.  
 suavissimum, 158.  
 subadunca, 28.  
 subaequa, 21.  
 subaequalis, 279.  
 subangulata, 447.  
 subauriculatum, 82.  
 subcapitata, 347.  
 subclavatum, 22.  
 subcoarctata, 49.  
 subcordata, 328.  
 subcrenulatus, 51.  
 subdariffa, 614.  
 subdigitatum, 72, 82.  
 suberosa, 321, 452, 506,  
 663.  
 sub-flaccida, 315.  
 subfruticosus, 313.  
 subglandulosum, 352.  
 subglobosus, 222.  
 subintegerrima, 52.  
 sublevisissima, 51.  
 subleptophyllum, 55.  
 sublimata, 35.  
 subluteum, 49.  
 sublyratus, 211.  
 submarina, 27.  
 suborbiculare, 35.  
 subpallidum, 53.  
 subpanduriformis, 550.  
 subperfoliata, 443.  
 subpyriformis, 272.  
 subquinqnervia, 570.  
 subracemosus, 551.  
 subreflexum, 49.  
 subrotunda, 455.  
 subrugulosa, 52.  
 subsalsa, 21.  
 subscandens, 233.  
 subsessile, 239.  
 subsetacea, 20.  
 subspathulatus, 54.  
 subspicata, 512.  
 substipulaceum, 495.  
 subtilis, 19.  
 subtilissima, 23, 24.  
 subtrinervium, 466.  
 subtriphyllum, 82.  
 subulata, 271.  
 subulatum, 43, 49.  
 subulatus, 119.  
 subulosus, 43.  
 subumbellata, 670.  
 subuninervis, 313.  
 subvagans, 54.  
 succifolia, 635.  
 succifolium, 309.  
 succulenta, 376.  
 suffruticosa, 453, 591.  
 suffruticosum, 647.  
 suffulta, 504.  
 sulcata, 329, 355.  
 sulcatum, 44, 50.  
 sulphuratum, 283.  
 sulphurea, 320.  
 sulphureus, 378.  
 sumia, 542.  
 sumatrana, 239, 485, 560,  
 588, 589, 599, 614, 663.  
 sumatranum, 677.  
 sumatrensis, 118.  
 sumbavia, 242.  
 sundaica, 490.  
 sundanum, 432.  
 sunipia, 164, 196.  
 superba, 127, 204, 505.  
 superficiale, 82.  
 supina, 120.  
 surcularis, 52.  
 sureuligera, 443, 674.  
 surrattensis, 614.  
 susanne, 184, 200.  
 swietenoides, 353.  
 swintonia, 549.  
 sylvatica, 265, 266, 553.  
 sylvaticum, 83.  
 sylvestris, 142, 221, 297,  
 578.  
 symblepharis, 49.  
 symphorema, 299.  
 symphyllia, 242.  
 symphyodon, 53.  
 symploca, 23.  
 symplocifolia, 416.  
 symplocina, 631.  
 symplocos, 355.  
 synechococcus, 21.  
 synedrella, 378.  
 synhymenium, 48.  
 syriacus, 613.  
 syrmaticum, 83.  
 syrhopodon, 44, 50.

## t.

- tabacina, 35.  
 tabacum, 326.  
 tabernemontana, 346.  
 tabularis, 585.  
 tacea, 147.  
 taeniophyllum, 191, 203.  
 taenitis, 74, 81.  
 tagetes, 380.  
 tagetiflora, 380.  
 takuma, 659, 679.  
 talium, 639.  
 tamarindifolia, 528.  
 tamarindus, 535.  
 tamarix, 639.

- tanarius, 248.  
 tankervilliae, 167.  
 tapeinodon, 50.  
 tapiria, 548.  
 tavoyana, 284, 409, 552, 598.  
 tavoyense, 44, 53.  
 taxithelium, 53.  
 taxoides, 277.  
 taylori, 43, 49.  
 tayloria, 41, 51.  
 tectona, 300.  
 tectorum, 484.  
 telephoides, 641.  
 tenacissima, 337.  
 tenasserimica, 50.  
 tenella, 58, 103.  
 tenellum, 27.  
 tenellus, 113.  
 tenera, 462, 679.  
 tenerifrons, 82.  
 tenerum, 43, 49, 83.  
 tenuicaulis, 509.  
 tenuiflora, 312, 504.  
 tenuifolia, 84, 85, 323, 563, 677.  
 tenuifolium, 83.  
 tenuifolius, 297.  
 tenuifrons, 71.  
 tenue, 19, 436.  
 tenuis, 33, 45, 53, 138, 524.  
 tenuissima, 28.  
 tenuissimum, 19, 20.  
 tenuispina, 29.  
 tephrosia, 523.  
 teramnus, 512.  
 teres, 176, 198, 199, 203, 296, 396, 496.  
 teretifolia, 481.  
 teretifolium, 181, 199.  
 terminale, 192.  
 terminalia, 474.  
 terminalis, 127, 280.  
 ternatea, 503.  
 ternatum, 418.  
 terniflora, 354.  
 ternifolia, 126.  
 ternstroemia, 630.  
 terrestris, 678.  
 tessellata, 118, 195.  
 tetracantha, 354.  
 tetracera, 609.  
 tetracoccus, 243.  
 tetragona, 469, 519.  
 tetragonocarpum, 476.  
 tetragonolobus, 511.  
 tetragonostachyus, 313.  
 tetragonus, 313.  
 tetrameles, 441.  
 tetramerista, 588.  
 tetrandra, 278, 418, 423.  
 tetrandrum, 412.  
 tetranthera, 285.  
 tetraptera, 525.  
 tetrasperma, 256.  
 teucrium, 295.  
 teysmanni, 563.  
 thadablota, 678.  
 thalictroides, 69, 84.  
 thecostele, 172, 197.  
 theezans, 570.  
 thelasis, 183, 200.  
 thelephora, 33.  
 thespesia, 616.  
 thespis, 391.  
 thevetia, 344.  
 thladiantha, 447, 675.  
 thomaëum, 97.  
 thomsoni, 261, 269, 528, 617.  
 thouarea, 111.  
 thrixspermum, 182, 199, 680.  
 thuidium, 54.  
 thumra, 470.  
 thunbergia, 317.  
 thunbergiaefolia, 577.  
 thunbergiana, 431.  
 thunia, 167, 189, 196.  
 thyridium, 50.  
 thyridostachyum, 97.  
 thyrsiflora, 530.  
 thyrsiflorum, 407.  
 thyrsiflorus, 311.  
 thyssanolæna, 110.  
 tigilium, 241.  
 tigrinum, 171, 197.  
 tigrinus, 138.  
 tiliaceus, 615.  
 tiliacora, 657.  
 tiliaefolia, 247, 333, 604.  
 tiliaefolium, 497.  
 timorensis, 277, 531.  
 tinctoria, 244, 337, 350, 407, 521, 523, 656.  
 tinctorius, 399.  
 tingens, 337.  
 tinospora, 656.  
 tipulifera, 200.  
 tirucalli, 255.  
 tithonia, 380.  
 tithymaloides, 256.  
 toddalia, 591.  
 tokbrai, 248.  
 tomentella, 475.  
 tomentosa, 26, 83, 230, 239, 285, 293, 299, 301, 317, 351, 361, 400, 414, 419, 422, 432, 450, 458, 493, 557, 559, 565, 578, 580, 599, 624, 656, 666, 673, 677.  
 tomentosum, 22, 110, 339.  
 tomentosus, 547.  
 toona, 586.  
 topophacca, 50.  
 toposia, 358.  
 tora, 532.  
 torenia, 323.  
 tortile, 154, 192.  
 tortula, 44, 50.  
 tortuosa, 277, 537, 573.  
 torvum, 324.  
 tournfortia, 329.  
 toxicaria, 275.  
 toxocarpus, 339.  
 trabecula, 18.  
 trachyacron, 54.  
 trachycarpus, 45, 53.  
 trachylophyllum, 53.  
 trachypodon, 54.  
 trachypus, 45, 52.  
 tragia, 250.  
 trametes, 33.  
 tranquebariensis, 20.  
 transparentis, 156, 193.  
 trapa, 454.  
 trapeziformis, 84.  
 tremma, 278.  
 trematodon, 43, 49.  
 tremella, 34.  
 tremellodon, 33.  
 trevesia, 434.  
 trewia, 242.  
 trialata, 674.  
 triandra, 143, 657, 677.  
 triangulata, 376.  
 triangulatus, 394.  
 trianthema, 439, 674.  
 tribuloides, 260.  
 tribulus, 30, 518, 600.  
 tricanthera, 606.  
 triceps, 121.  
 trichia, 34.  
 trichocoma, 34.  
 trichodesma, 327.  
 trichoglottis, 137, 197.  
 tricholepis, 398.  
 trichomanes, 85.  
 trichomitrium, 51.  
 trichopelona, 53.  
 trichophylla, 51.  
 trichosantha, 201.  
 trichosanthos, 444, 675.  
 trichostemon, 581.  
 tricuspidata, 674.  
 tricuspis, 482.  
 tridax, 377.  
 tridens, 47, 605.  
 tridentata, 331.  
 trifidum, 81.  
 triflora, 147, 486.  
 triflorum, 495.  
 trifolia, 563.  
 trifoliata, 521, 592, 593.  
 trifoliatum, 476.  
 trigona, 375.  
 trigonostemon, 252.  
 trigonum, 110.  
 trigyna, 630.  
 trijuga, 556, 585.  
 triloba, 271.

trilobata, 452.  
 trilobatum, 130, 324.  
 trilobulata, 202, 680.  
 trilobus, 509.  
 trilocularis, 605.  
 trilophota, 188.  
 trinervia, 410, 467, 652.  
 trinervis, 196.  
 trinervium, 119.  
 trinervius, 509.  
 tripartita, 84.  
 triphasia, 593.  
 triphylla, 590, 679.  
 triphyllum, 81.  
 tripudians, 191.  
 triquetra, 27.  
 triquetrum, 56, 58, 497.  
 triradiata, 674.  
 trispicatus, 112.  
 tristania, 467.  
 triste, 191.  
 tristis, 291, 471, 667.  
 tristyla, 632.  
 trita, 521.  
 triticum, 96.  
 triumfetta, 604, 678.  
 tropica, 21.  
 tropicus, 112.  
 tropidia, 202, 203.  
 truncata, 195, 374.  
 truncatum, 82, 122.  
 tuberculata, 562.  
 tuberculatus, 626, 678.  
 tuberculosa, 49.  
 tuberosa, 514.  
 tuberosum, 325, 517.  
 tulda, 98.  
 tunbridgiense, 85.  
 turpethum, 331.  
 tupidanthus, 435.  
 turbinaria, 27.  
 turbinatus, 627.  
 turgida, 425, 510.  
 turnera, 499.  
 turpinia, 554.  
 tylophora, 337, 417.  
 typhina, 220.  
 typhula, 34.

## u.

udum, 33.  
 uliginosa, 426, 529.  
 uliginosum, 110.  
 ulmifolia, 412, 499.  
 ulmus, 279.  
 ulothrix, 19.  
 umbellata, 120, 410, 448,  
 462, 678.  
 umbellatum, 464, 498.  
 umbellatus, 121.  
 umbellifera, 294.  
 umbraculifera, 139.

umbrina, 34.  
 umbrinum, 19.  
 umbrinus, 33.  
 umbrosa, 677.  
 unætochilus, 187.  
 uncaria, 406.  
 uncifoliola, 52.  
 uncifolius, 45.  
 uncinatum, 43, 49.  
 undiflorum, 124.  
 undulata, 48, 360.  
 undulatum, 672.  
 unguiculatum, 299.  
 uniflora, 162, 463, 495, 429.  
 unifolium, 409.  
 uniglandulosa, 272.  
 unioides, 103.  
 unitum, 83.  
 unona, 662.  
 unonæfolia, 665.  
 upluda, 114.  
 uraria, 499, 676.  
 urceola, 348.  
 urea, 25.  
 arena, 611, 678.  
 urens, 111, 619.  
 uroclada, 52.  
 urophyllum, 72.  
 urophyllum, 82, 429.  
 urophyllus, 485.  
 urticæfolia, 306, 323, 379.  
 urticæfolium, 303.  
 urticæfolius, 605.  
 usitata, 519.  
 usnia, 35.  
 ustulata, 195.  
 utillissima, 251.  
 utricularia, 321, 673.  
 utriculosa, 20.  
 uvaria, 660.  
 uvifera, 656.

## v.

vaccaria, 640.  
 vaccinae, 25.  
 vaccinium, 371, 673.  
 vagans, 675.  
 vaginalis, 121, 499.  
 vaginata, 58.  
 vahlii, 534.  
 valida, 474.  
 vallis, 348, 673.  
 vanda, 173, 189, 197, 202,  
 203, 680.  
 vandæflora, 666.  
 vandellia, 323.  
 vanguardia, 423.  
 vanilla, 185, 201, 203.  
 vareca, 450.  
 variabile, 80.  
 variabilis, 35, 650.  
 varians, 81.  
 variegata, 360, 533.  
 variegatum, 252, 571.  
 variiflexum, 55.  
 variolosa, 428.  
 variolosum, 82.  
 varium, 22, 41, 50.  
 varuna, 607.  
 vasculosa, 272, 311.  
 vatica, 630, 679.  
 vaucheria, 27.  
 vauchèrii, 21.  
 velutina, 201, 261, 300,  
 317, 319, 443, 528, 679.  
 velutinosum, 237.  
 velutinum, 237.  
 velutinus, 42, 265, 676.  
 ventilago, 568.  
 ventricosa, 310, 661.  
 venulosa, 434.  
 venusta, 470.  
 venustus, 613.  
 veratrifolia, 166.  
 verbascifolium, 324.  
 verbena, 305.  
 verbenefolia, 323.  
 vernonia, 395, 674.  
 veronicaefolia, 323, 391.  
 verrucosa, 519, 573, 656.  
 verrucosum, 50, 666.  
 versicolor, 33, 145, 619,  
 652.  
 verticellata, 105, 297, 412,  
 609, 639.  
 verticillatum, 371, 391, 409.  
 vesicatum, 27.  
 vespertilionis, 676.  
 vestita, 165, 195, 196, 304,  
 365, 504.  
 vestitum, 498.  
 vestitus, 627.  
 vexillata, 508.  
 viburnoides, 301.  
 viburnum, 431.  
 vicia, 502.  
 vicoa, 383.  
 vidua, 201.  
 viellardi, 22, 28.  
 vigna, 507, 676.  
 villebrunnea, 265.  
 villosa, 227, 238, 283, 362,  
 368, 408, 424, 458, 504,  
 546, 619, 631, 657, 667.  
 villosula, 98, 238.  
 villosum, 19, 188, 202, 297,  
 303.  
 villosus, 658.  
 viminea, 259, 265, 329, 651,  
 677.  
 vinca, 345.  
 viola, 646, 679.  
 violacea, 24, 522.  
 violaceo-lividum, 34.  
 violaceum, 115.  
 violæflora, 598.

violæfolia, 463.  
 violascens, 22, 25.  
 vipani, 189, 680.  
 virens, 80, 178, 198, 368, 642.  
 virgata, 311.  
 virgatum, 101, 355.  
 viride, 295.  
 viridiflora, 337, 417.  
 viridiflorum, 662.  
 viridifusca, 196.  
 viridis, 24, 291.  
 viridissima, 417, 554.  
 viridula, 24.  
 virosa, 131, 510.  
 viscida, 494, 622.  
 viscidula, 391, 674.  
 viscosa, 34, 521, 555, 650, 676.  
 viscosum, 81, 303, 395.  
 viscum, 223.  
 visenia, 624.  
 vitex, 304.  
 viticina, 590.  
 vitifolia, 331.  
 vitifolius, 612.  
 vitiginea, 564.  
 vitis, 561, 677.  
 vittaria, 74, 81.  
 vittata, 45.  
 vittatum, 52.  
 volkameriæfolia, 397.  
 volubilis, 312, 332, 390, 527.  
 vomitoria, 337.  
 vulgaris, 21, 99, 115, 121, 382, 445, 447, 509.

**W.**

wahlenbergia, 374.  
 wallichia, 141.  
 wallichiana, 84, 119, 136, 343, 375, 546.

wallichianum, 122, 637.  
 wallichianus, 266.  
 wallichii, 44, 50, 58, 77, 80, 148, 190, 241, 249, 253, 338, 339, 340, 349, 367, 391, 394, 411, 415, 422, 428, 429, 454, 478, 483, 511, 512, 564, 574, 575, 588, 594, 608, 625, 632, 673, 674, 675, 676, 678.  
 waltheria, 624.  
 wampi, 594.  
 wardianum, 188.  
 wattakaka, 337.  
 webera, 427.  
 weberæfolia, 419.  
 wedelia, 379, 674.  
 wendlandia, 407.  
 wendlandorum, 199.  
 wightiana, 120, 197, 386.  
 wightianum, 198.  
 wightii, 26, 43, 44, 45, 49, 51, 53, 173, 197, 278.  
 williamsoni, 181, 182, 199.  
 willughbeia, 343.  
 wimberleyi, 304.  
 winchia, 344.  
 wodier, 548.  
 woodfordia, 457.  
 wrightia, 350, 673.

**X.**

xanthantha, 331.  
 xanthioides, 207.  
 xanthium, 377.  
 xanthochymus, 679.  
 xanthophlebia, 167, 196.  
 xanthophlebium, 193.  
 xanthophyllum, 642.  
 xanthopus, 32.  
 xerophyllaceus, 33.  
 xerospermum, 558.

xestophyllum, 559.  
 ximenia, 576.  
 xylaria, 35.  
 xylicia, 541.  
 xylocarpa, 541.  
 xylophyllum, 190.  
 xylosma, 645.  
 xyris, 123.

**Y.**

yomæ, 141, 331.  
 yomahense, 53.

**Z.**

zalacca, 136.  
 zanonia, 499.  
 zanthoxylon, 591, 678.  
 zea, 107.  
 zedoaria, 206.  
 zehneria, 448, 499.  
 zerumbet, 207.  
 zeylanica, 79, 80, 103, 276, 296, 317, 333, 334, 351, 370, 374, 375, 468, 611, 670.  
 zeylanicum, 149, 283.  
 zibethinus, 618.  
 zinziber, 207.  
 zippelianus, 46.  
 zizyfolia, 577.  
 zizyphus, 569.  
 zollingeria, 561.  
 zollingerianum, 82.  
 zonaria, 27.  
 zonata, 33.  
 zornia, 500.  
 zosteræforme, 82.  
 zoysia, 114.  
 zygnum, 21.

## INDEX.

## PART II.—SYNONYMS.

- abbreviata*, 396.  
*abelmoschus*, 614, 615.  
*absinthifolia*, 390.  
*abyssinica*, 310, 312.  
*acampe*, 198.  
*acanthus*, 312.  
*acicularis*, 112.  
*acida*, 595.  
*ackeringæ*, 421.  
*acmella*, 380.  
*actephila*, 255.  
*actinodaphne*, 287.  
*aculeata*, 523, 591.  
*aculeatus*, 613.  
*acuminata*, 317, 347, 397,  
     624, 667.  
*acuminatum*, 361, 473.  
*acuminatus*, 570.  
*acuta*, 609.  
*acutangulum*, 544.  
*acutidens*, 455.  
*adambea*, 457, 458.  
*adenolepis*, 378.  
*adkatoda*, 310.  
*adinacanthus*, 314.  
*agagrophila*, 20.  
*aggyptiaca*, 446, 522, 590.  
*aggyptiacum*, 109, 115.  
*achmandra*, 448.  
*acridas*, 175, 199.  
*acruinosus*, 29.  
*æschynomene*, 523.  
*affine*, 110.  
*affinis*, 375, 421, 430.  
*africanus*, 446.  
*agalma*, 434.  
*aganope*, 530.  
*agapetes*, 371, 372.  
*agathis*, 216.  
*agati*, 522.  
*ageratum*, 395.  
*aggeianthus*, 194.  
*agnota*, 472.  
*agrestis*, 374.  
*agrostis*, 110.  
*ahsoca*, 537.  
*alata*, 411, 472.  
*alatus*, 509.  
*alba*, 326, 420, 456.  
*albans*, 569.  
*albescent*, 489.  
*albicans*, 550.  
*albiflora*, 374.  
*alhikkia*, 119.  
*albolutea*, 534.  
*alecafolia*, 489.  
*alnifolia*, 610.  
*alsine*, 440.  
*alternifolia*, 479.  
*altissima*, 201.  
*alyxia*, 346.  
*amabilis*, 103.  
*amana*, 420.  
*amanella*, 456.  
*amara*, 446.  
*ambigua*, 401, 417, 652.  
*amboinensis*, 277.  
*amictia*, 455.  
*amherstianum*, 657.  
*ammannia*, 455.  
*ampelopsis*, 563.  
*amplectens*, 314.  
*amplexicaulis*, 386.  
*amygdalus*, 486, 594.  
*amyria*, 594.  
*anagallidifolia*, 386.  
*ancistrolobus*, 638.  
*andamanensis*, 442.  
*andamanica*, 285, 589,  
     663.  
*andersonii*, 397.  
*andropogon*, 112, 113.  
*ancilema*, 124.  
*anthum*, 436, 437.  
*anfractuosum*, 618.  
*ania*, 160, 194.  
*anil*, 521.  
*anisomeles*, 296.  
*anisoptera*, 626.  
*anguina*, 506.  
*angulata*, 571, 605, 612.  
*angulatum*, 544.  
*angulatus*, 507, 593.  
*angulosa*, 519, 593.  
*angulosus*, 393, 593.  
*anguria*, 447.  
*angustifolia*, 194, 316,  
     317, 393, 453, 456,  
     463, 472, 555, 567.  
*angustissima*, 532.  
*angustum*, 110.  
*annesleya*, 654.  
*antarcticus*, 120.  
*anthelia*, 47.  
*antidysenterica*, 351.  
*antitaxis*, 658.  
*aperula*, 286, 287.  
*apetala*, 455.  
*aphylla*, 642.  
*apium*, 436.  
*aplotax*, 399.  
*aporum*, 155, 191, 202.  
*appendicula*, 196.  
*appendiculatum*, 199.  
*apteucis*, 464.  
*apus*, 33.  
*aquatica*, 639.

- aquaticum*, 395.  
*aralia*, 431.  
*arbores*, 304, 522, 540, 599.  
*arborescens*, 531.  
*arcca*, 141.  
*arenaria*, 386.  
*arenicola*, 111.  
*argentea*, 521, 662.  
*arguta*, 410.  
*aristata*, 114.  
*arjuna*, 476.  
*armata*, 260.  
*armeniaca*, 194, 486.  
*arnica*, 401.  
*arnottianum*, 110.  
*aromatica*, 206.  
*artemisia*, 382, 391.  
*artemisiaefolia*, 378.  
*articularis*, 413.  
*arundo*, 106.  
*arcensis*, 120, 503, 611.  
*arytera*, 560.  
*asiatica*, 369, 610.  
*aspera*, 296, 411, 490, 501.  
*asperum*, 396.  
*assurgens*, 316.  
*asteracantha*, 316.  
*astereoides*, 392.  
*attenuata*, 354, 356, 633.  
*attenuatus*, 558.  
*atheilema*, 315.  
*atragene*, 670.  
*atratum*, 83.  
*aurantiaca*, 660.  
*aurantiacus*, 514.  
*aurantium*, 595.  
*aurea*, 103.  
*aureum*, 193.  
*auricans*, 652.  
*auricoma*, 532.  
*auricomum*, 495.  
*auriculata*, 383.  
*auriculatum*, 497.  
*aurita*, 383.  
*avana*, 413.  
*avanum*, 316.  
*avensis*, 515.  
*avillaris*, 662.  
*avilliflorus*, 427.  
*azadirachta*, 581.  
*azauza*, 616.  
*baccatum*, 326.  
*bacteridium*, 25.  
*balanopteris*, 621.  
*bambusa*, 102.  
*bambusoides*, 101.  
*bancana*, 551.  
*bandhuca*, 420.  
*barbadense*, 616.  
*barbata*, 107, 196, 348, 518.  
*barbula*, 50.  
*barbulata*, 411.  
*barlerioides*, 313, 354.  
*bartramia*, 605.  
*bassia*, 362.  
*batatas*, 145.  
*bataricum*, 111.  
*bazzania*, 47.  
*begoniifolia*, 375.  
*bengalensis*, 446, 487, 510.  
*benjamini*, 111.  
*bergera*, 594.  
*bernhardia*, 58.  
*biolata*, 517.  
*bicolor*, 223.  
*bifaria*, 663.  
*bifidus*, 113.  
*biflora*, 379.  
*bignonia*, 320.  
*biloculare*, 412.  
*bilocularis*, 632.  
*bindaal*, 446.  
*binnendykia*, 624.  
*bisctosa*, 506.  
*bisperma*, 652.  
*bitangor*, 636.  
*bixagrewia*, 605.  
*blackwellia*, 450, 451.  
*blanda*, 420.  
*blandula*, 397.  
*blepharidium*, 641.  
*blumca*, 392.  
*blumeana*, 398, 420, 564.  
*blumeanum*, 434, 622.  
*blumci*, 113, 366, 646, 663, 664.  
*bombax*, 644.  
*brachiata*, 379.  
*brachypoda*, 410.  
*brachypterum*, 529.  
*bracteata*, 422, 468.  
*bracteatus*, 415.  
*brandisiana*, 552, 675.  
*brassicata*, 648.  
*breveflorum*, 192.  
*brevirrostris*, 377.  
*brookei*, 198.  
*brownei*, 114, 520.  
*browniana*, 556.  
*brunonis*, 376, 406.  
*bryonia*, 418.  
*bucki-amela*, 518.  
*buddleioides*, 223.  
*bulbosus*, 122.  
*bullerianum*, 193.  
*bupleurifolium*, 499.  
*burmanica*, 434.  
*burmanicum*, 601.  
*burmanni*, 453.  
*burmanniana*, 410, 555.  
*burmensis*, 52.  
*butarea*, 314.  
*butonica*, 472, 473.  
*caapa*, 658.  
*cachemiriana*, 501.  
*cactus*, 440.  
*cadmia*, 669.  
*cæsalpinaria*, 538.  
*cæsalpinia*, 540.  
*casia*, 543.  
*cæspitosa*, 518.  
*cajan*, 514.  
*cajuputi*, 467.  
*calanthe*, 194.  
*calcaratum*, 383.  
*calceolus*, 158, 193.  
*calimeris*, 392.  
*callostylis*, 194.  
*calophylla*, 417.  
*calva*, 378, 380.  
*calycine*, 513.  
*calycinum*, 484.  
*eulysaccion*, 636.  
*campanula*, 374.  
*campanularia*, 425.  
*camptoclada*, 51.  
*campylocarpa*, 563.  
*campylodes*, 394.  
*cana*, 605.  
*canariensis*, 610.  
*candelaria*, 480.  
*candida*, 30, 533.  
*candolleana*, 597.  
*canescens*, 121, 317, 543.  
*cannabina*, 523.  
*cannabinum*, 394.  
*canthium*, 423, 424.  
*cantonense*, 122.  
*cantonensis*, 392.  
*capensis*, 121.  
*capitatum*, 494.  
*capituliflora*, 412.  
*capreolata*, 562.  
*cardiosperma*, 382.  
*carduus*, 399.  
*careya*, 473.  
*carinata*, 425.  
*carpophyllum*, 620.  
*carpopogon*, 506, 507.  
*casearia*, 450.

- casparca*, 442.  
*catechu*, 542.  
*catechuoides*, 542.  
*cathecartii*, 674.  
*catjang*, 508.  
*cattu-picinna*, 446.  
*caudiculatum*, 115.  
*ceanothus*, 570.  
*centipeda*, 382.  
*cephalostigma*, 374.  
*cerasiflora*, 471.  
*cerasifolia*, 482.  
*cerastium*, 640.  
*cerasus*, 486.  
*ceratophorus*, 362.  
*ceratostemma*, 371.  
*cerbera*, 344, 345.  
*cerberæfolia*, 419.  
*cerea*, 631.  
*crifera*, 564.  
*cernuum*, 200.  
*chaillotia*, 579.  
*chamæburus*, 641.  
*championi*, 314.  
*charaefolia*, 430.  
*chate*, 447.  
*chavannesia*, 348.  
*chinense*, 110, 381, 517.  
*chinensis*, 119, 383, 538,  
 610.  
*chilocalyx*, 595.  
*chondrospermum*, 351.  
*chrysanthemum*, 392.  
*chrysocoma*, 396.  
*chrysodium*, 77, 80.  
*cicultristriatus*, 447.  
*ciliaris*, 118, 312.  
*ciliata*, 313.  
*ciliatus*, 402.  
*ciliosum*, 293.  
*cineraria*, 394.  
*cinerascens*, 387.  
*cinerea*, 467, 521, 525.  
*cinnamometorum*, 120.  
*cirrhopetalum*, 191.  
*cirsium*, 399.  
*cissus*, 562, 563, 564.  
*cissampelos*, 658.  
*citrullus*, 417.  
*citrus*, 593.  
*citta*, 506.  
*clavatum*, 156.  
*clome*, 650.  
*cleyera*, 630.  
*cliffortioides*, 293.  
*clinacandra*, 367.  
*coadunata*, 82.  
*cobbiana*, 680.  
*coccinea*, 370, 420, 448,  
 479, 523.  
*cocconeum*, 473.  
*cocculus*, 656, 657.  
*codaga*, 349.  
*codonopsis*, 374.  
*caloglossum*, 200, 201.  
*curulea*, 412, 519, 521.  
*coir*, 107.  
*collinum*, 496.  
*combretum*, 477.  
*commersiana*, 447.  
*commersonii*, 423.  
*communis*, 120.  
*comosa*, 270.  
*compressum*, 124, 192.  
*concinna*, 542.  
*concinnum*, 191.  
*concolor*, 467.  
*conferta*, 467.  
*confertum*, 384.  
*conferoides*, 28.  
*confinis*, 481.  
*confusum*, 384.  
*congenifolia*, 487.  
*congesta*, 344.  
*congestum*, 498.  
*conjugatum*, 73.  
*conocarpus*, 479.  
*conomon*, 447.  
*contractum*, 110.  
*convolvulacea*, 658.  
*conyza*, 386, 387, 389, 390,  
 392, 398.  
*cordata*, 374.  
*cordatum*, 394, 461.  
*cordifolia*, 270, 317.  
*cordifolium*, 395, 610.  
*coreopsis*, 378.  
*coromandeliana*, 573, 609.  
*coronans*, 82.  
*coronaria*, 346.  
*corymbosa*, 390, 410.  
*coryzadenia*, 480.  
*cosmirusa*, 520.  
*costata*, 425.  
*costatum*, 82, 110.  
*costatus*, 627.  
*cotyledon*, 484.  
*crassireticulatum*, 53.  
*crataeva*, 596.  
*crenata*, 368.  
*crenulata*, 368, 593.  
*crenulatum*, 308.  
*crinita*, 310.  
*crinitus*, 615.  
*crispa*, 346, 656.  
*crocea*, 588.  
*crustaceus*, 19.  
*cryptotheca*, 455.  
*eucumis*, 446, 448.  
*eucurbita*, 446, 447.  
*eudranus*, 268.  
*eumigia*, 82.  
*euneatum*, 392.  
*euneifolia*, 550, 648.  
*cunninghamii*, 382.  
*cupreum*, 193.  
*cuspidata*, 397.  
*cuspidatum*, 192.  
*cyanea*, 654.  
*cyanoecarpum*, 675.  
*cyanoecarpus*, 608.  
*cyanopsis*, 395, 396.  
*cyanospermum*, 514.  
*cygnisetum*, 54.  
*cylindrica*, 408.  
*cylindrocarpum*, 539.  
*cylindrostachya*, 258, 385.  
*cylindrostachyum*, 385.  
*cymbidium*, 196, 199.  
*cyminosma*, 591.  
*cymosa*, 471, 563.  
*cyperinus*, 121.  
*cyrtolophium*, 54.  
*cytisis*, 514.  
*dalbergaria*, 527.  
*dalbergia*, 526, 527.  
*dalbergioides*, 528.  
*dammara*, 216.  
*dasylobum*, 497.  
*dasyoneura*, 670.  
*dasyphylla*, 547.  
*davallioides*, 72, 82.  
*debile*, 124.  
*debilis*, 512, 521.  
*debregensia*, 266.  
*decagyna*, 610.  
*decandrum*, 477.  
*decancuron*, 396, 397.  
*decastrophia*, 577.  
*decemangularis*, 605.  
*decemangulata*, 481.  
*decipiens*, 421.  
*decurrens*, 81.  
*dehiscens*, 374.  
*deliciosus*, 447.  
*dimissum*, 473.  
*dendrobium*, 195, 198, 498.  
*densa*, 368.  
*densiflora*, 389, 414, 427.  
*derris*, 528.  
*desmanthus*, 541.  
*desmodium*, 500, 512.  
*diandrum*, 124.  
*diuicarpium*, 432.

- dicalyx*, 356.  
*dichotoma*, 58, 313, 348, 455, 648.  
*dichotomum*, 224.  
*dichotomus*, 350.  
*dichrocephala*, 382.  
*dieranoblasta*, 51.  
*dieranum*, 49.  
*dictamnoides*, 440.  
*dictopteris*, 71.  
*didictyon*, 49.  
*didyma*, 603.  
*didymosorum*, 83.  
*diesingia*, 511.  
*diffusa*, 410, 454, 568.  
*diffusum*, 496.  
*digitaria*, 109.  
*digitata*, 434.  
*dilatatum*, 197.  
*dilicariu*, 312.  
*dimetia*, 411.  
*dimidiata*, 296, 532.  
*dinochloa*, 99.  
*dioica*, 555, 667.  
*dioicus*, 667.  
*dioryctandra*, 647.  
*diopyrifolia*, 570.  
*diospyros*, 358.  
*diploclinium*, 442.  
*diplocos*, 276.  
*diplostemon*, 456.  
*dipteracanthus*, 316.  
*discolor*, 377, 572.  
*discospermum*, 427.  
*distans*, 374.  
*disticha*, 141, 651.  
*dithyrocarpus*, 124.  
*divaricata*, 618.  
*divergens*, 396.  
*diversifolia*, 406.  
*djiringa*, 544.  
*dolabriformis*, 541.  
*dolichos*, 508, 510, 511, 513, 514, 521.  
*domestica*, 472.  
*doniana*, 390.  
*dopatrioides*, 375.  
*doronicum*, 383.  
*doromma*, 473.  
*drilosiphon*, 22.  
*drynaria*, 73.  
*dubium*, 497.  
*duchassaingia*, 505.  
*duchesnea*, 490.  
*dulaim*, 447.  
*duhaldea*, 383.  
*dunbaria*, 513.  
*dysolobium*, 510.  
*ebenus*, 357.  
*eburneum*, 197.  
*ecalyculata*, 393.  
*eccremanthus*, 559.  
*ecdysanthera*, 348.  
*echinata*, 267.  
*echites*, 347, 348, 349.  
*edgeworthianus*, 314.  
*edule*, 557.  
*edulis*, 137.  
*effusa*, 400.  
*effusum*, 293.  
*egenolfia*, 76.  
*ckebergia*, 582.  
*elata*, 139, 435, 541.  
*elatum*, 395.  
*elliptica*, 476.  
*ellipticum*, 434.  
*ellipticus*, 595, 676.  
*elongata*, 416, 455, 668.  
*emaculata*, 463.  
*emarginata*, 528.  
*embelia*, 365, 366.  
*embryogonia*, 477.  
*embryopteris*, 358.  
*endivia*, 401.  
*enacaphyllum*, 539.  
*ensifolia*, 146.  
*ensiformis*, 510.  
*entada*, 540.  
*entodon*, 53.  
*epigynum*, 372.  
*epipactis*, 201.  
*epirhizantes*, 642.  
*epithimia*, 431.  
*eranthemum*, 308, 313.  
*erecta*, 379, 416, 410.  
*erigeron*, 390.  
*eriocarpum*, 83.  
*eriopetala*, 481.  
*eriphora*, 383.  
*eriorhaphis*, 623.  
*erubescens*, 421.  
*erythracanthus*, 217.  
*erythrochiton*, 630.  
*erythrorchis*, 201.  
*erythrosperma*, 510.  
*esculenta*, 348.  
*etaria*, 201.  
*eu-cymbidium*, 171.  
*eu-desmodium*, 195.  
*eugenia*, 467.  
*euloba*, 349.  
*eulophia*, 197.  
*eupatorium*, 394, 396, 398.  
*euphoria*, 557, 559.  
*euphroboscis*, 200.  
*euthodon*, 348.  
*eronymus*, 572.  
*ewyckia*, 464.  
*exaltata*, 453.  
*exelsa*, 534.  
*exocaria*, 254.  
*excisa*, 389.  
*eximius*, 559.  
*extensus*, 625.  
*fabaeformis*, 521.  
*fagonia*, 354.  
*falcatum*, 390.  
*falcatus*, 223.  
*fulcibum*, 83.  
*falconeri*, 259, 663.  
*fullae*, 402.  
*fascicularis*, 112.  
*fasciculata*, 597.  
*fastigiatum*, 395.  
*febrifuga*, 586.  
*fenestralis*, 24.  
*fenestrata*, 519.  
*fergusonii*, 412.  
*ferox*, 260.  
*ferruginea*, 356, 527.  
*ferruginescens*, 569.  
*filiculme*, 110.  
*filiforme*, 195.  
*filipes*, 110.  
*fimbristylis*, 120.  
*finlaysoni*, 126.  
*fistula*, 530.  
*fistulosus*, 447.  
*flaccida*, 393.  
*flaccidus*, 54.  
*flava*, 194, 314, 390.  
*flavola*, 197.  
*flavidum*, 110.  
*flavum*, 680.  
*flavus*, 514, 528.  
*flexuosa*, 609.  
*flexuosus*, 112, 417.  
*floribunda*, 355, 427, 453, 457, 479, 573, 591, 595, 632, 652, 668, 670, 679.  
*floribundum*, 464.  
*florida*, 531.  
*fluminea*, 547.  
*fetida*, 446, 644.  
*fetidissima*, 475, 594.  
*foliosa*, 390.  
*fontinalis*, 402.  
*formosum*, 478.  
*fragarioides*, 490.  
*fragrans*, 368, 427.  
*fraterna*, 612.  
*fraxinifolium*, 83.  
*frutescens*, 326.

- fruticosa*, 315, 453, 531.  
*fenticulosa*, 454.  
*fucus*, 29.  
*fuliginosa*, 195.  
*funes*, 621.  
*fusca*, 411.  
*fuscus*, 606.  
*gaertnera*, 599.  
*galeclupa*, 526, 529.  
*galega*, 523, 524.  
*galioides*, 411.  
*galempita*, 278.  
*gamoscapalum*, 191.  
*gangeticus*, 508.  
*garciniaefolia*, 365.  
*gardenia*, 427.  
*gardneri*, 470.  
*gastonia*, 434.  
*gendarussa*, 310.  
*geniculatum*, 113.  
*geophila*, 415.  
*gersenii*, 540.  
*getonia*, 479.  
*gigantea*, 200.  
*gigantum*, 119.  
*glaber*, 403.  
*glabra*, 63, 364, 457, 458, 476, 526, 631.  
*glabrata*, 113, 368, 381.  
*glabrescens*, 569.  
*glabrifolia*, 534.  
*glabrior*, 564.  
*glabriuscula*, 663.  
*gladiata*, 510.  
*glauca*, 564, 643.  
*glechomifolia*, 611.  
*glinus*, 440.  
*glumaceum*, 499.  
*glutinifera*, 358.  
*glutinosa*, 425.  
*glycine*, 509, 510, 512.  
*goniopteris*, 72, 76.  
*gonitrus*, 608.  
*gonocitrus*, 593.  
*gonopteris*, 627.  
*goodyera*, 202.  
*gordonia*, 632, 679.  
*gourrecephal*, 490.  
*graciliflorus*, 223.  
*gracilis*, 453, 539, 590.  
*grahamiana*, 441.  
*grahamii*, 550.  
*graminicola*, 410.  
*granadilla*, 451.  
*granatum*, 585.  
*grande*, 465.  
*grandiflora*, 196, 317, 420, 463, 519, 626.  
*grandiflorum*, 321, 355, 660.  
*grandis*, 208, 389.  
*granulatus*, 54.  
*gratissima*, 346.  
*greenia*, 408.  
*grevia*, 602, 603, 624.  
*griffithia*, 427.  
*griffithiana*, 66, 114, 456, 534.  
*griffithianum*, 192, 431, 451.  
*griffithii*, 348, 478, 583, 606, 642, 666.  
*grislea*, 457.  
*grossum*, 326.  
*grumilea*, 416, 417.  
*guarea*, 585.  
*guatteria*, 663.  
*guilandina*, 539.  
*guilelmi waldemarii*, 345.  
*gymnanthera*, 630.  
*gymnopetalum*, 417.  
*gymnopteris*, 80.  
*gymnosphæra*, 63.  
*gynopachys*, 427.  
*gynura*, 393.  
*habenaria*, 200.  
*henkei*, 119.  
*hamatus*, 664.  
*hamburgianum*, 194.  
*hamiltoniana*, 356.  
*hamiltonii*, 57.  
*hamulosa*, 580.  
*haplanthus*, 342.  
*haplostylis*, 119.  
*harrisi*, 317.  
*hasseltii*, 196.  
*hayneana*, 523.  
*hederacea*, 446.  
*hedysmum*, 193.  
*hedyotifolia*, 310.  
*hedyotis*, 412, 413.  
*hedysarum*, 493, 494, 495, 496, 497, 498, 499, 501, 515.  
*hefferi*, 608.  
*helictrifolia*, 603.  
*helique*, 348.  
*heloncha*, 379.  
*helospora*, 424.  
*hemisphærica*, 382.  
*henshallii*, 193.  
*henslowia*, 457.  
*herbaceum*, 616.  
*hermarioides*, 293.  
*heterandra*, 635.  
*heteranthera*, 598.  
*heterocarpa*, 525.  
*heteroclitum*, 656.  
*heterophylla*, 359, 597.  
*heterophyllum*, 495.  
*heterophyllus*, 614.  
*hexacentris*, 317.  
*hexagona*, 489.  
*hexandra*, 658.  
*hexandrus*, 511.  
*hexapetalum*, 432.  
*hexastachyus*, 122.  
*hibiscus*, 616.  
*himalayana*, 562, 563.  
*hindsii*, 394.  
*hingtscha*, 379.  
*hippocrates*, 571.  
*hirca*, 599, 600.  
*hirsuta*, 313, 316, 391.  
*hirsutum*, 415, 616.  
*hirta*, 508, 568.  
*hirtus*, 113.  
*hispidissima*, 501.  
*hispidula*, 408.  
*hispidum*, 124, 392.  
*hisutsua*, 392.  
*holigarna*, 550.  
*hololepis*, 398.  
*hookeri*, 83.  
*hookerianum*, 637.  
*hopea*, 239, 628.  
*hordeiformis*, 113.  
*hormosiphon*, 23.  
*horsfieldiana*, 356, 379.  
*horsfieldianus*, 350.  
*horsfieldii*, 407, 447, 465, 478, 490, 500, 513, 530, 535.  
*humifusa*, 386.  
*hunteria*, 344.  
*huttneriana*, 195.  
*hydrolythrum*, 454.  
*hymenolepis*, 77, 80.  
*hymenophylla*, 386.  
*hypaphorus*, 505.  
*hyperanthera*, 648.  
*hypoloma*, 32.  
*hypnum*, 53.  
*hypoxis*, 146.  
*hyptanthera*, 428.  
*hyssopifolia*, 296.  
*icosandra*, 650.  
*idolotrica*, 445.  
*ignea*, 547.  
*illicebroides*, 293.  
*imbricata*, 561.  
*imbricatum*, 57.  
*impatiens*, 598.  
*inaquilaterum*, 377.

- incana*, 316.  
*incanus*, 658.  
*inelyta*, 473.  
*inconspicua*, 577.  
*indica*, 43, 269, 306, 363,  
     445, 446, 447, 448,  
     472, 489, 526, 570,  
     581, 582, 624, 639,  
     640, 670.  
*indicum*, 377, 381, 520.  
*indicus*, 49, 440, 670.  
*indigofera*, 314.  
*inermis*, 404.  
*innocua*, 275.  
*insularis*, 379.  
*integerrima*, 481, 594.  
*integra*, 606.  
*integrifolia*, 302, 392,  
     571, 632.  
*intermedium*, 122, 664.  
*inversa*, 669.  
*involuta*, 516.  
*involutatum*, 399.  
*iodoneura*, 412.  
*ischemoides*, 109.  
*ischemum*, 113.  
*isonandra*, 362.  
*isopetala*, 533.  
*ixeris*, 402.  
*jackiana*, 464.  
*jackii*, 408.  
*jambosa*, 468, 470, 471,  
     472.  
*japonica*, 114, 391.  
*javanica*, 317, 435, 528,  
     580.  
*javanicum*, 384, 398, 432,  
     514.  
*javanicus*, 112.  
*jenkinsia*, 80.  
*jenkinsii*, 565.  
*johnia*, 573.  
*jonesia*, 535, 537.  
*jordoni*, 392.  
*juliana*, 201.  
*julianum*, 22.  
*juncum*, 493.  
*junciformis*, 120.  
*justicia*, 308, 309, 311,  
     312, 313.  
*kalanchoe*, 484.  
*kamila*, 481.  
*karensium*, 223, 487.  
*kariria*, 448.  
*karka*, 106.  
*ketnia*, 458.  
*khasiyana*, 85.  
*kiesera*, 523.  
*kissi*, 633.  
*kleiniana*, 490.  
*kanigi*, 531.  
*kanigii*, 103, 114.  
*kringia*, 544.  
*kopsia*, 345.  
*kora*, 110.  
*krouee*, 529.  
*kunthii*, 376.  
*kurzii*, 518.  
*lacera*, 387.  
*laciniata*, 313.  
*laflingia*, 640.  
*laflingia*, 640.  
*latum*, 352.  
*laevigata*, 121.  
*lavis*, 317.  
*lagenarium*, 501.  
*lagerstramia*, 458.  
*laggera*, 390.  
*lagopoides*, 500.  
*lamarekii*, 432.  
*lampongam*, 465.  
*lanceaefolia*, 523.  
*lanceolaria*, 389, 562.  
*lanceolata*, 609.  
*lanceolatum*, 607.  
*lanceolatus*, 316.  
*lanceifolia*, 477.  
*lanuginosa*, 400, 599.  
*lapsanoides*, 387.  
*lasiobema*, 535.  
*lasiocarpum*, 497.  
*lasiolepis*, 590.  
*latifolia*, 110, 194, 573.  
*latifolium*, 496.  
*laurifolium*, 464.  
*laurinum*, 555.  
*laxiflora*, 396, 551.  
*laxiflorum*, 496.  
*leersia*, 109.  
*leiocarpa*, 416.  
*lentiginosa*, 368.  
*lepidocarpa*, 471.  
*lepidocoma*, 516.  
*lepidotum*, 478.  
*leptocoma*, 391.  
*leptohymenium*, 53.  
*leptonium*, 578.  
*leptostachya*, 382.  
*leptotrichum*, 49.  
*leschenaultii*, 424, 655.  
*leucantha*, 378, 520, 524.  
*leucocarpa*, 374, 563.  
*leucosperma*, 510.  
*leucopyrenos*, 416.  
*lichenoides*, 29.  
*lignosus*, 510.  
*limodolum*, 197.  
*limonellus*, 593.  
*limonia*, 587, 592, 593.  
*limonum*, 595.  
*lindleyana*, 191.  
*lindleyi*, 614.  
*linearifolia*, 386.  
*linearis*, 456, 460.  
*lineata*, 412.  
*linifolia*, 296.  
*linnai*, 564.  
*linoceroïdes*, 354.  
*linociera*, 354.  
*linum*, 601.  
*lippaya*, 409.  
*liriodendron*, 659, 660.  
*littoralis*, 474.  
*littoreum*, 585.  
*lobatum*, 544.  
*lobbiana*, 375, 483, 579.  
*lobbii*, 674.  
*lobelia*, 375.  
*lodiculare*, 113.  
*longicaulis*, 397, 401, 413.  
*longicollis*, 461.  
*longiflora*, 113, 479.  
*longifolia*, 316, 379, 389,  
     550, 586.  
*longifolius*, 608, 615.  
*longifolium*, 122.  
*longipedunculatus*, 511.  
*longipes*, 453.  
*longispina*, 593.  
*loniceroides*, 635.  
*loranthifolia*, 216.  
*loriforme*, 82.  
*lucida*, 365, 425, 477.  
*lucidulum*, 423.  
*lucidum*, 465.  
*lucidus*, 570.  
*ludea*, 644.  
*lunata*, 483.  
*lupinus*, 521.  
*lurida*, 417.  
*lutescens*, 464.  
*luxurians*, 518.  
*lycopodium*, 57.  
*lyrata*, 401.  
*lythroides*, 453.  
*maccllellandia*, 456.  
*macraei*, 113, 297.  
*macrocarpa*, 349, 368,  
     411, 476.  
*macrocarpum*, 424, 582.  
*macrocarpus*, 657.  
*macrophylla*, 127, 412,  
     421, 504, 616.  
*macrophyllum*, 540.

- macropodum*, 620.  
*macrorhiza*, 480.  
*maculatus*, 520.  
*madagascariense*, 648.  
*madrasspatensis*, 312.  
*madrasspatana*, 569.  
*madurensis*, 395.  
*magnificum*, 473.  
*mahonia*, 655.  
*majus*, 368.  
*malabarica*, 412.  
*malacophyllus*, 113.  
*malayana*, 431, 490.  
*malayensis*, 598.  
*mallea*, 582.  
*mallotus*, 244, 248.  
*mammia*, 472.  
*mangle*, 480.  
*manillanum*, 461.  
*marchantioides*, 194.  
*marcottiana*, 680.  
*marcreightia*, 357.  
*marginata*, 640.  
*marinus-iridis*, 448.  
*mariscus*, 121.  
*martabanica*, 260.  
*masonanthus*, 133.  
*massoniana*, 213.  
*maugium*, 459, 481.  
*mauritanica*, 401.  
*max*, 509.  
*marima*, 110.  
*medica*, 595.  
*medicagineus*, 513.  
*melanocarpa*, 518.  
*melanopus*, 83.  
*melanosperma*, 503.  
*melastoma*, 460, 462.  
*meliacca*, 583.  
*melica*, 110.  
*melocanna*, 101.  
*melodorum*, 666.  
*menispermum*, 656, 657, 658.  
*menthoides*, 297.  
*meoschium*, 113.  
*mephitidea*, 115.  
*merguensis*, 589.  
*meridiana*, 639.  
*merkusi*, 213.  
*mesopus*, 32, 33.  
*mespilus*, 487.  
*mesua*, 637.  
*metabolus*, 412.  
*meyenianum*, 113.  
*meyenii*, 119.  
*meyera*, 384.  
*meyerianus*, 124.  
*micrantha*, 371, 544, 593.  
*microcarpa*, 455.  
*microcephala*, 542.  
*microcephalus*, 385.  
*microcos*, 603.  
*microphylla*, 543, 610.  
*micropteryx*, 506.  
*microsperma*, 510.  
*microsphaera*, 25.  
*microsporon*, 26.  
*microzyma*, 26.  
*miliare*, 110, 111.  
*minosa*, 540, 541, 542, 543, 544, 545.  
*minusoides*, 532.  
*miniaturum*, 198.  
*minima*, 382.  
*minimum*, 326.  
*minor*, 146.  
*minus*, 368.  
*misguttianum*, 293.  
*miserum*, 122.  
*moacurroides*, 621.  
*mollis*, 349, 385, 563, 587, 602, 620.  
*mollissima*, 310, 534.  
*molluccana*, 475, 489.  
*mollugo*, 410.  
*momordica*, 445, 446, 447, 448.  
*monadelphica*, 448.  
*monander*, 120.  
*monas*, 25.  
*monenteles*, 385.  
*monetia*, 354.  
*moniliformis*, 201.  
*monoceras*, 606, 607.  
*monogynum*, 601.  
*monomeria*, 196.  
*monophylla*, 595.  
*monospermum*, 666.  
*montana*, 354, 419, 435, 517, 555, 556, 648.  
*montanum*, 555.  
*mordecca*, 444.  
*moringa*, 618.  
*morisia*, 119.  
*moschatus*, 614.  
*mucronatum*, 495.  
*muelleri*, 167.  
*multicaule*, 385.  
*multiceps*, 384.  
*multiflora*, 396, 422, 572.  
*multiflorum*, 352, 497.  
*mundulea*, 524.  
*mungo*, 509.  
*munjista*, 130.  
*munroana*, 669.  
*muralis*, 309.  
*murex*, 606.  
*muricata*, 446, 562.  
*muricia*, 417.  
*murraya*, 594.  
*mussanda*, 429.  
*mutabilis*, 659.  
*myosotoides*, 657.  
*myrabolanus*, 475.  
*myriocephala*, 389.  
*myriophylla*, 532.  
*myrsine*, 366.  
*myrtinus*, 570.  
*myrtus*, 470.  
*mysorensis*, 490.  
*mysorensis*, 610.  
*nageli*, 467.  
*nana*, 455.  
*nanus*, 509.  
*napeca*, 569.  
*napifolia*, 101.  
*napus*, 648.  
*nasuta*, 309.  
*nataus*, 541.  
*nauclea*, 414.  
*neckera*, 51, 52, 53.  
*neilgherrensis*, 357, 563, 609.  
*neilgherrica*, 581.  
*neli-tali*, 501.  
*nelitris*, 467.  
*nelumbium*, 655.  
*nematopyxis*, 454.  
*nepalense*, 110, 461.  
*nepalensis*, 106, 313, 435, 675.  
*nerium*, 350.  
*neriifolium*, 303.  
*nerrosa*, 491.  
*nervosum*, 313.  
*neustanthus*, 511.  
*nicobarica*, 605.  
*niliacum*, 385.  
*niphobolus*, 72, 73.  
*nitida*, 389.  
*nivea*, 306, 399.  
*niveus*, 133.  
*nodiflora*, 412.  
*nodiflorum*, 394.  
*norysca*, 638.  
*notho-millittia*, 524.  
*notomiana*, 487.  
*nutata*, 664.  
*nuda*, 313.  
*nugaria*, 538.  
*nummularifolius*, 499.  
*nutans*, 365, 389, 572.  
*obcordata*, 645.

- oblata*, 633.  
*obliqua*, 371.  
*obliquus*, 121.  
*oblonga*, 348, 383, 461, 605, 654.  
*oblongifolia*, 141.  
*oblongifolium*, 578, 585, 637.  
*oblongifolius*, 221.  
*obovata*, 316, 367, 631, 642.  
*obovatum*, 397.  
*obtectus*, 223.  
*obtusa*, 531, 576, 588.  
*obtusifolium*, 616.  
*occidentalis*, 493.  
*ochra*, 588.  
*ochroleucum*, 502.  
*octandra*, 605.  
*octandrum*, 456.  
*odorata*, 346.  
*odoratissima*, 281.  
*odoratum*, 198.  
*odlicollum*, 51.  
*oldenlandia*, 410, 411.  
*oleracea*, 380, 511.  
*oleosperma*, 539.  
*oligocarpa*, 442.  
*oligoccephala*, 386.  
*ophimenus*, 109.  
*ophioxylodes*, 417.  
*oppositifolia*, 345.  
*orbiculare*, 110.  
*orbicularis*, 382.  
*orchis*, 201.  
*orientalis*, 216, 384.  
*origanoides*, 309.  
*orixense*, 130, 381.  
*orixensis*, 402.  
*ornata*, 668.  
*ornithocephalochloa*, 111.  
*osmospermus*, 309.  
*otochilus*, 195.  
*ottilis*, 567.  
*oudemansia*, 622.  
*ovalifolia*, 401, 411.  
*oralis*, 606.  
*ovata*, 194, 414.  
*ovatum*, 675.  
*oxylosum*, 81.  
*oxyphylla*, 543, 566, 592.  
*oxystophyllum*, 202.  
*oxytenanthera*, 99.  
*pachyderma*, 464, 675.  
*pachystoma*, 196.  
*pæderia*, 416, 418.  
*palcmbanicum*, 471.  
*pallescens*, 467.  
*pallidum*, 197.  
*palpebrae*, 158.  
*paludosa*, 379, 523.  
*paludosum*, 109.  
*panax*, 433, 434.  
*panicatum*, 374.  
*panicoides*, 109.  
*paniculata*, 464, 538, 642, 656.  
*paniculatus*, 348.  
*panicum*, 104.  
*papaya*, 452.  
*paradisiaca*, 204.  
*parasitica*, 642.  
*paratropia*, 434.  
*parictosa*, 481.  
*parishii*, 65, 76, 81, 674.  
*parviflora*, 309, 440, 533.  
*parviflorum*, 486.  
*parvifolia*, 302.  
*parvifolium*, 495.  
*pastinaca*, 437.  
*patens*, 494, 648.  
*patrinii*, 646.  
*patula*, 113.  
*paucijuga*, 590.  
*paucinervia*, 344.  
*pavetta*, 419, 420, 421.  
*pedicellaris*, 569.  
*pedilonum*, 680.  
*peduncularis*, 405.  
*pedunculata*, 591, 637.  
*peguensis*, 397.  
*pelticalyx*, 662.  
*pendulina*, 658.  
*pendulum*, 496.  
*pentagona*, 120.  
*pentagyna*, 587.  
*pentagynum*, 440.  
*pentandra*, 348, 446, 479, 555.  
*pentaphylla*, 440, 524.  
*pentaphyllus*, 350, 615.  
*pentaptera*, 475, 476, 478.  
*peplis*, 455.  
*pepo*, 446.  
*perennis*, 453.  
*perfoliata*, 640.  
*pericampylus*, 658.  
*peristylodes*, 200.  
*permollis*, 364.  
*perrottetii*, 293.  
*pertenuis*, 122.  
*petaloma*, 479.  
*petiolaris*, 551.  
*petiolatus*, 124.  
*petola*, 446.  
*petrocarya*, 676.  
*petunga*, 428.  
*phanera*, 534.  
*picrophloja*, 354.  
*picta*, 365, 417, 522.  
*pileostigma*, 533.  
*pilosa*, 296, 448, 603.  
*pilosissima*, 517.  
*pinifolia*, 410.  
*pinnata*, 484, 528, 553, 567.  
*piptolepis*, 121.  
*pirigara*, 474.  
*pithecolobium*, 514, 545.  
*planckonia*, 474.  
*platanthera*, 200.  
*platyhyppum*, 53.  
*platyphyllum*, 478.  
*plebeia*, 622.  
*plectocolia*, 47.  
*pleiogyne*, 382.  
*pleione*, 195.  
*plena*, 541.  
*pleurolobium*, 494.  
*pleuropteris*, 560.  
*pleuropus*, 33.  
*plicata*, 201.  
*plocaria*, 30.  
*plumulosus*, 314.  
*pod*, 103, 104.  
*pogonia*, 201.  
*polhii*, 317.  
*poiriana*, 538.  
*poirrea*, 477.  
*polanisia*, 650.  
*polyandra*, 362.  
*polyantha*, 573.  
*polyantha*, 529.  
*polybotrya*, 317.  
*polycarpum*, 494, 657.  
*polyccephala*, 391, 399, 435.  
*polyccephalos*, 385.  
*polychilos*, 173.  
*polygama*, 467.  
*polygonoides*, 291, 309, 410.  
*polymorpha*, 104.  
*polyphyllus*, 556.  
*polypodioides*, 85.  
*polysticta*, 368.  
*polythyrsa*, 530.  
*pomiferum*, 468.  
*pongamia*, 524, 525, 530.  
*poosia*, 401.  
*populifolia*, 610.  
*populifolium*, 577.  
*populnea*, 482.  
*populucoides*, 616.

- porosum*, 82.  
*potamochoa*, 109.  
*phacanthus*, 667.  
*phaius*, 196.  
*pharmaceum*, 440.  
*phaseolus*, 508, 510.  
*phagopteris*, 72.  
*philippica*, 610.  
*philippinensis*, 244.  
*phillyrea*, 354.  
*phlomisoides*, 316.  
*pholidota*, 195.  
*phragmicoma*, 48.  
*phyllanthus*, 231, 235, 236.  
*phyllodium*, 498.  
*phyllomatia*, 514.  
*phymatodes*, 73.  
*physalifolia*, 396.  
*præmorsum*, 199.  
*prasium*, 465.  
*premnacea*, 431.  
*prenanthes*, 401, 403.  
*prensans*, 513.  
*procris*, 261.  
*procumbens*, 323, 401, 519.  
*prolifera*, 127, 390.  
*pronifolium*, 57.  
*propinqua*, 420.  
*propinquum*, 83.  
*prostrata*, 440, 532.  
*prostratus*, 614.  
*protococcus*, 19, 21, 24.  
*protractile*, 53.  
*prunifolium*, 638.  
*pruriens*, 507, 613.  
*psalliota*, 31.  
*psaraleoides*, 509.  
*pseudo-cajan*, 514.  
*pseudo-cappa*, 383.  
*pseudo-gyroides*, 194.  
*pseudo-trichosanthes*, 445.  
*pseudo-triquetrum*, 498.  
*psilobium*, 428.  
*psychotria*, 417.  
*pterocarya*, 485.  
*pterogonium*, 52, 53.  
*pteroloma*, 497.  
*puberula*, 424, 595.  
*pubescens*, 109, 349, 352, 353, 392, 396, 457, 473, 539.  
*pubiflora*, 392.  
*pulchella*, 194, 199, 460.  
*pulchellus*, 503.  
*pulehra*, 167, 196.  
*pulnicusis*, 508.  
*pulverulum*, 553.  
*punctatum*, 675.  
*punctatus*, 112.  
*purduana*, 397.  
*punica*, 623.  
*purpurascens*, 83, 533.  
*purpurea*, 396, 430.  
*purpureum*, 193, 494.  
*pursatha*, 540.  
*pusilla*, 454, 597, 648.  
*pycnopteron*, 53.  
*pygmaea*, 386.  
*pyramidalis*, 674.  
*pyrethrum*, 381.  
*pyriferum*, 468.  
*pyrifolia*, 390.  
*pyrranthus*, 479.  
*pysifolius*, 676.  
*quadrivalvis*, 316.  
*quercus*, 260.  
*quinquangulare*, 497.  
*quinquangularis*, 120.  
*quinquangulatum*, 497.  
*quinciflorum*, 352.  
*quinquejuga*, 585.  
*rabaniana*, 659.  
*racemosa*, 358, 391, 411, 489, 534, 599, 647.  
*racemosus*, 613.  
*radicans*, 110, 121, 316.  
*rageniana*, 120.  
*ramiflora*, 658.  
*ramiflorum*, 464, 466.  
*ramigerum*, 384.  
*ramosa*, 395, 410, 648.  
*rampoutan*, 558.  
*randia*, 427, 428.  
*rapa*, 648.  
*recurvum*, 197, 423.  
*reginae*, 458.  
*regium*, 361.  
*reincardtianum*, 384.  
*religiosa*, 653.  
*reniforme*, 315, 495.  
*reniformis*, 415.  
*rennelia*, 423.  
*repanda*, 390, 394, 564.  
*repens*, 379, 520, 601.  
*reticulata*, 475.  
*retrofracta*, 312.  
*retusa*, 610.  
*retusifolia*, 604.  
*retzii*, 109.  
*rhamnus*, 570.  
*rhaphis*, 112.  
*rhedei*, 348, 473, 481.  
*rhizophora*, 368, 480, 481.  
*rhizophylla*, 484.  
*rhodoneurum*, 193.  
*rhombifolia*, 530, 610.  
*rhomboudea*, 610.  
*rhopalopetalum*, 665.  
*rhymanthera*, 461.  
*rhynchosoides*, 513, 516.  
*rhynchosperma*, 349.  
*riedleia*, 624.  
*rigida*, 194, 356, 427.  
*rigidus*, 612.  
*rigiophylla*, 396.  
*reogens*, 345.  
*ricale*, 395.  
*robinia*, 526.  
*roethboelliana*, 120.  
*roethboellii*, 120.  
*rondeletia*, 412.  
*rostellaria*, 310.  
*rostrata*, 114.  
*rostratus*, 509.  
*rotala*, 454, 455.  
*rothiana*, 419.  
*rothii*, 124, 582.  
*rotleri*, 512.  
*rottlerianus*, 309.  
*rotunda*, 658.  
*rotundifolia*, 317, 370.  
*rotundifolium*, 432, 478.  
*rotundifolius*, 510.  
*rourea*, 547.  
*rosburghiana*, 455, 480, 599.  
*rosburghii*, 231, 293, 317, 377, 381, 415, 505, 634, 635, 647.  
*rubiginosa*, 356.  
*rubroides*, 411.  
*rubra*, 473.  
*ruellia*, 312, 314, 315.  
*rufa*, 124.  
*rugosa*, 408.  
*rugosum*, 395.  
*rumphii*, 268, 540.  
*runcinata*, 387, 401.  
*russeliana*, 382.  
*saccolabium*, 198.  
*sagittata*, 393.  
*sagotia*, 494.  
*saltiana*, 520.  
*salvifolia*, 603.  
*salvadora*, 383.  
*sambucina*, 581.  
*sapida*, 258.  
*sapindus*, 556.  
*saponaria*, 640.  
*sarcostachys*, 473.  
*sarmentosa*, 310.  
*scabra*, 413.  
*scabrella*, 448.

- scabrophylla*, 604.  
*scandens*, 312, 379, 391, 424, 430, 511, 534, 593, 642.  
*scaphium*, 620.  
*scapigera*, 411.  
*scarabæoides*, 514.  
*schistomitrium*, 49.  
*schkuhii*, 83.  
*schmidelia*, 557.  
*schmidii*, 382.  
*schisma*, 47.  
*scirpoides*, 119.  
*scirpus*, 120.  
*scopolia*, 591.  
*scotanthus*, 445.  
*scutellatum*, 675.  
*scytalia*, 558.  
*securinea*, 236.  
*sedgwickia*, 482.  
*secmanni*, 132.  
*segetum*, 113.  
*sellowia*, 455.  
*seloides*, 114.  
*semecarpus*, 550.  
*semialata*, 518.  
*semicordata*, 563.  
*semidecumbens*, 115.  
*semicordium*, 641.  
*sempervirens*, 581.  
*senegalensis*, 446.  
*senna*, 530, 531, 532.  
*sensitiva*, 501, 532.  
*sericea*, 523.  
*serrata*, 392, 632.  
*serratus*, 607.  
*serrulata*, 319.  
*serrulatum*, 110.  
*sessilis*, 564.  
*setacea*, 120, 597.  
*setaria*, 109.  
*sethia*, 601.  
*setosus*, 615.  
*sibia*, 457.  
*sida*, 610.  
*sideroxylon*, 361.  
*silhetense*, 396.  
*silhetensis*, 400.  
*simiarum*, 663.  
*simora*, 539.  
*simplex*, 310.  
*simplicifolia*, 566, 633.  
*simpliciusculum*, 104.  
*sinapis*, 648.  
*sinense*, 595.  
*singaporeana*, 583.  
*sinuatum*, 497.  
*sirissa*, 544.  
*sissoa*, 527.  
*smithia*, 501.  
*smithiana*, 513.  
*solanacea*, 348, 367.  
*sonchifolia*, 387.  
*sonneratioides*, 458.  
*sophora*, 532.  
*spathaceus*, 615.  
*spathodea*, 319.  
*spatholobus*, 505.  
*spathulata*, 663.  
*spathulatum*, 374.  
*spathulatus*, 54.  
*speciosa*, 406, 472, 531, 637, 668.  
*speciosum*, 198, 655.  
*spectabile*, 83.  
*spectabilis*, 467.  
*spermacoce*, 412.  
*sphaericus*, 608.  
*spharidiophora*, 521.  
*sphaerocarpa*, 555.  
*sphaerocarpum*, 427.  
*sphaeromorphæa*, 382.  
*spicata*, 408.  
*spicatus*, 385.  
*spinidens*, 386.  
*spinosa*, 456, 611, 651.  
*spinulosa*, 523.  
*spiralis*, 450.  
*spirostylum*, 423.  
*sponia*, 278.  
*squarrosa*, 389, 396.  
*stagninum*, 109.  
*staphylæa*, 567.  
*staurogyne*, 317.  
*stellata*, 194.  
*stelligerus*, 625.  
*stenotropis*, 506.  
*stercodon*, 52, 53.  
*sternutatoria*, 382.  
*steudeliana*, 118.  
*stipulaceum*, 495.  
*stipularis*, 375.  
*stizolobium*, 506.  
*storekii*, 613.  
*strangulatum*, 496.  
*stravadium*, 473.  
*streptostigma*, 561.  
*striata*, 312, 391, 401, 440.  
*striatiflora*, 620.  
*stricta*, 391, 410, 518.  
*stricti*, 313.  
*strictum*, 385.  
*strictus*, 121, 614.  
*strophostyles*, 509.  
*stylocoryne*, 427.  
*stylosa*, 480.  
*styrum*, 432.  
*snaris*, 425.  
*subæqualis*, 278.  
*subamplectans*, 484.  
*subincisa*, 375.  
*sublyratum*, 392.  
*suborata*, 551.  
*subpeltata*, 669.  
*subpinnatus*, 670.  
*subracemosa*, 375.  
*subscandens*, 576.  
*subsessilis*, 396.  
*subteres*, 192.  
*subtriflora*, 467.  
*subvelutina*, 419.  
*succidora*, 275.  
*succosum*, 53.  
*succulenta*, 375.  
*suffruticosa*, 531.  
*sumatrana*, 310, 364, 505, 531, 661.  
*sumatranum*, 676.  
*sumatrensis*, 413.  
*sundra*, 542.  
*sundaica*, 378.  
*sucatziana*, 453.  
*svetlenia*, 585.  
*sylvestica*, 486, 648.  
*sylvestre*, 553.  
*symplosiphon*, 22.  
*synapta*, 626.  
*syndesmis*, 552.  
*synnema*, 316.  
*synotis*, 393.  
*syringæfolium*, 352.  
*syrrhopodon*, 49.  
*syzigium*, 468, 470.  
*taccuda*, 376.  
*taractogenos*, 616.  
*tarayana*, 592, 612.  
*tayloria*, 43.  
*tarotrophis*, 276.  
*telanthera*, 291.  
*telephioides*, 409.  
*telfairiana*, 532.  
*tenella*, 386, 448, 532.  
*tenellum*, 113, 376.  
*tener*, 312.  
*tenericaule*, 83.  
*tenuispis*, 470.  
*tenuiflorus*, 122.  
*tenuifolia*, 114, 519.  
*tenuirostris*, 41.  
*tenuis*, 24.  
*tenuispica*, 121.  
*tenuissima*, 103.  
*trophosia*, 526.

- teres*, 413.  
*teretifolia*, 194.  
*terminalia*, 477.  
*terminans*, 83.  
*ternifolia*, 301, 461, 471.  
*ternstroemia*, 632.  
*testaceum*, 175.  
*tetragonolobus*, 511.  
*tetragonus*, 120.  
*tetralocularis*, 616.  
*tetrandra*, 411.  
*tetrapetalum*, 636.  
*tetraphylla*, 592.  
*teysmanni*, 586.  
*thalictrum*, 669.  
*thea*, 633.  
*theretia*, 311.  
*thibaudia*, 371, 372.  
*thinoderma*, 24.  
*thunbergiana*, 401.  
*thyrsoides*, 317.  
*thyrsomitrium*, 49.  
*tiliafolia*, 570.  
*timorensis*, 571.  
*tinctorium*, 464.  
*tjangkorreh*, 102.  
*toddaloides*, 470.  
*tomentosa*, 120, 425, 432,  
 457, 476, 605, 675.  
*tong-dong*, 113.  
*toroites*, 532.  
*torta*, 543.  
*tortuosus*, 615.  
*tothila*, 621.  
*trachyloba*, 501.  
*tranquebaricus*, 508.  
*tremblya*, 461.  
*trialata*, 375.  
*triandra*, 533, 535.  
*trichandra*, 376.  
*trichocarpa*, 408.  
*trichocaulon*, 491.  
*trichomanes*, 65.  
*trichophora*, 386.  
*trichosanthos*, 441.  
*trichospermum*, 321.  
*trichostomum*, 50.  
*trichostylis*, 624.  
*tricuspidatum*, 609.  
*tridesmis*, 638.  
*triflora*, 598.  
*triflorum*, 495, 637.  
*trifolia*, 304.  
*trifoliata*, 480, 653.  
*trifoliatum*, 436, 516.  
*trifoliatulus*, 521.  
*trifolium*, 520.  
*trigona*, 375.  
*trigyna*, 601, 669.  
*trilocularis*, 605.  
*trinervis*, 464.  
*trinervium*, 119.  
*triopteris*, 599.  
*triostrum*, 415.  
*tripartitum*, 381.  
*triphylla*, 440.  
*triphyllum*, 590.  
*trisetorum*, 191.  
*triste*, 197.  
*trivulvaria*, 663.  
*trivialis*, 112.  
*truncatum*, 374.  
*truncatus*, 612.  
*tryphera*, 440.  
*tuberculata*, 562.  
*tuberosa*, 82.  
*tubiflora*, 445.  
*tubularis*, 412.  
*tubulosus*, 613.  
*tungurrut*, 259.  
*turbinatus*, 626.  
*turraea*, 581.  
*uliginosa*, 455, 529.  
*ulmifolia*, 314, 603.  
*umbellata*, 367, 624.  
*umbellatum*, 423, 498,  
 675.  
*uncinata*, 522.  
*uncinellus*, 393.  
*undulata*, 80, 316, 417.  
*undulatus*, 124.  
*uniflora*, 510.  
*uniflorum*, 192, 665.  
*uraria*, 496.  
*uvcolatus*, 54.  
*urochloa*, 109.  
*urophylla*, 526.  
*urtica*, 265.  
*utilis*, 507.  
*utilissimus*, 417.  
*uraria*, 661, 662, 663,  
 664, 665, 666, 667.  
*vagans*, 394, 397.  
*valonia*, 28.  
*vanda*, 199.  
*variabilis*, 428.  
*varians*, 484.  
*variegata*, 371.  
*variegatum*, 371.  
*variolosa*, 487.  
*ratica*, 626.  
*vellichianum*, 373.  
*velutina*, 278, 531, 586,  
 624, 657, 667.  
*velutinus*, 510, 564.  
*venosa*, 316, 412.  
*verbesina*, 378, 379.  
*vernonioides*, 389.  
*verrucosa*, 364.  
*verticillata*, 103, 557.  
*verticillatum*, 672.  
*verticillatus*, 103.  
*resicatoria*, 455.  
*vestita*, 604.  
*villosa*, 341, 365, 396, 453,  
 479, 504, 557, 581.  
*villosus*, 657.  
*viminea*, 603.  
*vincaflora*, 345.  
*viola*, 647.  
*virens*, 76, 387, 631.  
*viridiflorum*, 561.  
*viridifusca*, 194.  
*viscidum*, 385.  
*viscosa*, 103.  
*volubile*, 391.  
*volubilis*, 530.  
*vulgaris*, 445, 452, 472.  
*vulpinus*, 615.  
*walkeri*, 646.  
*wallichiana*, 81, 402.  
*wallichianum*, 630.  
*wallichii*, 119, 349, 350,  
 378, 389, 428, 499, 578,  
 581, 601, 620, 663.  
*weissia*, 44, 50.  
*wollastonia*, 379.  
*wightiana*, 470, 631.  
*wightianum*, 175, 669.  
*wightianus*, 402.  
*wightii*, 196, 277, 362, 481.  
*xanthochymus*, 635.  
*xanthoxylon*, 555, 590.  
*ximenia*, 590.  
*xylocarpus*, 585.  
*youngia*, 401.  
*zanonia*, 449.  
*zeurine*, 201.  
*zeylanica*, 276, 460, 473,  
 481, 651, 663.  
*zeylanicum*, 321, 594.  
*zollingeri*, 197, 616.  
*zollingeriana*, 310, 391,  
 522, 535.  
*zucca*, 417.

## GENERAL INDEX TO VOLUMES I. II.

## A.

- Abbot, Capt., mentioned, i. 345.
- Abraham, P. S., paper on mollusks referred to, i. 141.
- Abraham, the oath of, ii. 274, 689.
- Abrus seeds, used as weights, ii. 503.
- Abyssinian remedy for tape-worm, ii. 246.
- Abyssinian War (1868), the indirect cause of, ii. 485.
- Acanthaceæ, ii. 308-317.
- Aconite poison, ii. 669.
- Acotyledonous or Flowerless Plants, ii. 15 *et seq.*
- Acrogens, ii. 36 *et seq.*, 92.
- Actinolite, i. 13.
- Adam, allegory of the fall of, ii. 689.
- Adam, in the Legend of the Cross, ii. 218.
- Adam, fall of, the account of, not to be understood in a literal sense, ii. 274.
- Adams, H. and A., their 'Genera of Recent Mollusca,' quoted, i. 123 *et seq.*
- Adjutants, C. T. Bingham on, i. 346.
- Adonis, the rose sprung from the blood of, ii. 488.
- African elephant, i. 447.
- African rhinoceros, i. 452.
- Agar Agar, an edible seaweed, ii. 30.
- Agassiz, quoted, i. 474.
- Agates, i. 13.
- Agave, its uses, ii. 147.
- Agnosticism, ii. 671.
- Ahmedabad, whence the name of Amadavat or Avadavat, i. 383.
- Ahriman, ii. 687.
- Air-breathing fishes, i. 185.
- Air-plants, ii. 148.
- Alabaster, Oriental, i. 14.
- Algae, or the Algal Alliance, ii. 16.
- Algae, ii. 15 *et seq.*
- Alismaceæ, ii. 144.
- Allan-myo, adventure with an elephant at, i. 449.
- Alligator pear, ii. 288.
- All-spice, ii. 474.
- Almond, ii. 485.
- Alumina, native, i. 11.
- Aluminate of Magnesium, i. 12.
- Aluminum, Silicate of, i. 14.
- Amarantaceæ, ii. 290.
- Amber, i. 15.
- Ambergris, i. 445.
- Amentaceæ, economic products of, ii. 528.
- Amentales, ii. 256 *et seq.*
- American beef, some, i. 341.
- American calumba root, ii. 334.
- American water weed, ii. 210.
- American wild ipecacuanha, ii. 338.
- Amethyst, i. 13; Pliny's account of the means required to produce a dye resembling, i. 145.
- Amherstia, ii. 491; discovery of, ii. 536.
- Ampelideæ, ii. 561-568.
- Amphibia, i. 288.
- Amphibole, i. 13.
- Anacardiaceæ, ii. 547; useful products of, ii. 553.
- Andaman pig, i. 454.
- Andamans, climate of, i. 480.
- Andamans, flora of, i. 480.
- Andamans, inhabitants of, i. 479 *et seq.*
- Andaman Islands, Catalogue of Orchids gathered in the, ii. 202.
- Andamanese: chastity of—brotherly love of—their racial affinities, i. 482; their manners and customs—burial ceremonies—food—habitations, i. 483; pottery—savage races, i. 484.
- Anderson, Dr. J., quoted, i. 171, 290; erroneous assertion of, i. 292; on the skulls of turtles, i. 339; errors regarding Trionices, i. 340; on mammalia, i. 413; on shrews, i. 439; infelicitous attempt to correct Dr. Jerdon, i. 464; on monkeys, i. 476.
- Anderson, Dr. Thomas, chemical experiments on Kamala, quoted, ii. 245, 246; his arrangement of the Acanthaceæ, ii. 308.
- Angiosperms, ii. 219.
- Aniseed, ii. 439.
- Anomales, ii. 203 *et seq.*
- Anonaceæ, ii. 660-667.
- Ant-cow, i. 38.
- Ant lion, i. 48.
- Ant thrushes, i. 363.
- Ants, i. 46, 116.
- Ants "milking" aphides, i. 37.
- Anthropoid apes and man, comparisons between, i. 478.
- Antidotes to snake poison—"Bosh," i. 316.
- Anti-fat, a quack medicine, ii. 31.
- Antimony, sulphide of, i. 10.
- Apetalous Plants, ii. 219 *et seq.*
- Aphides, i. 37.
- Apocynæ, ii. 342; the useful products of, ii. 351.
- Apollon, the Pythian and Delian, ii. 685.
- Apollonius Rhodius, quotation from, ii. 217.
- Apples, cognate senses of the words for, ii. 485.
- Apricot, ii. 485.
- Aquatic fern, ii. 69.
- Aquatic snakes, i. 304.
- Arachnida, i. 33.
- Arakan earth-oil, i. 15.
- Arakan mountains, adventure with elephants in, i. 448.
- Arales, ii. 129.
- Araliaceæ, economic value of, ii. 433.

- Argo, the first ship, ii. 216.  
 Argonautic voyage, *De Gubernatis'* remarks on the, ii. 217.  
 Argonauts, i. 182.  
 Argus pheasants, i. 389; habits of, i. 390.  
 Arhar, a substitute for peas, ii. 491, 514.  
 Aristolochia, medicinal virtues of, ii. 229; used for a curious purpose, ii. 688.  
 Aristolochiae, ii. 229.  
 Arjun, Krishna's address to, ii. 310.  
 Armstrong, mentioned, i. 315.  
 Arnotto dye, how made, ii. 644.  
 Aroidae, ii. 130.  
 Arragonite, i. 11.  
 Arrow-heads in the Andamans, i. 181.  
 Arrowroot, ii. 206; origin of the name, ii. 209.  
 Arsenides, i. 10.  
 Artemis, the goddess of the moon, ii. 381.  
 Artichokes, ii. 103.  
 Asbestos, i. 13.  
 Ascaris, the reproduction of, i. 22.  
 Asclepiadeae, ii. 336; qualities of the order, ii. 340.  
 Asparageae, ii. 125.  
 Assafoetida, ii. 139.  
 Asteraceae, ii. 377.  
 Asterales, ii. 376.  
 Asthma, remedies for, ii. 326, 327.  
 Asurales, ii. 227.  
 Atkinson, W. S., mentioned, i. 51; referred to, i. 112.  
 Atlas moth, i. 88.  
 Atropine, medicinal uses of, ii. 327.  
 Attar of roses, costliness of, ii. 488.  
 Attaran, the hot-springs of, i. 7.  
 Atures, the extinct tribe of, i. 410.  
 Augite, i. 13.  
 Augustus, a Roman kitchen garden in the days of, ii. 438.  
 Auks, i. 398.  
 Australian parrakeets, i. 408.  
 Avena, ii. 485.  
 Avifauna of the Himalyas, Tenasserim and Burma compared, i. 376.  
 Avocado, ii. 288.
- B.
- Baber, the Moghul Emperor, hunted Rhinoceroses sendaiensis, i. 451.  
 Baboons, i. 475.  
 Bac, ii. 510; fruit of the, ii. 596.  
 Bahia cotton, ii. 616.  
 Balanophoraceae, ii. 220.  
 Balas rubies, i. 11.  
 Balder, or Baldur, the son of Odin, myth of, ii. 221.  
 Balfour, 'Cyclopaedia of India,' quoted and referred to, in both volumes *passim*; a cluster of mistakes in, i. 462.  
 Balour, 'Forest Trees,' quoted, ii. 140; 'Timber Trees,' referred to, ii. 692.  
 Ball, V., mentioned, 341; his 'Jungle Life in India,' quoted, i. 482.  
 Balm, ii. 295.  
 Balm of Gilead, ii. 587.  
 Balm of Mecca, ii. 587.  
 Balsam of Copaiba, ii. 491.  
 Bamboo, economic uses of, ii. 102.  
 Bamboo forest on fire, ii. 101.  
 Bamboo fruit, ii. 101.  
 Bamboo rats, habits of, i. 422.  
 Bamboos, ii. 97 *et seq.*  
 Banana, ii. 203, 204.  
 Bandicoot, a species of rat, i. 118.  
 Bang, a narcotic, ii. 263.  
 Ban-rheca, ii. 266.  
 Ban-sēm, ii. 491.  
 Banting, the, i. 460.  
 Barackpore Zoological Gardens, unpleasant episode at, i. 173.  
 Barbo, Rev. Mr., mentioned, i. 345.  
 Barbets, i. 319.  
 Baring-Gould, S., 'Curious Myths of the Middle Ages,' quotation from, ii. 217-9.  
 Barking deer, i. 459.  
 Barley, ii. 96.  
 Barn owls, i. 406.  
 Barnacle goose, i. 24.  
 'Barri-al guns,' mysterious sounds so called, i. 491.  
 Bartlett, A. D., paper on a curious phenomenon in hornbills, i. 351; on the birth of a rhinoceros in London, i. 153.  
 Basalt, i. 5.  
 Basil thyme, ii. 295.  
 Basilica, esteemed as vegetables, 290.  
 Basking shark, further remarks on the, i. 496.  
 Bastard fennel, ii. 439.  
 Bastard saffron, ii. 399.  
 Bastian, Prot., referred to, i. 490.  
 Bateman, Mr., mentioned, ii. 160.  
 Batrachia, remarks on the generic and specific differences of, i. 198.  
 Batrachia, i. 289. Boulenger's Catalogue of, i. 497.  
 Bats, i. 423 *et seq.*; dentition of, i. 424 *et seq.*; singular instance of voracity in, i. 425; their nocturnal feasts, i. 431.  
 Bats, parasites on, i. 48.  
 Batty Malve, a breeding station of birds, i. 389.  
 Bayas, i. 383.  
 Bellium, ii. 587.  
 Bead tree, ii. 581.  
 Beans, and the mythology connected with them, ii. 491; in connection with fortune telling, ii. 492.  
 Bear spider, i. 35.  
 Bears, i. 462; instances of their attacking men, i. 463; two young ones, fed on women's milk, *ibid.*  
 Beavan, Capt. R. C., his paper on the Thamen quoted, i. 456-458; on wild goats, i. 459; collection of birds referred to, i. 502.  
 Beberine, an alkaloid, ii. 288.  
 Bee, the, and its symbolism, i. 120.  
 Bee lice, i. 48.  
 Beech, ii. 258.  
 Beef-wood, ii. 257.  
 Beer, preparing barley for, ii. 96.  
 Bees, i. 115; dislike fire, i. 452.  
 Bees, parasites on, i. 111.  
 Begoniaceae, ii. 442.  
 Being, thoughts touching the mystery of, three thousand years ago, ii. 340-1.  
 Bekii, i. 188.  
 Belgium, curious custom in, ii. 227.  
 Bellow, H. W., 'Afghanistan and its People,' referred to, ii. 439, 563.  
 Bengal Club, in Calcutta, caution as to the turtle soup, i. 314.  
 Bengal mungoose, i. 469.  
 Bengal sage, ii. 295.  
 Bennett, Dr. G., on the mode of capturing the pearly nautilus, quoted, i. 179.  
 Bennett, Hon. T. R., referred to, i. 181.  
 Benson, Colonel, and the Orchid, ii. 156; he rediscovers an Orchid, ii. 159; mentioned, ii. 163, 167.  
 Bentham's 'Notes on Orchideae,' quoted, ii. 152 *et seq.*  
 Benzoin, ii. 288, 357.  
 Berberideae, ii. 654.  
 Berberine, ii. 655.  
 Berdmore, Major, examination of gold sent by him to

- Calcutta, i. 9; mentioned, i. 345; and the Hama-dryad, i. 310; error of, as to the dammar pine, ii. 216.
- Bergamot, ii. 596.
- Beryl, i. 14.
- Betel leaf used in chewing pān, ii. 231.
- Betel-nut palm, ii. 143.
- Betel vine, cultivation of, ii. 231.
- Betuline, ii. 258.
- Bhangar, i. 4.
- Bhimrāj, Blyth's remarks on, i. 379.
- Bhutni, Indian name for *Iguis fatus*, i. 489.
- Bhyri, the peregrine falcon, i. 403.
- Bignoniaceæ, ii. 317-321.
- Bilberries, ii. 372.
- Bimana, i. 479.
- Binary Compounds, i. 11.
- Bingham, C. T., mentioned, i. 345.
- Binoxide of Tin, i. 12.
- Binturong, i. 469.
- Bion, quoted, ii. 488.
- Birch, ii. 258.
- Birch-camphor, ii. 258.
- Birdlime, ii. 224.
- Bird's eye chillies, ii. 326.
- Birds of Burma, authorities quoted from, i. 345 *et seq.*
- Birds of prey, i. 402.
- Bisulphide of Iron, i. 10.
- Bitter aloes, ii. 129, 147, 282.
- Bixineæ, 643-646.
- Black dammar-tree, ii. 587.
- Black leopards, i. 472.
- Black Oxide of Manganese, i. 13.
- Black pepper, ii. 231.
- Black pomfret, i. 220.
- Black rock-cod, i. 206.
- Black tigers, i. 472.
- Black-varnish tree, ii. 549.
- Blanford and Medlicott's 'Geology of India,' i. 1.
- Blennies, characters of, i. 233.
- Blessed thistle, ii. 403.
- Blind crustacean, i. 26.
- Blind snakes, myths concerning, i. 297.
- Blister fly, i. 110.
- Blood rain, ii. 25.
- Bloodsucker, i. 334.
- Blue birds, i. 368.
- Blue bungarus, i. 322.
- Blue dye extracted from Polygonum, ii. 292.
- Blue thrush-tits, i. 375.
- Blue Vanda, ii. 176.
- Blue water-lily, ii. 654.
- Blue-winged teal, i. 400.
- Blundell, Mr., introduces cotton into Burma, ii. 616.
- Blyth, E., 'On the Mammals and Birds of Burma,' quoted, i. 88, *et passim*; his statements not to be lightly set aside, i. 399; our indebtedness to, for knowledge of the mammalia of Burma, i. 411.
- Boatswain birds, i. 401.
- Bob-tailed thrushes, i. 363.
- Bocas Islands, where Canon Kingsley heard his musical fish, i. 493.
- Bombadier beetles, i. 114; disagreeable encounter with one, *ibid.*
- Bombay ducks, i. 260.
- Bonaparte, Prince, referred to, i. 397.
- Bonitos, i. 221.
- Booth's cocoa-nut, ii. 621.
- Boraginæ, ii. 327; medicinal plants, ii. 329.
- Bornean iron wood, ii. 289.
- 'Bosh,' i. 130, 316.
- Botanical authorities, ii. 308.
- Botany and Zoology, their twin relationship, ii. 1.
- Bots, i. 48.
- Boulenger, G. A., his 'Catalogue of Batrachia Salientia' mentioned, i. 289; quoted, i. 497.
- Bourbon cotton, ii. 417.
- Bourne, Vincent, his 'Creation,' quoted, i. 130; ii. 1.
- Brachelytrous beetles, i. 113.
- Brachiopods, i. 124.
- Bracken, in Burma, ii. 4.
- Brahminy beads, ii. 608.
- Braminy duck, i. 399.
- Brandis, quoted, as to the economic value of timbers, etc., ii. 99 *et passim*.
- Brandis, Dr., his list of Burmese woods, ii. 3.
- Brazil gooseberry, ii. 325.
- Brazil wood, ii. 491.
- Bridgewater Treatise, error in, regarding snails, i. 168.
- Brine springs, i. 6; ii. 616.
- Brittle stars, i. 19.
- Brittleworts, ii. 18.
- Broad beans, ii. 491.
- Broadbills, i. 354.
- Bromeliaceæ, ii. 203.
- Bronze implements, i. 505.
- Broome, C. E., mentioned, ii. 91.
- Bruceine, a poison, ii. 343.
- Bryony, ii. 449.
- Buccinum, the source of Tyrian purple, i. 145.
- Buchanan, Dr., an early collector of Burmese plants, ii. 2; derivation of *tapsi mäch*, i. 211; quoted, i. 257, 278.
- Buckwheat, ii. 292.
- Buddhism, interesting trait of, i. 309.
- Buddhist doctrine, a pleasing trait of, i. 463.
- Buddhist notions of the origin of fire-flies, i. 115.
- Buddhist legends of the Creation, i. 59.
- Buddhist traditions of the dance of the Devas, ii. 506.
- Buddhists, yellow dye used by the, ii. 351.
- Buffaloes, characteristics of, i. 461; general ignorance and amusing instances of mistakes concerning, i. 462.
- Bug-powder, how puffed, ii. 502.
- Bugs, i. 40, 41.
- Buist, Dr., on sharks, i. 284.
- Bulbuls, i. 368.
- Bull frog, i. 290.
- Bull, W., an orchid grower, ii. 167.
- Bullet wood, ii. 363.
- Bullock's heart, ii. 664.
- Bumble bees, i. 122.
- Buntings, i. 383, 384.
- Bunyan, referred to, ii. 262.
- Burachang, a fish, curious belief relating to, i. 237.
- Burgess's suggestion as to bayas, i. 383.
- Burial ceremonies of the Andamanese, i. 483.
- Burmanniaceæ, ii. 147.
- Burmese Avifauna, i. 376.
- Burmese boxwood, ii. 592.
- Burmese cheroots, ii. 328.
- Burmese custom in canoe building, ii. 217.
- Burmese Forests, ii. 5 *et seq.*
- Burmese houses built of bamboos, ii. 102.
- Burmese legend of the Spirit-Fire, i. 486.
- Burmese nightingale, i. 371.
- Burmese Orchids, Enumeration of, ii. 189 *et seq.*
- Burmese palm swift, i. 357.
- Burmese priests straining at gnats, i. 49.
- Burmese Shikarree, a, his observations on Thamen, quoted, i. 458.
- Burmese superstition regarding the pangolin, i. 412; with regard to elephants, i. 447.
- Burmese superstitions, i. 504-5.
- Burney, locality given by, for platina, i. 9.
- Burrowing crabs, i. 26.
- Burseraceæ, ii. 586; balsamic products of, ii. 587.
- Bush bulbuls, i. 368.
- Bustard quail, i. 391.
- Bustards, i. 392.
- Butea, vivid effect produced by the flowers of, ii. 505.
- Butler, Capt. A. E., on the egg of *Dromas*, i. 394.

- Butler's list of Fulgora, i. 39.  
 Butter fish, i. 256.  
 Butterflies, i. 50.  
 Butterfly collecting, Vincent Bourne on, i. 51.  
 Butterfly Orchis, ii. 185.  
 Byer plum, ii. 569.  
 Byron's 'Bride of Abydos,' quoted, ii. 214.
- C.
- Cabbage, ii. 649.  
 Cacao bean, ii. 625.  
 Cachalots, uncertain temper of, i. 445.  
 Cactea, ii. 140.  
 Cactus, as a hedge tree—the Cacticide epidemic at Madras, ii. 141.  
 Caddis, i. 48.  
 Cain represented in Hell, ii. 218.  
 Cajuput oil, ii. 467.  
 Calabar bean, ii. 491.  
 Calameae, ii. 136.  
 Calcareous Spar, i. 14.  
 Calcite, i. 14.  
 Calcium Carbonate, i. 14.  
 Calcium Fluoride, i. 14.  
 Caliban's dislike for apes, i. 478.  
 Calcutta, Agricultural and Horticultural Society of, Report by, on cotton, quoted, ii. 617.  
 Calyciflorae, ii. 431.  
 Cambridge, Rev. O. P., remarks on Epirids, i. 34.  
 Cameos, shells used for, i. 149.  
 Campanales, ii. 373.  
 Campanulaceae, ii. 373; formerly used as medicinal plants, ii. 375.  
 Camphire, confusion in the identification of, ii. 156.  
 Camphor, ii. 283, 288, 625; manufacture of, ii. 692.  
 Camphor-wood, ii. 283.  
 Cancer, remedy for, ii. 646.  
 Canide, i. 465.  
 Cannabimae, economic uses of, ii. 262.  
 Cannaceae, economic products of, ii. 209.  
 Cannibalism, suggested reason why it is becoming extinct, i. 483.  
 Canoes, timber used for, ii. 630, 636.  
 Cantor, Dr., quoted, i. 442; description of Helaretos, i. 162.  
 Caoutchouc, trees yielding, ii. 269, 340.  
 Cape gooseberry, ii. 325.  
 Capparidæ, ii. 650-653.  
 Caprifoliaceae, ii. 430.  
 Caprifoliiales, ii. 404 *et seq.*  
 Carbolic acid, its effects in changing the colours of various birds, i. 374.  
 Carbon, i. 10.  
 Cardamoms, ii. 207.  
 Cardoon artichoke, ii. 403.  
 Carey, Felix, the missionary, an early collector of Burmese plants, ii. 2.  
 Carn-ian, i. 13.  
 Carnivora, i. 462 *et seq.*  
 Carpenter, quoted, i. 131.  
 Carpenter bees, i. 122.  
 Carpet snake, i. 306.  
 Carrageen moss, ii. 36.  
 Carriers, genera of shell-fish so called, i. 158.  
 Carrots, ii. 439.  
 Carthamine, a dye produced from safflower, ii. 399.  
 Caryophyllales, ii. 639 *et seq.*  
 Caryophylleae, ii. 640.  
 Cashew-nut tree, ii. 551.  
 Cassava, ii. 232, 251.  
 Cassiterite, i. 12.  
 Castor-oil plant, as a medicine, ii. 251; a tasteless oil prepared from, by the natives, *ibid.*  
 Casuarina recommended as an ornamental tree, ii. 257.  
 Cataphracta, the fruits and bark of, ii. 615.  
 Caterpillar, a poisonous, i. 78.  
 Caterpillar metamorphosis, a peculiar instance of, i. 93.  
 Cat fishes, i. 184, 250.  
 Cattle heron, i. 308.  
 Catullus, quoted, i. 145; ii. 456; comparison of the vine to matrimony by, ii. 566.  
 Celastrales, ii. 561 *et seq.*  
 Celastrineae, ii. 571-574.  
 Celery, ii. 439.  
 Celtidae, ii. 277.  
 Celts found in the Andamans, i. 484.  
 Celts in Burma, the material they are made from, i. 504.  
 Centipedes, i. 32.  
 Cephalopoda, i. 179.  
 Ceramiaceae, ii. 28.  
 Cereals, ii. 95 *et seq.*  
 Ceres, classical allusions to, quoted, ii. 116-7.  
 Cervide, i. 156.  
 Cestoid worms, i. 20.  
 Ceylon cow-plum, ii. 340.  
 Ceylon elemi, ii. 587.  
 Ceylon iron-wood, ii. 637.  
 Ceylon lemon-grass oil, ii. 112.  
 Ceylon moss, ii. 30.  
 Chaillotiaceae, ii. 580.  
 Chalcopyrite, i. 10.  
 Chameer, ii. 55.  
 Charles, ii. 262.  
 Chatterers, i. 308.  
 Chaulmoogra oil, a new remedy for various complaints, ii. 645.  
 Cheese, how coloured, ii. 644.  
 Cheese mite, i. 33.  
 Chelonia, i. 335 *et seq.*  
 Chenopodiales, ii. 290.  
 Chenu's 'Manuel de Conchyliologie,' mentioned, i. 123 *et seq.*  
 Cherries, ii. 485.  
 Chervil, ii. 439.  
 Chestnut, ii. 258.  
 Chicory, ii. 403.  
 Chillies, ii. 326.  
 Chimney swallow, i. 356.  
 China creeper, ii. 333.  
 China-grass cloth, ii. 266.  
 China silkworm, i. 81.  
 Chinese date tree, ii. 360.  
 Chinese epicures, i. 357.  
 Chinese, extravagant medical idea of the, i. 453.  
 Chinese honey-suckle, ii. 479.  
 Chinese preserves, ii. 593.  
 Chinese tallow-tree, ii. 254.  
 Chiretta, ii. 334.  
 Chiroptera, i. 123 *et seq.*  
 Chittagong wood, ii. 704.  
 Chloranthaceae, virtues of, ii. 230.  
 Chlorine Compounds, i. 11.  
 Chocolate, ii. 625; how coloured, ii. 644.  
 Chondrodite, i. 14.  
 Chowmook, fishing adventure at, i. 342.  
 Christian ideas intermixed with the pantheism of the 'Mahabharata,' ii. 344.  
 Christy & Co., 'New Commercial Plants and Drugs,' ii. 352, 353, 476, 477, 645, 681, 683.  
 Chrysophanic acid, ii. 491.  
 Chunda bora, Bengal name for Russel's viper, i. 312.  
 Chutnee, ii. 138; an excellent, ii. 691.  
 Cieada, as musicians, i. 38, 40; as food, i. 40; their musical apparatus described, i. 10.  
 Cichoriaceae, ii. 401.  
 Cinchoneae, ii. 404.  
 Cinnamon, ii. 283, 288.  
 Cirripedes, i. 23.  
 Citrus, value of the genus, ii. 596.  
 Civet cat, fondness of the, for the durian, ii. 618.  
 Civet of commerce, i. 467.  
 Claudian, quoted, i. 145, 478; ii. 217.  
 Cleanliness in pigs, the value of, enforced, i. 22.  
 Clearings, described, ii. 14.  
 Cleghorn, Dr., quoted, ii. 111 *et passim*.

- Climate, death sometimes unjustly put down to, i. 344.  
 Climate, great contrast of, in contiguous places, ii. 4.  
 Climbing fish, i. 228.  
 Clive, Lady, said to have introduced Bryophyllum into India, ii. 484.  
 Clouded tiger-cat, i. 472.  
 Clouded yellow butterfly, i. 50.  
 Clover, ii. 491.  
 Cloves, ii. 474.  
 Club mosses, ii. 56.  
 Cobbold, Dr., quoted, i. 20-1 *et passim*.  
 Cobra, i. 322; adventures with a, i. 312.  
 Cobra monil, i. 312.  
 Cobra, the bite of a, the only cure for leprosy, ii. 340.  
 Cocculus Indicus, ii. 637.  
 Coccus *versus* Cactus, the battle of, ii. 441.  
 Cochineal insect, i. 36.  
 Cockatoos, i. 408.  
 Cockroaches, i. 44.  
 Cockscorn oysters, i. 126.  
 Cockscorns, ii. 292.  
 Cockup fish, i. 188.  
 Cocoa-nut crab, i. 27.  
 Cocoa-nut palm, ii. 143.  
 Cod-liver oil, spurious substitute for, i. 186.  
 Coffee, ii. 430; substitutes for, ii. 209, 615.  
 Coir, manufacture of, ii. 681.  
 Coleoptera, i. 107 *et seq.*  
 Collingwood, Dr., spiders from Lahuan, i. 34.  
 Collyrium, i. 10.  
 Colocyath, ii. 449.  
 Colonisation of bats, Dobson's remarks on, quoted, i. 436.  
 Colt's-foot, ii. 403.  
 Columbus, referred to, i. 221.  
 Combretaceae, ii. 474-480.  
 Commelynales, ii. 123.  
 Commelyneae, ii. 123.  
 Common artichoke, ii. 403.  
 Common barnacles, i. 24.  
 Common Burmese bear, i. 462.  
 Common civet-cat, i. 467.  
 Common crane, i. 394.  
 Common English brake, ii. 68.  
 Common paddy bird, i. 398.  
 Common parodoxure, i. 468.  
 Common potato, ii. 325.  
 Common purslane, ii. 639.  
 Common Salt, i. 11.  
 Common silkworm, i. 81.  
 Common snails, i. 172.  
 Common teal, i. 399.  
 Common vervain, ii. 305.  
 Common wild cat, i. 473.  
 Composite, ii. 376; a huge, but not important order of plants, ii. 403.  
 Conchology, i. 123 *et seq.*  
 'Conchologia Iconica,' referred to, i. 126 *et seq.*  
 Concretionary Iron Ore, i. 12.  
 Convolvaceae, ii. 18.  
 Congers, i. 280.  
 Coniferous Forests, ii. 8.  
 Coniferae, economic importance of the order, ii. 213.  
 Connaraceae, ii. 545; economic value of, ii. 547.  
 Convolvulaceae, ii. 330-333.  
 Coots, i. 396.  
 Copairi, ii. 587.  
 Copal, ii. 491.  
 Copper and bronze implements found in Burma, Mr. Ball on, i. 505.  
 Copper celts, i. 505.  
 Copper Pyrites, i. 10.  
 Copper-smith, a bird so called, i. 350.  
 Copper, Sulphantimonite of, i. 11.  
 Copper, Sulphide of, i. 10.  
 Coriariace, ii. 600.  
 Coriander, origin of the name, ii. 438.  
 Cork, ii. 258.  
 Cormorants, i. 398, 402.  
 Corn flour *versus* Rice flour, ii. 108.  
 Corn flower, ii. 403.  
 Cornaceae, ii. 432.  
 Corundum, i. 11.  
 Cosmogonical Edda, quoted, ii. 225.  
 Costume of the ancients, ii. 205.  
 Cotyledonous Plants, ii. 95 *et seq.*  
 Cotton in Burma, report on, ii. 616-17; suitability of soil for, ii. 617.  
 Cotton trees, uses to which they are put, ii. 618.  
 Coughs, remedy for relieving, ii. 295.  
 Country almonds, ii. 475.  
 Country French beans, ii. 508.  
 Cowitch, ii. 507.  
 Cowries, i. 152.  
 Cows, bad dietary for, i. 341.  
 Cowslip creeper, ii. 337.  
 Cox, Rev. G. W., 'Mythology of the Aryan Nations,' quoted, ii. 116, 224, 284-7.  
 Crab-eating monkey, i. 477.  
 Crab mungoose, i. 469.  
 Crab plovers, i. 393.  
 Crag martin, i. 357.  
 Cranberries, ii. 372.  
 Cranes, i. 394.  
 Crassulaceae, ii. 484.  
 Craufurd, ambassador to Ava, ii. 2.  
 Craufurd and Balcarres, the Earl of, his 'Argo' quoted, ii. 216.  
 Crawfish, sea and river, i. 25.  
 Creation, quotation from Vincent Bourne on the, i. 130.  
 Creek oyster, i. 126.  
 Creepers, i. 362.  
 Crested cockscorn, ii. 292.  
 Cretaceous Group of rocks, i. 3.  
 Crickets, i. 45.  
 Crocodiles, i. 335; their flesh esteemed, *ibid.*  
 Cross, the, a sacred sign long before the time of Christ, ii. 219.  
 Cross, Legend of the, ii. 217, 689.  
 Cross, Mr., his remarks on rats quoted, i. 417.  
 Crow, unprovoked attack by a, on Judge Norman, i. 502.  
 Crown of oak-leaves as a symbol, ii. 117.  
 Crowned partridges, i. 390.  
 Cruciferae, ii. 648; chief members of the order, ii. 649.  
 Cruise to the Andamans and Nicobars, i. 480.  
 Crusaders, a plant used by the, ii. 220.  
 Crustacea, i. 23 *et seq.*  
 Cryptogams, ii. 15 *et seq.*  
 Crystal Worts, ii. 48.  
 Cuckoo spit, i. 38.  
 Cuckoos, i. 358.  
 Cucumbers, ii. 449.  
 Cucurbitaceae, ii. 443; a fruit-yielding order, ii. 449.  
 Cumin, ii. 438; superstitions connected with, ii. 439.  
 Curacoa, ii. 596.  
 Curare of South America, ii. 343.  
 Curaru, the arrow poison, ii. 561.  
 Curlews, i. 394; good eating, i. 395.  
 Curries, an ingredient of, ii. 296.  
 Curtius, Ernest, his poem on the Aturian parrot, i. 410.  
 Cuscutae, ii. 329.  
 Cushing, Mr., his mistake in killing a viper, i. 312.  
 Cushing, Mrs., presence of mind of, i. 312.  
 Custard apple, ii. 664.  
 Cycadaceae, economic products of, ii. 210.  
 Cyperaceae, ii. 117; products of, ii. 122.  
 Cyperaceous plants, uses of, ii. 122.  
 Cypress plant, held in high esteem by the Greeks, Arabs and Turks, ii. 456.  
 Cypress, why chosen for a funeral tree, ii. 214.  
 Cyrtopodium, remarkable fertilizing apparatus of, ii. 187.  
 Cyrtopidae, i. 116.  
 Cysticercus, i. 21.  
 Cysticine, ii. 403.

## D.

- Daddy long legs, i. 49.  
 Dad, its indigestibility, ii. 502.  
 Dammar bee, its ingenious nest described, i. 121.  
 Dammer pine, described, ii. 216.  
 Damp Hill Forests, ii. 8.  
 Dampier and Commerson, referred to, i. 221.  
 Dandelion, ii. 403.  
 Daphnales, ii. 280 *et seq.*  
 Darjiling, an unreliable "habitat," i. 51.  
 Darters, i. 402.  
 Darwin, E., quoted, ii. 64, 149, 150, 189.  
 Darwinian doctrine, unwarranted sneer at the, i. 129.  
 Dasee silkworm, i. 81.  
 Date sugar, ii. 142.  
 Datisceace, ii. 441.  
 Daturia, an alkali, ii. 326.  
 Davis, J., i. 157, 158.  
 Davis's "Pain-killer," ingredient of, ii. 326.  
 Davison, mentioned, i. 345 *et passim*.  
 Day, Dr., his "Report on Fish," and "Fishes of India," quoted, i. 83 *et passim*.  
 Day, Surgeon, on the manners of the Andamanese, i. 483.  
 Dayal, i. 371.  
 Deadly nightshade, ii. 326.  
 Decapoda, i. 180.  
 Deciduous, or Leaf-shedding Forests, ii. 9.  
 Degenerate taste acquired by swine and cattle in India, ii. 247.  
 De Gubernatis, Angelo, "Mythologie des Plantes," quoted, ii. 108 *et passim*.  
 Deluge, the, historically discredited, ii. 262.  
 Demeter, Hymn to, quoted, ii. 116.  
 Deo-dhân, ii. 115.  
 Deo-mooga silkworm, i. 81.  
 Derby, the late Lord, his translation of a memorable Homeric passage, i. 119.  
 De Roepstorff, i. 345.  
 Derbyshire Spar, i. 11.  
 Devil-in-a-bush, ii. 679.  
 Devil, the, his collateral ancestors, and varied reputation, ii. 687-8.  
 Devil's-guts, ii. 329.  
 Devil's pepper, ii. 326.  
 Dhanchi hemp, ii. 523.  
 Dhoib nuts, ii. 559.  
 Diatomaceæ, ii. 18.  
 Dichondrea, ii. 329.  
 Dicotyledons, ii. 210 *et seq.*  
 Diedrichsen, 'List of Nicobar Plants,' mentioned, ii. 144.  
 Digitaline, the bitter principle, ii. 324.  
 Dilleniaceæ, 667-669; properties of, ii. 667.  
 Dioscoreales, ii. 144.  
 Dioscoreæ, ii. 144.  
 Diphteria, a liniment for, ii. 353.  
 Dippers, i. 363.  
 Dipsacæ, ii. 104.  
 Dipterocarpeæ, ii. 625-630; balsamic products of, ii. 625.  
 Discifloræ, ii. 547.  
 Distant, W. L., list of hemiptera, i. 36.  
 Dobson, Dr., on various Natural History questions, i. 393, *et passim*.  
 Doodlers, ii. 329.  
 Dodona and its oak, ii. 216.  
 Do gaz, a net for catching birds, i. 404.  
 Dog-rose, ii. 485.  
 Dog's-bane, ii. 340.  
 Dog's-tooth grass, ii. 105.  
 Domestic bees not kept in Burma, i. 119.  
 Domestic goats, i. 460.  
 Dorian, or Durian, compared with the mango, ii. 553; the most esteemed fruit in the world, ii. 618.  
 Dorsal, definition of meaning, in Cephalopods, i. 180.  
 Doryllie, i. 117.  
 Dove-hawk, i. 403.  
 Doves, i. 388.  
 Downes, E. T., i. 93.  
 Dragon-fly, i. 47.  
 Dragon's blood, ii. 125, 139, 491.  
 Drayton, M., 'Poly-Olbion,' referred to, ii. 576.  
 Dream, effect of a, i. 488.  
 Dreams, physiology of, i. 487.  
 Dromas, egg of, i. 394.  
 Drongo shrikes, i. 378.  
 Drougos, i. 371.  
 Drop-wort, ii. 485.  
 Droseraceæ, ii. 483.  
 Druids, their reverence for the mistletoe, ii. 224.  
 Drum, or Drummer fish, description of, ii. 194.  
 Drum-sticks, seeds so called, ii. 648.  
 Dry Forests, ii. 10.  
 Dry Hill Forests, ii. 8.  
 Dryden's 'Virgil,' quoted, ii. 152.  
 Dub grass, ii. 104.  
 Ducks, i. 399.  
 Duck-weed, ii. 130.  
 Dudûm, the mandrake of Scripture, ii. 204.  
 Duff, Lieut. A., account of the Spirit-Fire, i. 186.  
 Dugong, the flesh of, good for eating, i. 446.  
 Dung-outs, ii. 140.  
 Duke of York's nose, a hill so called, ii. 67, 688.  
 Duncan, Capt., on Andaman houses, i. 483.  
 Dunchi hemp, ii. 523.  
 Dune Forests, ii. 13.  
 Dung beetle, i. 33.  
 Dung-rolling beetles, i. 112.  
 Dunny palm, ii. 143.  
 Dusky cockatoos, i. 408.  
 Dusky-leaf monkey, i. 479.  
 Dutch rush, ii. 56.  
 Dwarf bean, ii. 333.  
 Dye from *Rottlera*, ii. 244.  
 Dysentery, remedy for, ii. 338.

## E.

- Eagles, i. 404.  
 Eagle owls, eggs of, i. 406.  
 Eagle-wood, ii. 284.  
 Earth-oil, i. 14.  
 Earth-soap, i. 14.  
 Earth-worms, i. 23.  
 Earwigs, i. 45.  
 East Indian arrowroot, ii. 206.  
 Eau de Cologne, ii. 295.  
 Ebenaceæ, products of, ii. 357.  
 Ebenales, ii. 355.  
 Ebony, ii. 357, 360.  
 Ebenicis, curious use to which it is put, i. 221.  
 Echinoderms, i. 19.  
 Eden's whale, i. 445.  
 Edible ant, i. 117.  
 Edible bird's nest, i. 357; ii. 31.  
 Edible fungi, ii. 91.  
 Edible seaweeds, ii. 30.  
 Edible shell fish, i. 123.  
*Edinburgh Review*, on A. O. Hume, i. 502.  
 Eels, i. 280.  
 Egg-plant, ii. 325.  
 Egypt, sacred bird of, i. 398.  
 "Egyptian bath-sponge," ii. 446.  
 Ekman's process of preparing fibre, ii. 681.  
 Elacagnæ, ii. 280.  
 Elatineæ, ii. 638-9.  
 Elder, ii. 431.  
 Elephantiasis, medicinal remedy for, ii. 57.  
 Elephant-foot yam, ii. 146.  
 Elephant grass, ii. 115.  
 Elephants treated of: differences between the Indian and African species—periods of gestation—diseases—a source of income—Burmese superstition regarding dangers of tracking, i. 447; modes of treatment, i. 448;

sensitive skin, i. 449; *most* season, i. 449-50; head-covering, i. 451.  
 Eleusinian Mysteries, ii. 116.  
 Emanuel, Mr., quoted, i. 11.  
 Eng or Laterite Forests, ii. 9.  
 Eng., differing identifications of species of, ii. 626.  
 English cholera, a case traced to eating fish, i. 186.  
 English Government, its apathy in promoting research, i. 479.  
 English mouse, i. 420.  
 Entada, a gigantic creeper, eagerly sought for as food, ii. 540; the seeds used for a popular pastime, ii. 692.  
 Entomology, i. 36 *et seq.*  
 Epacridæ, ii. 370.  
 Epicures, their uncleanly taste illustrated, i. 204.  
 Epigynous plants, ii. 373 *et seq.*  
 Epiphyte, ii. 148.  
 Equisetaceæ, ii. 55, 93.  
 Ergot of rye, ii. 90.  
 Eria silk moth, i. 80.  
 Ericaceæ, ii. 372; properties of, ii. 373.  
 Ericales, ii. 370.  
 Eriocaulonæ, ii. 122.  
 Eschallotte, ii. 128.  
 Essence of Neroli, ii. 596.  
 Eugenia, qualities of, ii. 472.  
 Eulabes, i. 386.  
 Euphorbiaceæ, economic products of, ii. 232.  
 Euphorbiales, ii. 232 *et seq.*  
 Euphorbium, a substitute in India for sative, as a purgative, ii. 256.  
 "Evangelicals," their low estimate of "good works" deprecated, ii. 341.  
 Eve, Karen legend of her being seduced by a python, i. 308.  
 Evergreen Forests, ii. 5.  
 Evil spirits, antidote to, ii. 485.  
 Experiments on snake bites, i. 324.  
 Eye-bright, ii. 323.  
 Ezekiel, referred to, ii. 670.

## F.

Fabre, M., on the evolution of *Sitaris*, i. 110.  
 Fairy blue birds, i. 371.  
 Faith, as a religious duty, ii. 341.  
 Falcon tribe, Burmese name for the, i. 102; Godwin-Austen on, i. 403.  
 Falconry, i. 403.  
 Falcons, habits of, i. 403.  
 False limpets, i. 170.  
 False scorpions, i. 33.  
 Fan palm, its economic value, ii. 140.  
 Fantails, i. 381.  
 Fayrer, Dr., quotations from his 'Thanatophidia' concerning snake bite, i. 324-326.  
 Feast of the Exaltation of the Cross, ii. 219.  
 Fedden, Mr., quoted, i. 9.  
 Felidæ, i. 470.  
 Fennel, ii. 439.  
 Fennel flower, ii. 670.  
 Ferns, ii. 58 *et seq.*; catalogue of, ii. 80 *et seq.*  
 Fertility, a symbol of, ii. 449.  
 Ficoidales, ii. 439.  
 Ficoidæ, ii. 439.  
 Field mouse, i. 419.  
 Fielden, Capt., mentioned, i. 345; identification of a heron, i. 398; quoted, i. 403 *et passim.*  
 Fig-leaf, substitute for, in the Andamans, i. 481-2.  
 Fig-leaves, as a covering, ii. 274.  
 Fig-tree, ii. 204.  
 Fig-trees, ii. 268; vernacular names for, ii. 274; legends and allegories connected with, *ibid.*; wood chosen for making idols, and classical allusions to, ii. 275.  
 Fijians' liking for the nautilus, i. 179.  
 Filicales, ii. 93.  
 Filices, ii. 58 *et seq.*  
 Finches, i. 383, 385.  
 Findlay, James, discoverer of an orchid, ii. 159.  
 Finlayson, Capt., referred to, i. 421.  
 Finner whale, i. 415.  
 Finsch, Dr., castigated by Mr. Hume, i. 409; his work 'Die Papageien,' referred to, i. 503.  
 Fire, the process of producing, by friction, described, ii. 103; another method, ii. 681.  
 Fire-eating rhinoceros, i. 452.  
 Fire-flies, i. 111, 114; description of a group of, i. 115; attracted to a shrub, ii. 368.  
 Fire tiger, i. 473.  
 Fish as a food supply, i. 183.  
 Fish, inability of some persons to eat, i. 186.  
 Fish insect, i. 36.  
 Fish, legend of men being transformed into, i. 237.  
 Fish, list of, i. 188 *et seq.*  
 Fish oil, i. 186.  
 Fish, plants or fruits used for poisoning, ii. 380, 543, 646, 657.  
 Fish, reasons why sometimes unfit for food, i. 187.  
 Fish, remarkable mode of hatching their ova, i. 252.

Fish, variability of colour in, i. 236.  
 Fishermen, liable to a peculiar accident, i. 239.  
 Fisher monkey, i. 477.  
 Fishes, respiration of, i. 184.  
 Fishing hooks made from the roots of a tree, ii. 258.  
 Fishing owl, i. 406.  
 Fishing tackle, ii. 357.  
 Fishing tiger-cat, i. 472.  
 Fitches of Isaiah, ii. 670.  
 Flagellariæ, ii. 123.  
 Flat fish, i. 248.  
 Flax, ii. 129.  
 Flea, i. 50.  
 Flour made from a species of *Cycadeæ*, ii. 211.  
 Flower beetles, i. 112.  
 Flower-peckers, i. 375.  
 Flowering Plants, ii. 95 *et seq.*  
 Flowering plants, numbers of, awaiting discovery in Burma, ii. 187.  
 Flowerless Plants, ii. 15 *et seq.*  
 Fluor Spar, i. 11.  
 Fluorine Compounds, i. 11.  
 Fluorite, i. 11.  
 Flycatchers, i. 381.  
 Flying fox, i. 423; cleanly habits of, i. 424.  
 Flying lemur, i. 444.  
 Fodder, ii. 105.  
 Fœtid til of the Canaries, ii. 288.  
 Folia Malabathri, an ingredient in cookery, ii. 288.  
 Folk-lore, vanishing, ii. 262.  
 Fool's parsley, ii. 439.  
 Foraminifera, i. 16.  
 Forest Department, its rules concerning the girdling of teak, analyzed and controverted, ii. 689-691; nonsensical rule of the, ii. 693.  
 Forest fly, i. 48.  
 Forest Officers of Burma, ii. 3.  
 Fowl's-bone, ii. 304.  
 Fox, the, of the English Bible, probably the jackal, i. 165.  
 Fox-brush *Aerides*, the, ii. 178.  
 Fox-glove, ii. 321, 324.  
 Freckles, cure for, ii. 453.  
 French beans, ii. 491.  
 Freshwater crabs, i. 29.  
 Freshwater "polypus," i. 17.  
 Fresh-water shark, i. 259.  
 Frog hopper, i. 38.  
 Frogs, i. 289.  
 Frugivorous bats, i. 423.  
 Fucaceæ, ii. 26.  
 Fungoides, ii. 89.  
 Fungi, ii. 31 *et seq.*  
 Fytche, Col., referred to, ii. 160, 536.

## G.

Gad flies, i. 49.

- Gadwall, i. 399.  
 Gagal resin, ii. 587.  
 Galanga, ii. 288.  
 Galangal, ii. 296.  
 Galena, i. 10.  
 Gallinaceous birds, i. 389.  
 Gallinules, i. 396.  
 Galls, ii. 258.  
 Gamboge, ii. 635.  
 Gammie, J., on a peculiar species of woodpecker, quoted, i. 384.  
 Ganges, sacred water of the, ii. 298.  
 Gannets, i. 401.  
 Ganny, ii. 606.  
 Gapes, i. 22.  
 Garden cress, ii. 649.  
 Garden pea, ii. 503.  
 Garjun oil, ii. 627.  
 Garland flower, ii. 207.  
 Garlic, ii. 128.  
 Garnet, i. 14.  
 Gastropoda, i. 139.  
 Gaudama, legends of, ii. 629.  
 Gayal and Gour, Blanford's account of the differences between the, i. 461.  
 Gecko, in the Syrian version of the Bible, i. 341.  
 Geckos, i. 329; their pugnacity, i. 331.  
 Geese, i. 399.  
 Gentiales, ii. 334.  
 Gentian, ii. 334.  
 Gentianaceæ, properties of, ii. 334.  
 Gentianine, ii. 334.  
 Geography of the Andamans and Nicobars, i. 480.  
 Geology, i. 1.  
 'Geology of India,' by Medlicott and Blanford, i. 1.  
 Geraniaceæ, ii. 596 7.  
 Geraniales, ii. 580 *et seq.*  
 Gesenius, quoted, ii. 204.  
 Gesneraceæ, ii. 321.  
 Giant clam, i. 131.  
 Gibbons, i. 474; the cry of, given in musical notation, i. 475; cruel to deprive them of liberty, *ibid.*  
 Gid, i. 21.  
 Gier, connected with the Pali *gizā*, i. 402.  
 Gilson, Dr., ii. 636.  
 Ginger, ii. 208.  
 Ginsburg, Dr., ii. 689.  
 Ginseng, ii. 433.  
 Girasole, ii. 493.  
 Girdling timber, objections against, ii. 690.  
 Gladstone, W. E., translation of the *Iliad* quoted, i. 117.  
 Glass-rope sponge, i. 17.  
 Globe artichoke, ii. 227.  
 Glow-worm, i. 111.  
 Glucinum, Silicate of, i. 14.  
 Glumales, ii. 95.  
 Gymnosperms, ii. 210.  
 Gnathites, i. 24.  
 Goats, straining at, i. 49.  
 Gnetaceæ, ii. 211.  
 Gnetum, structure of, ii. 212.  
 Goa beans, ii. 511.  
 Goa powder, ii. 491.  
 Goats, i. 459.  
 Goat's dung, a wood so called, ii. 240, 547, 703.  
 Godwin-Austen, H. G., quoted and referred to, i. 174.  
 Godwits, i. 394.  
 Gohn-nyin-toh-pw̃, ii. 692.  
 Gold, i. 8; principal localities for working, i. 9.  
 Golden apples, or figs, legends of the, ii. 689.  
 Golden-backed fern, ii. 68.  
 Golden eye, strange habit of the, i. 399.  
 Golden flies, i. 116.  
 Golden vulture, the eagle occasionally so called, i. 404.  
 Golgotha, Adam's sepulchre on, ii. 218.  
 Gong-ringer, i. 350.  
 Good and evil, the conflict between, ii. 686-7.  
 "Good works," ii. 341.  
 Goose harnesses, i. 24.  
 Gordon, Dr. C. A., experience of Kamala, ii. 246; on the unclean food of cattle and pigs in India, ii. 247.  
 Gould, Dr., of Boston, U.S.A., mentioned, i. 123, 171.  
 Gour, the, i. 460.  
 Gourds, ii. 449.  
 Gout, remedy for, ii. 467.  
 Gower, Capt., ii. 165.  
 Grains of Paradise, ii. 208.  
 Gram, ii. 491, 502.  
 Gramineæ, ii. 96; extreme importance and economic uses of, quotations respecting, ii. 16-17.  
 Gramineæ, ii. 459.  
 Granite, i. 5.  
 Grapes, and the grape vine, ii. 565.  
 Graphite, i. 10.  
 Grass oil, ii. 133.  
 Gray, Dr., i. 341 *et passim*.  
 Great basking shark, i. 284, 496.  
 Great burnet, ii. 485.  
 Greater thatching grass, ii. 115.  
 Grebes, i. 398, 409.  
 Greek mythology, ii. 684.  
 Green bullbuls, i. 368, 369.  
 Green doves, i. 387.  
 Green pigeons, i. 387.  
 Green vipers, i. 322.  
 Green viper bloodsucker, i. 333.  
 Greenheart timber, ii. 288.  
 Greenstank, i. 395.  
 Greenstone, i. 5.  
 Grey-bearded spider-hunter, i. 361.  
 Grey civet-cat, i. 466.  
 Grey Copper Ore, i. 11.  
 Grey pomtret, i. 220.  
 Griffith, Dr., his collection of Burmese plants, ii. 2.  
 Grimm, quoted, ii. 687.  
 Gromwell, ii. 329.  
 Grote, A., mentioned, i. 51.  
 Ground doves, i. 389.  
 Ground frogs, i. 291.  
 Ground ivy, ii. 295.  
 Ground lizards, i. 327.  
 Ground nuts, ii. 491.  
 Ground rattan, ii. 111.  
 Grunts, a species of fish producing musical sounds, i. 494.  
 Guano of bats collected by Chinamen, i. 425.  
 Guarana, ii. 561.  
 Guava, ii. 474.  
 Guggur resin, ii. 587.  
 Guinea grass, ii. 109.  
 Guinea worm, i. 22.  
 Gulls, i. 398, 400.  
 Gum Arabic, ii. 491.  
 Gum kino, ii. 491.  
 Gum used in calico printing, ii. 157.  
 Günther, Dr., quoted, i. 18 *et passim*.  
 Gut, fishermen's, i. 79.  
 Guttapercha, ii. 263.  
 Guttiferæ, ii. 633-637; products of the order, ii. 635.  
 Guttiferales, ii. 625 *et seq.*  
 Gymnastics, peculiar feat of, in a butterfly, i. 97.  
 Gymnosperms, ii. 210 *et seq.*  
 Gynocardic acid, ii. 646.  
 Gypsum, i. 14.

## II.

- Hamatite, i. 12.  
 Halite, i. 11.  
 Hamadryad, i. 309; adventures with, i. 310.  
 Hamamelidæ, ii. 482.  
 Hamilton, Buchanan, referred to, i. 387 *et passim*.  
 Hammer-headed sharks, i. 285.  
 Hammer oyster, i. 127.  
 Hanbury, Daniel, paper on *Rottlera* and *Kamala*, quoted, ii. 244-247.  
 Hance, Dr., ii. 135.  
 Hanley, Sylvanus, i. 123; i. 134.  
 Harding, Mr., ii. 165.  
 Hardyweke, on size of handi-crocs, i. 418.  
 Hari mung, ii. 491.  
 Harmless snakes, i. 297.  
 Harrison, Capt., ii. 536.  
 Harvest bug, i. 33.  
 Harvey, Rev. M., i. 181.  
 Hawk's-bill turtle, i. 344.  
 Hawthorn, ii. 485.

- Hazel-nut, ii. 258.  
 Health, effect of a fish diet on, i. 187.  
 Hel, ii. 688.  
 Helfer, Dr., his description of the hot-springs of Attaran, i. 7; mentioned and quoted, i. 345 *et passim*.  
 Helix, Godwin-Austen on, i. 174.  
 Helmets, i. 149.  
 Hemlock, ii. 439.  
 Hemp, values of, ii. 262-3.  
 Hen hawk, i. 404.  
 Henna, ii. 459.  
 Hepaticæ, ii. 92.  
 Hepatic complaints, recipe worth knowing for, ii. 493.  
 Heritiera, an extraordinarily tough wood, ii. 621, 625.  
 Hermit crabs, i. 125; Hume's amusing account of, i. 27.  
 Herons, i. 394; habits of, i. 397.  
 Heron's dung-shell, i. 171, 176.  
 Herpestidæ, i. 469.  
 Herpetology, i. 288 *et seq.*  
 Herrings, i. 187.  
 Hessian fly, i. 50.  
 Heysham, Col., quoted, i. 447.  
 Hiawatha, the legend of, referred to, i. 117.  
 Hibiscus, economic products of the genus, ii. 616.  
 Hiern, referred to, ii. 556-8.  
 Hill Eng Forests, ii. 10.  
 Hill Forests, ii. 8.  
 Hill mainas, power of mimicking the human voice, i. 379.  
 Hill tits, i. 375.  
 Hill wagtails, i. 374.  
 Hilsa, i. 187, 276.  
 Himalayan Avifauna, i. 376.  
 Hinde, Mr., referred to, ii. 681.  
 Hodgson, on Cuon, i. 465.  
 Hog deer, modes of hunting, i. 456.  
 Hog's lard tree, ii. 629.  
 Hog's slide, ii. 620.  
 Holland, Major, on Pipe fishes, i. 281.  
 Holbrock, ii. 609.  
 Holly, ii. 576.  
 Holm oak, ii. 576.  
 Holothuria, i. 20.  
 Holy basil, ii. 298.  
 Holy Family, legend of the, ii. 215.  
 Homer, quoted, i. 117, 119, 120, 285, 496; ii. 78, 147, 275, 381, 488.  
 Honey-buzzard, i. 405.  
 Honey-suckers, i. 361.  
 Honcysuckle, ii. 431.  
 Hooker, Sir J. D., Editor of *Le Maout and Decaisne's 'Descriptive and Analytical Botany,'* quoted, ii. 1, *et passim*.  
 Horace, quoted, ii. 214, 275, 305, 306, 381, 439, 576.  
 Horehound, ii. 295.  
 Hornbill in the Zoological Gardens, London, i. 352.  
 Hornbills, i. 350; remarkable mode of supplying food to the female by the male, i. 351; food of, ii. 342, 699.  
 Hornblende, i. 13.  
 Horned owls, i. 406.  
 Hornets, i. 118.  
 Horny corals, i. 18.  
 Horse-cut, i. 466.  
 Horse-radish-tree, ii. 648.  
 Horsfield, T., and F. Moore, 'Catalogue of Lepidopterous Insects,' i. 51, 88.  
 Horsley, referred to, ii. 381.  
 Hot-springs, in various localities, described, i. 7, 8.  
 Hough, A., i. 426, 476.  
 House leek, ii. 484.  
 House lizard, i. 331.  
 House martins, i. 356.  
 House mouse of India, i. 419.  
 House rat, i. 419.  
 House sparrow, i. 384.  
 Hab-ul-mashk, ii. 614.  
 Humble bee, a parasite of the, i. 22.  
 Hume, A. O., Editor of 'Stray Feathers,' quoted, i. 27 *et passim*; details of the inhabitants of the Andamans and Nicobars, i. 479 *et seq.*  
 Humfray, Mr., i. 483; ii. 348.  
 Humphrey, W. G., 'Aranidines,' quoted, ii. 671.  
 Humming-birds, i. 361.  
 Hungary water, ii. 295.  
 Hutton, Capt., quoted, i. 79, 427.  
 Hydralæ, ii. 209 *et seq.*  
 Hydrocarbon Compounds, i. 14.  
 Hydrocharidæ, ii. 209.  
 Hydroleacæ, ii. 334.  
 Hydrous Calcium Sulphate, i. 14.  
 Hydrous Oxide of Iron, i. 12.  
 Hypericinæ, ii. 637-8.  
 Hypogynous plants, ii. 294 *et seq.*  
 Hyssop, ii. 295.
- I.
- Ibises, i. 398.  
 Iceland moss, ii. 35.  
 Ichneumonidæ, i. 116.  
 Ichthyology, i. 183 *et seq.*  
 Ignis fatuus, i. 488.  
 Illicineæ, ii. 575-576.
- J.
- Imperial pigeon, i. 387; advantage taken of its peculiarity in feeding, i. 388.  
 Imphee, ii. 115.  
 India-rubber, ii. 351.  
 Indian black bear, i. 463.  
 Indian buffalo, i. 461.  
 Indian coal, i. 359.  
 Indian corn, ii. 107.  
 Indian crow, unfriendly trait of the, i. 387; Jerdon's remarks on, *ibid.*  
 Indian edible turtle, i. 314.  
 Indian elephant, i. 447; ancestry of the, i. 130.  
 Indian fibres, ii. 262.  
 Indian loggerhead, i. 343.  
 Indian oaks, compared with European, ii. 258.  
 Indian olibanum, ii. 587.  
 Indian opium, ii. 653.  
 Indian otter, i. 464.  
 Indian palm swift, i. 357.  
 Indian privet, ii. 456.  
 Indian raven, i. 387.  
 Indian rorqual, i. 445.  
 Indian *rusa horus*, i. 456.  
 Indian spotted deer, i. 456.  
 Indian wild dog, i. 465.  
 Indigo, ii. 491, 522.  
 Ink bag, i. 181.  
 Inman's 'Ancient Faiths,' quoted, i. 120; ii. 214.  
 Insectivorous bats, i. 426.  
 Insects, i. 36 *et seq.*  
 Intoxication, alleged remedy for, ii. 526.  
 Intoxicants, comparison of opium and alcohol, ii. 653.  
 Intrusive Rocks, i. 5.  
 Involute, definition of meaning, in Cephalopods, i. 180.  
 Iodine, ii. 31.  
 Ipeacuanha, and its substitutes, ii. 338, 426, 430.  
 Iridosmine, i. 10.  
 Iron, Bisulphide of, i. 10.  
 Iron, Hydrous Oxide of, i. 12.  
 Iron Ore, Concretionary, i. 12.  
 Iron, Protosquinoxide of, i. 12.  
 Iron Pyrites, i. 10.  
 Iron Sesquioxide of, i. 12.  
 Iron, Sulphide of, i. 10.  
 Ironwood of Pegu, ii. 541.  
 Isabelline brown, i. 304.  
 Isaiah, referred to, ii. 670.  
 Isinglass, i. 186.  
 Isinglass-producing fish, i. 186, 212 *et seq.*  
 Issue peas, ii. 647.  
 Italian legend of the Holy Family, ii. 215.  
 Itch, the, i. 33.  
 Iulus (Millipedes), i. 32.  
 Ivy, ii. 373, 433.

- Jacko, an Andaman chief, burial of, i. 483.  
 Jade, i. 13.  
 Jala hasti, i. 446.  
 Jalap, ii. 294, 330.  
 Jambo, ii. 474.  
 Jasminea, ii. 351-354.  
 Jasmine, native names for—delicious fragrance of—two methods of making a perfume from, ii. 353.  
 Javan elemi, ii. 587.  
 Jelinek, Mr., on Nicobar canoes, ii. 636.  
 Jenny, the monkey in the London Zoological Gardens, referred to, i. 477.  
 Jerdon, referred to and quoted, ii. 189 *et passim*.  
 Jerusalem artichokes, origin of the name, ii. 403.  
 Jesus Christ, wood for the Crucifixion of, ii. 219.  
 Jewish idea of Satan, ii. 687.  
 Jinjouk, i. 125.  
 Job, quoted, ii. 671.  
 Job's tears, ii. 107.  
 Job's tempter, ii. 687.  
 Johnson, General, his magpie, i. 502; the former master of Kaykree, ii. 682.  
 Johnston, Dr., quoted, i. 179.  
 Johnstone, Mr., on the occurrence of platina, i. 9.  
 Jones, Edmund, of Raungoon, cause of his death, ii. 635.  
 Jones, Sir W., quoted, ii. 149, 173, 298.  
 Jorae silkworm, i. 81.  
 Jotakas, i. 355.  
 Jnglandaceæ, ii. 226.  
 Juncea, ii. 125.  
 Jute of commerce, ii. 605; might be cultivated with profit, ii. 606.  
 Juvenal, quoted, i. 187, 237; ii. 91, 129, 237, 257.
- K.
- Kafal, ii. 587.  
 Kala-jira, ii. 670.  
 Kālā mung, ii. 491.  
 Kalonja, ii. 670.  
 Kamala, the native name for a dye produced from *Rottlera*, ii. 244; description of—chemical treatment of—used as a dye for silk—as an anthelmintic, ii. 245; cases quoted in which it was used as an effectual remedy for tapeworm, ii. 245-247; doses recommended by Dr. C. Mackinnon—further medical experience of, ii. 246, 247.  
 Kanraunga, of India, ii. 597.  
 Kangu, i. 3.
- Ka-oung, the Bghais in, and diseased elephants, i. 447.  
 Kapilapodi, a combined Sanskrit and Tamil word for "pollen of a flower," ii. 244.  
 Karen belief in a fabulous animal, i. 463.  
 Karen bill of fare, i. 297.  
 Karen legend, i. 308.  
 Karen mode of catching lizards, i. 327.  
 Karen myth, regarding the barking deer and the tiger, i. 459.  
 Karen potato, ii. 145.  
 Karen women, ear ornament of, ii. 552.  
 Karens, their judicious treatment of elephants, i. 447-48.  
 Karens, remarks on their habits, ii. 537.  
 Karg, Persian name of the rhinoceros, i. 452.  
 Kasur of India, ii. 491, 502.  
 Katechn, ii. 491.  
 Kath, ii. 491.  
 Kaup, on skulls of owls, i. 407.  
 Kaykree, a valuable servant of the Rev. C. Parish, account of his habits, and appalling death, ii. 682.  
 Kay-mah-hpyoo, route to, i. 13.  
 Kayu lakka of commerce, ii. 527.  
 Keut, Saville, quoted, i. 17.  
 Kosāri-dal of India, ii. 502.  
 Kesora, synonym of *Pannaga*, ii. 244.  
 Khadir, i. 4.  
 Kidney worm, i. 22.  
 King, C., referred to, i. 93.  
 King crabs, i. 21.  
 King-crow, i. 359, 378.  
 Kingfishers breeding in ants' nests, i. 353.  
 Kingsley, Canon, account of musical fish, i. 493.  
 Kittens, the right way of destroying, ii. 343.  
 Kitto's *Cyclopædia*, referred to, ii. 204 *et passim*.  
 Kiwach, ii. 507.  
 Kjökkenmøddings of the Andamans, i. 484.  
 Kokum butter, ii. 636.  
 Kooth, ii. 205.  
 Kothanaiong, the Amherstias at, ii. 536.  
 Ko-tsay-ko-gewn, remarkable orchid found near, ii. 185.  
 Kouso, failed to expel tapeworm, ii. 245; as a remedy, ii. 485.  
 Krait snake, i. 311, 322.  
 Krishna's addresses to Arjun, ii. 340-1.  
 Kulthi, ii. 491.  
 Kurz, Sulpiz, his 'Forest Flora of British Burma,' and other contributions, ii. 3 *et passim*; botanical remarks and reports on timber trees, quoted, ii. 99 *et passim*; his tribute to Dr. Mason, ii. 133; 'Catalogue of Orchids gathered in the Andaman Islands,' ii. 202.  
 Kusa grass, ii. 104.  
 Kyan, Burmese name for the rhinoceros, i. 453.
- L.
- Labiata, herb-yielding order of plants, ii. 295.  
 Lac, ii. 505.  
 Lac insect, i. 37.  
 Ladies' slipper oyster, i. 125.  
 Lady-birds, i. 107.  
 Lady's mantle, ii. 485.  
 Lady's-smock, ii. 484.  
 Lamarck's arrangement of shells, i. 123.  
 Lamellibranchs, i. 124.  
 Lamellicorn beetles, i. 112.  
 Lamelliostres, i. 398.  
 Lamiales, ii. 294.  
 Land crabs, i. 29.  
 Land Shells, i. 159 *et seq.*  
 Landes, a curious custom in the, ii. 227.  
 Lapps, a plant used by the, to thicken milk, ii. 322.  
 Lapwings, i. 393.  
 Lard Shorea, ii. 629.  
 Large bamboo rat, i. 421.  
 Large black squirrel, i. 412.  
 Large white yam, ii. 145.  
 Larger mouse deer, i. 455.  
 Larks, i. 383, 385.  
 Larkspur, ii. 671.  
 Laterite Forests, ii. 9.  
 Latrines, the outfalls of, not productive of fish fit for eating, i. 187.  
 Latter, Capt., discoverer of a species of pine, ii. 213.  
 Laughing thrushes, i. 367; Davison's description of the hideous row they make, and their dancing powers, *ibid.*  
 Laurales, ii. 282.  
 Laurel, put to base uses, ii. 289.  
 Laurineæ, ii. 282; commercial importance of the order, ii. 288.  
 Lavender, ii. 295.  
 Laver, a medicinal seaweed, ii. 31.  
 Lawson, referred to, ii. 563-4; commended, for expunging shadowy species from the 'Flora of India,' ii. 567.  
 'Lay of Vattbrudni,' quoted, ii. 225.  
 Layard's suggestion, as to bayas, i. 383.

- Lea, the American conchologist, quoted, i. 129.  
Lead, Sulphide of, i. 10.  
Leaf-nosed bat, i. 428.  
Leaf-shedding Forests, ii. 9.  
Lecheuquana bee, ii. 561.  
Leeches, i. 23.  
Leek, ii. 128.  
Legendary lore, ii. 381.  
Legends, considerations on, ii. 257.  
Legends of the Oak, ii. 261.  
Leguminosæ, ii. 490-545; the second most important order of plants—enumeration of its chief members, ii. 491.  
Le Maout et Decaisne, their 'Descriptive and Analytical Botany,' referred to, ii. 1 *et passim*.  
Lemnaceæ, ii. 130.  
Lemon-grass oil, ii. 112.  
Lemuria, i. 474.  
Lentils, i. 491, 502.  
Leopard, story of a, i. 472.  
Leopard-cat, i. 473.  
Leprosy, erroneously attributed to a fish diet, i. 187; remedies for, ii. 340, 645.  
Leslie's translation of Norden-skiöld's 'Voyage of the Vega,' quoted, i. 485.  
Lesser-eared owls, i. 407.  
Lesser hemlock, ii. 439.  
Lesser one-horned rhinoceros, i. 451.  
Lesser wild Burmese bull, i. 460.  
Lesser yellow-eared spider-hunter, i. 361.  
Lewin, Capt. H. T., 'Hill Tracts,' etc., quoted, ii. 681.  
Lice, i. 43.  
Licheus, ii. 35, 91.  
Lign-aloes, ii. 281; etymology of native name, ii. 282.  
Lignum vitæ, ii. 549.  
Liliales, ii. 125 *et seq.*  
Lilies, ii. 129.  
Liliputian oranges, ii. 593.  
Lime juice, ii. 596.  
Limonite, i. 12.  
Limpets, i. 171.  
Lindley's 'Genera and Species of Orchidaceous Plants,' and other botanical works, quoted, ii. 150 *et passim*.  
Lineæ, ii. 600-1.  
Liquorice, ii. 491.  
Litchi, a fruit, ii. 558, 561.  
Little owl, as a decoy, i. 407.  
Littoral Forests, ii. 5.  
Liver fluke of sheep, i. 20.  
Livers of sharks, weights of, i. 186, 284.  
Liverworts, ii. 46.  
Livingstone, the African traveller, his observations of hornbills quoted, 351.  
Lizards, esteemed for food, i. 327.  
Loadstone, native, i. 12.  
Lobelesæ, ii. 375; now fallen into disuse as medicinal plants, ii. 376.  
Lobsters, i. 25.  
Lockhart's 'Wedding of the Cid,' quoted, ii. 108.  
Locusts, i. 45.  
Logwood, ii. 491.  
Long-armed apes, i. 475.  
Long-haired pig-tailed monkey, ii. 476.  
Long-nosed gharial, i. 335.  
Long pepper, ii. 231.  
Long-tailed doves, i. 388.  
Long-tailed monkeys, i. 478.  
Longan, a fruit, ii. 561.  
Longicorn beetles, i. 108.  
Looping snails, i. 163.  
Loquat, ii. 485, 487.  
Loranthaceæ, ii. 221.  
Lords and Ladies, ii. 132.  
Loreal shield, the, in snakes, an absolute proof of their harmlessness, i. 323.  
Lories, i. 408, 409.  
Lovage, ii. 439.  
Love-apples, ii. 205.  
Love-charms, made from the heads of hornbills, i. 351.  
Low, Mr., his supplementary list of Orchids, ii. 188, 503.  
Low Forests, ii. 10.  
Lower Mixed Forests, ii. 12.  
Lubbock, Sir J., quotation from, on the evolution of the Sitaris beetle, i. 110.  
Lucern, ii. 491.  
Lucertius, quoted, i. 487.  
Luddoo, a native confection, i. 457.  
Ludiana, a disease in horses, ii. 87.  
Luffa, use to which the fruit of, is put, ii. 446.  
Lump fish, possessed of a poison organ, i. 188.  
Lung-wort, ii. 329.  
Lupines, ii. 491.  
Lutinos, Jerdon's remarks on, i. 350.  
Lycopodiaceæ, ii. 56, 93.  
Lycopods, ii. 56, 93.  
Lyell, Sir Charles, quotation from, ii. 17.  
Lythrariceæ, ii. 454-459.
- M.
- Macaws, i. 408.  
Mace, ii. 289.  
Macfarquhar, Maj., a superior cotton grown by, ii. 616.  
Mackinnon, Dr. C., treats tapeworm successfully with Kamala, ii. 245.  
McLeod, Major, his description of hot-springs, i. 7.  
MacMaster, Col., remarks on the Pegu tree shrew, i. 441.  
Madagascar mackerel, i. 218.  
Madder-dye, ii. 430.  
Madras silk-worm, i. 81.  
Madura turbans, ii. 410.  
Maggots, i. 48.  
Magnesium, Aluminate of, i. 12.  
Magnet, the, i. 12.  
Magnetite, i. 12.  
Magnoliaceæ, bitter principle in, ii. 659.  
Magpie, account of a, i. 502.  
Magpie, the common Indian, i. 386.  
'Mahabharata,' quotations from the, ii. 340-1.  
Mahogany, ii. 586.  
Mahomedan patients, how not to offend their religious scruples, ii. 256.  
Maiden-hair fern, ii. 67.  
Maigre, a species of fish, i. 494.  
Mainwaring, Col. G. B., discoverer of a newt, i. 289.  
Majun, a confection, ii. 263.  
Malabar teakwood, ii. 691.  
Malarious fever, tobacco a preventive in, ii. 326.  
Mallows, properties of, and Horace's lines on, ii. 609.  
Malpighiaceæ, ii. 598-600.  
Malvaceæ, ii. 608-619; chief members, ii. 619.  
Malvales, ii. 601 *et seq.*  
Mammalia, i. 411 *et seq.*  
Maunched, used to poison arrows, ii. 209.  
Mandragera, ii. 204.  
Mandrakes, ii. 204.  
Manganese, ii. 13.  
Mange in dogs, i. 33; remedy for, ii. 646.  
Mango fruit, its universality, ii. 553.  
Mango fish, i. 211.  
Mangosteen, ii. 634, 635.  
Mangrove-swamp prawn, i. 26.  
Mamhot, ii. 251.  
Manilla hemp, ii. 203, 204.  
Manna, i. 37.  
Mantide, i. 44.  
Marble wood, ii. 359.  
Marbled tiger-cat, i. 473.  
Marcasite, i. 10.  
Marco Polo and Polar Bears, i. 485.  
Marigold, derivation of, ii. 403.  
Marine monsters, i. 181.  
Marine turtles, i. 343.  
Marjoram, ii. 295.  
Marking ink, ii. 550.  
Marsiliaceæ, ii. 58, 93.  
Martaban camphor-wood, ii. 283.  
Martial, quoted, ii. 91, 275.  
Mary Magdalene, ii. 381.  
Masked reduvius, i. 41.

- Mason's snow-white flower, ii. 133.  
 Mason, Mrs. E. H. B., her verses on Amherstia, ii. 536.  
 Mastie, ii. 554.  
 Masur-ka-däl, ii. 502.  
 Mats made from Maranta, ii. 208.  
 Mattah, hot-springs near, i. 7.  
 Matthew, A. L., ii. 224.  
 Maulmain group of rocks, i. 2.  
 Manz, Arabic name of the plantain, ii. 204.  
 Manza, Pali name of the plantain, ii. 204.  
 Max Muller, Prof., ii. 687.  
 May fly, i. 47.  
 Mayanong district, adventures with elephants in, i. 447, 450.  
 Mayo, Lord, a tree named in honour of, ii. 319.  
 Maypures, a parrot living in, i. 410.  
 Mead-wort, ii. 485.  
 Meadow-sweet, ii. 485.  
 Meat, how it can be rendered tender, ii. 452.  
 Medicinal remedies, ii. 90, 93, 112, 125, 127, 131, 206, 211, 229, 241, 244-247, 251, 256, 263, 295, 298, 299, 319, 323, 326, 329, 338, 340, 343, 345, 351, 371, 426, 453, 467, 484, 485, 503, 507, 532, 549, 551, 590, 596, 627, 641, 645, 646, 647, 649, 653, 658.  
 Medllars, ii. 485.  
 Mellicott and Blanford's 'Geology of India,' i. 1.  
 Meduse, i. 18.  
 Megaderma, predaceous habits of, i. 430.  
 Megapodes, habits of, i. 392.  
 Melanthaceæ, ii. 127.  
 Melastomaceæ, ii. 459-466.  
 Meldola, R., mentioned, i. 51.  
 Meliaceæ, ii. 580; main value of the order, ii. 586.  
 Melilot, ii. 491.  
 Melodeon of the Cicadæ, i. 40.  
 Melons, ii. 449.  
 Memilled, or spotted summer coat of deer, i. 456.  
 Menispermaceæ, ii. 655-659.  
 Mergui group of rocks, i. 2.  
 Merriam, Madame, i. 114.  
 Metamorphic Rocks, i. 1.  
 Mexican clemi, ii. 587.  
 Mhor, or great basking-shark, how captured, i. 284, 496.  
 Mice, various species described, i. 417-420.  
 Mignonette, ii. 617.  
 Millipedes, i. 32.  
 Milne-Edwards, A., i. 155.  
 Milton, quoted, i. 445, referred to, ii. 671.  
 Mimicry, rare powers of, of the Bhimraj, i. 379.  
 Mincopie, the, fully described, i. 479; racial affinities of, i. 482.  
 Mineralogy, i. 8.  
 Minivets, i. 380.  
 Mint, ii. 297.  
 Miracles, suggested origin of some, i. 488.  
 Mistletoe, etymology of, ii. 224.  
 Mites, marine, freshwater and terrestrial, i. 33.  
 Mit'hum, the, i. 461.  
 Mixed Forests, ii. 11.  
 Mocha coffee, what some undergoes, i. 388.  
 Mocha stones, i. 13.  
 Mohit, ii. 491.  
 Mo-jio, or thunderbolt, regarded by the Burmese as of great value, i. 504.  
 Mole cricket, i. 45.  
 Mollusca, i. 124 *et seq.*  
 Monboddlo, Lord, his theory of the disappearance of tails, illustrated, i. 476.  
 Monimiaceæ, ii. 290.  
 Monkey pea, i. 24.  
 Monkey-tiger, i. 469.  
 Monkey's concubine, i. 474.  
 Monkeys, various species of, fully described, i. 474; curious habit of some, i. 476.  
 Monoclamydeæ, ii. 219 *et seq.*  
 Monocotyledons, ii. 95 *et seq.*  
 Monopetalous plants, ii. 294.  
 Montgomery, Mr., i. 471.  
 Montyplics, Scotch term for inner stomach, i. 454.  
 Moon daisy, ii. 381.  
 Moon, goddess of the, ii. 381.  
 Moore, F., Catalogues of Lepidopterous Insects of Bengal, of the Andamans and Nicobars, and of Upper Tenasserim, i. 51 *et seq.*  
 Morea, a fruit-yielding order of trees, ii. 266-277.  
 Morel, ii. 90.  
 Morgan, Major, remarks on teak, ii. 691.  
 Moringaceæ, ii. 648.  
 Morphia, ii. 653.  
 Morrison's Pills, the active ingredient of, ii. 635.  
 Mosquitoes, i. 49.  
 'Moss' agates, i. 13.  
 Mosses, ii. 36 *et seq.*; Systematic List of Burmese, ii. 43 *et seq.*  
 Moths, i. 52.  
 Mouchez, Capt., i. 181.  
 Mound-building birds, i. 392.  
 Mountain ash, ii. 485.  
 Mountain barbel, a fish sometimes deleterious, i. 186.  
 Mountain hemlock, ii. 439.  
 Mouse deer, comparison of differences of, i. 455.  
 Mucilaginous plants, ii. 375.  
 Mud fishes, i. 222.  
 Mud vegetables, i. 6.  
 Mugilis, Juvenal on, i. 237.  
 Mullen, ii. 691.  
 Muller, Dr. S., on offensive odour emitted by bats, i. 139.  
 Mulletts, ii. 204.  
 Mung, ii. 491.  
 Mongoose, i. 469; reasons why he may sustain and survive snake bite, ii. 408.  
 Murie, Dr., paper on a curious phenomenon in hornbills, i. 351; quoted, i. 465.  
 Musaceæ, economical importance of, ii. 203.  
 Muscæ, ii. 92.  
 Muscivory duck, i. 399.  
 Mushrooms, English, in Burma, ii. 31, 91.  
 Musical fish, i. 214; the Rev. C. Parish's narrative of, i. 492; Kingsley's story of, i. 493; a natural cause suggested as the origin of the phenomenon, i. 494; Dr. Günther's remarks on, i. 494; Sir Emerson Tennent's account of, i. 494; "W. C. P.'s" account of, i. 495.  
 Musk rat, i. 440.  
 Mussels, i. 128.  
 Mustelch-plants, their improper treatment, i. 449; their proper treatment, i. 450.  
 Mustard, found in a remote place—oil in—how to mix—as an emetic—poultice, ii. 649.  
 Mustelide, i. 464.  
 Mycelium = fungus spawn, ii. 227.  
 Mynahs, i. 385.  
 Myristicaceæ, ii. 289.  
 Myrobolans, varieties of, ii. 476; method of extracting tannin from, *ibid.*  
 Myroporineæ, ii. 407.  
 Myrosine, the albuminous principle in mustard, ii. 649.  
 Myrrh, ii. 587.  
 Myrsineæ, ii. 363-368.  
 Myrtaceæ, ii. 466-474.  
 Myrtales, ii. 453.  
 Myth of Baldur, ii. 224.  
 Myths relating to the soul and the butterfly, i. 50; the philosophy of, i. 487; question relating to the origin of, ii. 217; origin of, ii. 683; quotations from De Gubernatis and the Rev. W. G. Cox on, ii. 683-688.

- Narcissales, ii. 146.  
 Narcotine, ii. 653.  
 Nasturtium, ii. 648.  
 Native Alumina, i. 11.  
 Native descriptions of wondrous animals, i. 411.  
 Native elements, i. 8.  
 Native Leadstone, i. 12.  
 Native testimony *not* utterly untrustworthy, i. 506.  
 Nāt-mee, or the Spirit-Fire, i. 486.  
 Natron, i. 14.  
 Nāt-toung, distinction between the two places so named, ii. 571.  
 Nature, the study of, ii. 671.  
 Navel-wort, ii. 484.  
 Necklace bulbophyllum, ii. 154.  
 Necklace snake, i. 312.  
 Nectarine, ii. 485.  
 Neem-tree, ii. 581, 586.  
 Negritos, race whence the Minicopies have sprung, i. 482.  
 Nelumbo, a useful plant, held in mystic reverence, ii. 655.  
 Nematodes, i. 22.  
 Nemertes, i. 20.  
 Nepenthes, ii. 230.  
 Nepenthe of Homer, ii. 653.  
 Nerium, or oleander, ii. 350.  
 Nether world, spirits of the, propitiated by black beans, ii. 491.  
 Neuralgia, remedies for, ii. 327, 646.  
 Nevill, G. and H., quoted and mentioned, i. 123 *et seq.*  
 Nicéville, Lionel de, quoted and mentioned, i. 51 *et seq.*  
 Nicholson, Dr., account of the teeth of snakes, quoted, i. 314; his method for killing snakes, i. 315; quoted and mentioned, i. 326 *et seq.*  
 Nicobar canoes, ii. 636.  
 Nicobar ground doves, i. 389.  
 Niepa bark, its bitter qualities, ii. 589.  
 Nightjar, difference of opinion regarding the note of, i. 355.  
 Ninepins, the game of, in the Chittagong Hills, ii. 692.  
 Ninety-nine Islands, ii. 185.  
 Nipal spinach, ii. 291.  
 Nipal volcrine, i. 465.  
 Nistry silkworm, i. 81.  
 Nocturnal moths, plan for catching, i. 107.  
 Noddy, i. 401.  
 Non-poisonous snakes, how distinguished, i. 322.  
 Nordenskiöld, Baron, 'Voyage of the Vega,' quoted, i. 485.  
 Norman, Judge, attacked by a kite, i. 502.  
 North American Sea Island cotton, ii. 417.  
 Nudibranchs, picturesque description of, i. 140-1.  
 Nummulites, i. 16.  
 Nummulitic Group, i. 3.  
 Nuptial flight of the queen-bee, i. 119.  
 Nut-hatch, i. 377.  
 Nutmeg, ii. 289.  
 Nux-vomica, ii. 342.  
 Nyctagineæ, ii. 293.  
 Nymphææ, ii. 654-5.  
 O.  
 Oak of Dodona, 216-217.  
 Oaks, ii. 258; legends relating to, ii. 261.  
 Oates, E., mentioned and quoted, i. 345 *et passim*.  
 Oaths, binding, ii. 298.  
 Oaths in patriarchal times, ii. 274, 689.  
 Ochnaceæ, ii. 587-8.  
 Octopoda, i. 181.  
 Ocydodes, i. 30.  
 Odontophore, i. 124.  
 Oil, a vegetable concrete, ii. 363.  
 Oil beetle, i. 110.  
 Oil of ben, ii. 648.  
 Oil sardine, i. 275.  
 Olacales, ii. 574 *et seq.*  
 Olacineæ, ii. 576-580.  
 Oldham, Dr., on gold forwarded to Calcutta by Major Berdmore, i. 9; mentioned, i. 310.  
 Old man, ii. 403.  
 Oleanders, ii. 344.  
 Onagraceæ, ii. 453.  
 Onion, ii. 128; Juvenal's lines on the, ii. 129; part taken in religion, ii. 129.  
 Onion of Askalon, ii. 128.  
 Onyx, i. 13.  
 Open Forests, ii. 9.  
 Ophioccephali, i. 237.  
 Ophioglossæ, ii. 94.  
 Ophthalmia, remedy for, ii. 206.  
 Opium, remarks on, ii. 653.  
 Orange-flower water, ii. 596.  
 Oranges, ii. 678.  
 Oreoidaceæ, ii. 148.  
 Orchidales, ii. 153.  
 Orchids, Burmese, ii. 148 *et seq.*; ii. 189 *et seq.*; of the Andamans, ii. 202; Additional, ii. 680; fertilization of, ii. 680.  
 Oriental woodpecker, i. 347.  
 Orientals, dyeing their own skin and nails, and also the manes and tails of their horses, ii. 456.  
 O'Riley, Mr., mentioned, i. 209, 345.  
 O'Rileyite, i. 10.  
 Ormuzd, ii. 687.  
 Ornithology, i. 345 *et seq.*; list of authorities, papers, and books on, *ibid.*  
 Orobanchæ, ii. 321.  
 Orris root, ii. 147.  
 Orthoptera, i. 43.  
 Ortolan, i. 385.  
 O'Shaughnessy, Dr., directions for preparing seaweed, ii. 30; referred to, ii. 653.  
 Osmunda, derivation of, ii. 77.  
 Otaheity cane, ii. 115.  
 Otters, i. 464.  
 Ovid, on Echeneis, quoted, i. 221; describing Ceres as first teaching the cultivation of corn, ii. 116; quoted, ii. 209, 491, 688.  
 Owen, Prof., quoted, i. 80.  
 Owls, habits of, i. 406.  
 Oxygen Compounds, i. 11.  
 Oysters, i. 124.  
 Oyster catchers, i. 393.  
 P.  
 Paddy bird, i. 398.  
 Paddy-eater, i. 196.  
 Pai, hot springs at, i. 7; analysis of the water, i. 8.  
 Painted snipe, i. 394.  
 Palas of India, ii. 505.  
 Palma-Christi, ii. 251.  
 Palmales, ii. 135.  
 Palms, economic uses, i. 136.  
 Palouk, hot-springs at, i. 7.  
 Pān, ii. 207; chewing, a harmless luxury, ii. 231.  
 Pandanææ, ii. 133.  
 Pandanus, uses of, ii. 135.  
 Pangolin, i. 412.  
 Pantheism of the Mahabharata, ii. 340.  
 Papaveraceæ, ii. 653-4.  
 Papaw, juice of, good for rendering meat tender, ii. 352; power of dissolving living tissues, ii. 353; Sir J. D. Hooker on, ii. 452.  
 Papayotin, its peculiar property, ii. 452.  
 Paper, plants yielding, ii. 276, 281.  
 Paradise flycatcher, i. 381.  
 Paradoxures, horrible stench emitted from, i. 468.  
 Paraguay tea, ii. 576.  
 Paralysis, caused by unwholesome food, ii. 503; induced by a species of pulse, ii. 509.  
 Parietales, ii. 643 *et seq.*  
 Paris-b, Rev. C., remarks on the habitat of crabs, i. 30-1; account of Pgai-nwet, i. 121; quoted, i. 146; his account of musical fishes, i. 214, 492-3; on the botany of Burma, ii. 3 *et passim*; his account of Burmese Orchids, ii. 148 *et seq.*; his 'Enumeration of Burmese Orchids systemati-

- cally arranged,' ii. 189 *et seq.*; his discovery at Ta-ok of a species of *Rafflesia*, ii. 228; discovery of a wild Amherstia, full account of, ii. 537; account of Kayree, ii. 682.
- Parra-beike, ii. 276.
- Parrakeets, conflicting accounts of beaks of, i. 409.
- Parrot, i. 504.
- Parrot fishes, at some seasons unfit for food, i. 187.
- Parrots, teeth of, i. 408; age of, i. 410.
- Parsley, ii. 439.
- Parship, ii. 439.
- Parthenogenesis, instances of, i. 38; ii. 484.
- Partridges, i. 391.
- Pascoe, F. P., his 'Zoological Classification,' i. 16 *et pass.*
- Paste eels, i. 22.
- Pastillorales, ii. 411.
- Patchouly, ii. 295, 297.
- Pawpaw, American, ii. 661.
- Peach, ii. 485.
- Peacock-brains, i. 403.
- Peacocks, their antipathy to tigers, i. 389; their cry supposed to herald rain, *ibid.*
- Pea-towl, i. 389.
- Pea-measle, i. 21.
- Pearl oyster, i. 127.
- Pearly nautilus, mode of capturing, i. 179.
- Pears, ii. 485.
- Pearson, Dr., i. 315.
- Pearson, Major, remarks on teak, ii. 691.
- Peckolt, Dr., discoverer of papayotin, ii. 452.
- Peepul, parasitism of the, ii. 149.
- Pegu hare, dentition of, i. 422.
- Pegu ironwood, ii. 511.
- Pegu tree shrews, anecdotes of the tameness and death of two, 441; specific distinctions, i. 442.
- Pelicans, i. 398.
- Pemberton, Dr., on the action of gum kino, ii. 529.
- Penguins, i. 398.
- Pennyroyal, ii. 295.
- Pentastoma, i. 35.
- Peppermint, ii. 295.
- Peregrine falcon, i. 403.
- Perigynous plants, ii. 294 *et seq.*
- Periwinkles, i. 155.
- Pernambuco cotton, ii. 616.
- Peruvian cotton, ii. 616.
- Petersburgh hemp, ii. 262.
- Petrels, ii. 398, 400.
- Petrified wood, ii. 692.
- Petroleum, i. 6, 14.
- Phenogams, ii. 95.
- Phallic symbolism, and the fig-tree, ii. 274.
- Pharisee, modern instance of a, ii. 653.
- Phasimide, i. 41.
- Phayre, Sir A., dedication to, i. xxi; as the first systematic collector of birds in Burma, i. 345; 476.
- Pheasants, i. 389.
- Philtres, ii. 204-5.
- Phosphoric fish, i. 215.
- Phrynidæ, i. 35.
- Physaline, ii. 325.
- Phytolacceæ, ii. 293.
- Picrotoxin, ii. 657.
- Piddington, Mr., on the best soil for cotton, ii. 616.
- Pig bear, i. 462.
- Pig rat, i. 418.
- Pigeons, i. 387, 388.
- Pigeon's blood, a ruby tint, i. 11.
- Pigmy falcons, i. 403.
- Pig-tailed baboon, i. 476.
- Pigs, dentition of, i. 454.
- Pike whale, i. 415.
- Pilcher plants, ii. 230.
- Pill-rollers, i. 112.
- Pilot fish, i. 219.
- Pimento pepper, ii. 474.
- Pinang lawyer, ii. 110.
- Pine-apple, ii. 203.
- Pine Forests, ii. 9.
- Pine-coucs, significance of, ii. 214.
- Pines, ii. 213; De Gubernatis on, ii. 214.
- Pintail, i. 400.
- Pipe-clay as a head-covering for elephants, i. 451.
- Pipe fishes, i. 281.
- Piperacæ, ii. 230.
- Piperales, ii. 230 *et seq.*
- Pisces, i. 188 *et seq.*
- Pissabed, ii. 403.
- Pistachio-nut, ii. 554.
- Pitré, M., quoted, ii. 215.
- Pittas, i. 363.
- Pittosporæ, ii. 643.
- Pit-vipers, i. 313.
- Plantaginæ, ii. 369.
- Plantain, ii. 203; discussion on the name, ii. 204.
- Plantain fibre, manufacture of, ii. 683.
- Plant lice, i. 37.
- Platina button, analysis of, i. 9.
- Platinum, i. 9.
- Pliny on the manufacture of Tyrian purple, i. 444.
- Plovers, i. 392.
- Plum, a species of, ii. 280.
- Plumbaginæ, ii. 369.
- Plumbago, the roots of, purpose to which they are applied, ii. 370.
- Plumbeous redstart, i. 372.
- Poachd-egg tree, ii. 637.
- Pochards, i. 399, 400.
- Point-tying, superstition concerning, ii. 688.
- Poison apparatus of snakes explained, i. 314.
- Poisoning of animals, ii. 313.
- Poisonous fish, i. 186, 223, 274, 282.
- Poisonous plants as food in times of scarcity, ii. 145.
- Poisonous snakes distinguished, i. 322; few in number, i. 323.
- Polar bears, i. 485.
- Polemoniales, ii. 327.
- Police-men ants, i. 116.
- Polygalales, ii. 640 *et seq.*
- Polygalicæ, ii. 640-643.
- Polygonæ, a useful order of plants, ii. 292.
- Polypetalous plants, ii. 431 *et seq.*
- Polypoda, i. 179.
- Polyzoa, i. 23 *et seq.*
- Pomegranate, ii. 159.
- Pometrets, i. 220.
- Pongamia, oil of, ii. 526.
- Pontederales, ii. 124.
- Pontederiacæ, ii. 124.
- Poon, ii. 700.
- Poon spars, dispute as to the tree used for, ii. 636.
- Pope, quotation from, i. 16; 'Homer,' quoted, i. 129, 285, 496; ii. 78; 'Essay on Man,' quoted, ii. 145.
- Pope's blessing, attitude in, very ancient, ii. 492.
- Peppy, ii. 653.
- Porcupines, dentition of, i. 422; not yet sufficiently discriminated, i. 424.
- Pork tape-worm, i. 21.
- Portugal, a *savant* of, unduly disparaged, i. 504.
- Portulacæ, ii. 639.
- Posthumus, Horace's Ode to, quoted, ii. 214.
- Potamides, ii. 113.
- Potameæ, ii. 141.
- Potato, ii. 325.
- Pottery in the Andamans, i. 484.
- Poultry, i. 389.
- Power possessed by some snails of dissolving parts of their shells, i. 167.
- Pras of India, ii. 505.
- Pratincoles, i. 392.
- Prawns, i. 25.
- Prehensile tale, the only placental mammal in the old world with a, i. 469.
- Priapus, images of, ii. 275.
- Prickly pear, i. 36.
- Primulacæ, ii. 368.
- Primulides, ii. 363.
- Prince of trees, ii. 217.
- Prionodon, described, i. 467.
- Prior, R., 'Popular Names of British Plants,' quoted, ii. 67 *et passim*; on the derivation of holli-hock, ii. 609.

- Pristidae, i. 497.  
 Promise, a must elephant at, i. 449.  
 Propertius, quoted, ii. 205.  
 Proscodex, i. 21.  
 Protoplasm, i. 16.  
 Protosquioxide of Iron, i. 12.  
 Protozoa, i. 16.  
 Providential design, remarks on, ii. 671.  
 Prussic acid, ii. 330.  
 Psilomelane, i. 13.  
 Psora, cure for, ii. 319.  
 Psoriasis, liniment for, ii. 353.  
 Pteropoda, i. 139.  
 Ptolemy's soldier who killed a cat, i. 312.  
 Puff-balls, ii. 91.  
 Puff fishes, i. 187.  
 Puffin, i. 394.  
 Puffia fish, i. 256.  
 Pugin's 'Glossary of Ecclesiastical Ornaments,' referred to, ii. 459.  
 Pulses, diverse properties of various species of, ii. 509.  
 Pumpkins, ii. 449.  
 Punch's verses on sea animals, i. 489-90.  
 Purchas, the traveller, ii. 618.  
 Pure ideas, perversion of, illustrated, ii. 685-6.  
 Purgative, a good, ii. 241.  
 Purslane, ii. 639.  
 Putchuk, ii. 205.  
 Pwai-nget, described, i. 121.  
 Pyoung, i. 460.  
 Pyrite, i. 10.  
 Pyrophorus, ii. 103.  
 Pyroxene, i. 13.  
 Pythagoras, rejected beans as food, ii. 491.  
 Python, i. 684.  
 Python, i. 308; Karen legend concerning the, *ibid.*; esteemed as food, *ibid.*; killed by pigs, i. 454.
- Q.
- Quadrumana, i. 474.  
 Quails, i. 391.  
 Quaker thrushes, i. 359.  
 Quartz, i. 13.  
 Quatrefages, M. de, views on the racial affinities of the Mincopies, i. 482.  
 Queen of Orchidaceous plants, the, ii. 177.  
 Quernales, ii. 225 *et seq.*  
 Quinine, ii. 288.
- R.
- Rabenhorst, Dr. L., ii. 25 *seq.*  
 Radish, ii. 649.  
 Rafflesia, a species of, found at Ta-ok, ii. 228.  
 Rafflesiaceae, ii. 227.  
 'Raff' of Iantlana, i. 179.  
 Rails, i. 392, 396.  
 Rainey, J., on "Barrisal guns," i. 494.  
 Rajmahal Hills, *Ignis fatuus* in, i. 489.  
 Rambutan fruit, ii. 556, 561.  
 Rampion, ii. 375.  
 Ramsay, Lieut. W., referred to, i. 345, 393.  
 Ranales, ii. 654 *et seq.*  
 Randia as a substitute for ipecacuanba, ii. 426.  
 Ranges of hills crossing Burma, i. 1.  
 Rangoon creeper, ii. 479.  
 Rangoon earth oil, i. 14.  
 Rannunculaceae, ii. 669-671.  
 Raptors, i. 406.  
 Raspberry, ii. 485.  
 Rat birds, i. 367.  
 Rat snake, i. 301.  
 Rats, their antipathy to snakes, i. 301; destruction caused by, i. 417.  
 Rattans, ii. 137.  
 Razor fish, i. 136.  
 Recent Deposits, i. 4.  
 Red coral, i. 19.  
 Red-crested pochard, i. 400.  
 Red currant jelly, substitute for, ii. 614.  
 Red jasmine, ii. 333.  
 Red jowar, ii. 115.  
 Red monkey, i. 478.  
 Red mullet, i. 204.  
 Red shrikes, i. 380.  
 Red snow, ii. 86.  
 Red-whiskered bulbul, i. 369.  
 Reem, Hebrew name of the rhinoceros, i. 452.  
 Regur, i. 5.  
 Reichenbach, Prof. H. G., tribute paid to, ii. 152; papers on Orchids, quoted, ii. 152 *et seq.*  
 Reindeer moss, ii. 35.  
 Religions, relationship between dead and living, ii. 219.  
 Religion and Trade, proverb applicable to each, ii. 502.  
 Religious symbols, ignorance regarding, and neglect of priests to impart knowledge concerning, ii. 492.  
 Religious symbolism, ii. 129.  
 Renan, referred to, ii. 689.  
 Reptilia, i. 297; flesh of, as food, i. 297.  
 Republican swallows, i. 356.  
 Resedaceae, ii. 647.  
 Resin, trees producing, 626, 627, 628.  
 Restiales, ii. 122.  
 Revivalists, their tub-thumping reprehended, ii. 506.  
 Revoltely, definition of, i. 180.  
 Rhamnaceae, ii. 568-571.  
 Rhea grass, cultivation of, and fibre produced from, ii. 365.  
 Rhesus monkey, i. 476, 478.  
 Rheumatism, remedies for, ii. 327, 467, 551, 645, 658.  
 Rhinoceroses, Blyth's remarks on, quoted, i. 451.  
 Rhinophidae, i. 426.  
 Rhizogens, ii. 227.  
 Rhizophoreae, ii. 480-481.  
 Rhizopods, i. 16.  
 Rhododendrons, ii. 373.  
 Rhubarb, ii. 292.  
 Rice, ii. 107; methods of cultivation, ii. 108; legends and superstitious connected with, *ibid.*  
 Rice flour v. Corn flour, ii. 103.  
 Rice paper, ii. 433.  
 Ridley, S. O., acknowledgment to, i. 490.  
 Ringworm, cure for, ii. 532.  
 Rissoids, i. 159.  
 Robber crab, adventure with, i. 28-9.  
 Rock oyster, i. 126.  
 Rocks, Metamorphic, i. 1.  
 Rodents, i. 412.  
 Roepstorff, F. A. de, mentioned, i. 51; quoted i. 484.  
 Rohde, G., mentioned, ii. 110.  
 Roman Catholic mythology, ii. 381.  
 Room, the dye called, ii. 311.  
 Rosaceae, ii. 485-490; the chief members of this order enumerated, ii. 485.  
 Rosales, ii. 482 *et seq.*  
 Rose, the, ii. 485; the old poetic fancy of the birth of, ii. 488.  
 Rose-apple, ii. 474.  
 Rose beetles, i. 112.  
 Rose of Jericho, curious superstition in connexion with the, ii. 649.  
 Roselle, fruit of the, ii. 614.  
 Rosemary, ii. 295.  
 Rosenmüller, quoted, ii. 456.  
 Rose-tangles, ii. 28.  
 Rosewood, a substitute for, ii. 525.  
 Rottler, Rev. Dr., ii. 244.  
 Rottlera, a valuable medicinal plant, description of, ii. 244.  
 Rottlerine, a substance extracted from Kamala ii. 245.  
 Rouge, how made, ii. 399.  
 Rowan, ii. 485.  
 Roxburgh, Dr., quoted, i. 80; his 'Flora Indica,' ii. 2 *seq.*  
 Roxburghiaceae, ii. 125.  
 Royal falcon, i. 403.  
 Royle, Dr., mentioned, ii. 133; experiments on hemp, ii. 262.  
 Rubiaceae, ii. 404; an important order of plants, ii. 430.  
 Rubies, their value, i. 11.  
 Ruddy shieldrake, i. 399.

Ruminants, stomachs of, i. 151.  
 Rumphius, quaint piety of,  
 ii. 145.  
 Rusot, ii. 655.  
 Russell, A. E., mentioned, i.  
 51; quoted, i. 190.  
 Russell's viper, i. 322.  
 Rust, ii. 90.  
 Rutaceæ, ii. 590-596; pro-  
 perties of, ii. 590.  
 Rutland Island tribe of Anda-  
 manese, i. 481; their good  
 qualities, i. 482.

## S.

- Saba, Queen of, ii. 587.  
 Sabiaceæ, ii. 554.  
 Sable fish, i. 276.  
 Sacred tree of the Buddhists,  
 ii. 629.  
 Safflower, ii. 399.  
 Saffron, ii. 147.  
 'Saffron-robed' Dawu of  
 Homer, ii. 147.  
 Sage, ii. 295.  
 Sago, ii. 139, 211.  
 Sal, of India, ii. 628.  
 Salad burnet, ii. 485.  
 Salt, common, i. 11.  
 Salt, economic considerations  
 on, i. 280.  
 Salt, employed in catching  
 shell fish, i. 136.  
 Salviniæ, ii. 93.  
 Salween River, origin of the  
 name, ii. 608.  
 Sambhur deer, i. 456.  
 Samphire, ii. 439.  
 Samydææ, ii. 450.  
 Sand martins, i. 356.  
 Sandal-wood, ii. 307.  
 Sandoricum tree, fruit of the,  
 ii. 583.  
 Sandpipers, i. 394.  
 Santalacææ, ii. 220.  
 Santales, ii. 220 *et seq.*  
 Santalum, economic products  
 of, ii. 221.  
 Sapindacææ, ii. 554; useful  
 products of, 561.  
 Sapindales, ii. 547 *et seq.*  
 Sapindus, a wood, ii. 240.  
 Sapotacææ, 360; products of,  
 363.  
 Sappan-wood, ii. 491, 538.  
 Sapphire, i. 11.  
 Sarcodæ, i. 16.  
 Sardine, i. 275, 276.  
 Sardonix, i. 13.  
 Sarsaparilla, ii. 127, 340.  
 Sassaparas, ii. 287, 288.  
 Satav, the Aryan and Iranian  
 conception of, ii. 687.  
 Saururacæ, ii. 230.  
 Savage races in the Andamans,  
 i. 481.  
 Savannahs, ii. 14.  
 Saviour, the idea of an in-  
 carnate, in the 'Mahabha-  
 rata,' ii. 341.  
 Savory, ii. 295.  
 Saw-fish, the oil produced  
 from, substituted for "cod-  
 liver oil," i. 186; the fish  
 described, i. 286.  
 Saxifragææ, ii. 483.  
 Scale mosses, ii. 47.  
 Sealy ant-eater, i. 412.  
 Scammony, ii. 330.  
 Scandinavian legends, origin  
 of, ii. 684.  
 Scandinavian mythology, ii.  
 225.  
 Scarlet dye, valuable, ii. 410.  
 Scarlet runner, ii. 491.  
 Scent *versus* sight, in vultures,  
 i. 402.  
 Scented wood, ii. 586.  
 Schlegel, referred to, i. 397.  
 Schultens, his abortive at-  
 tempt to reduce the plan-  
 tains to order, ii. 204.  
 Schater, Dr., i. 482.  
 Scolex, i. 21.  
 Seabrothers, i. 220.  
 Scopoli, mentioned, i. 374.  
 Scorpion fish, i. 185.  
 Scorpions, i. 33, 152.  
 Screech owls, i. 406.  
 Screw pine, ii. 134.  
 Scrophularinææ, ii. 322-324.  
 Scurvy, remedy for, ii. 596.  
 Scylla, Homer's description of,  
 probably borrowed from  
 some mariner's yarn of an  
 octopus, i. 285.  
 Seythian rhubarb, ii. 292.  
 Sea anemones, i. 18, 489.  
 Sea cucumbers, i. 20.  
 Sea eagle, habits of, i. 404.  
 Sea eggs, i. 19.  
 Sea Island cotton, ii. 617.  
 Sea lilies, i. 19.  
 Sea mantis, i. 25.  
 Sea pancakes, i. 19.  
 Sea pink, ii. 111.  
 Sea plovers, i. 393.  
 Sea snakes, i. 316.  
 Sea urchins, i. 19.  
 Sea weeds, scarcity of, on  
 Burmese coasts, ii. 16.  
 Sea worms, i. 23.  
 Sea wracks, ii. 26.  
 Seer fishes, i. 221.  
 Selung boats, ii. 136.  
 Sena, ii. 532.  
 Sensitive plant, the, ii. 541.  
 Serpent of Genesis, ii. 274;  
 falsification concerning the,  
 deprecated, ii. 688.  
 Serpentine, i. 5.  
 Sesamee, ii. 307.  
 Sesamum, and Hindu cere-  
 monies, ii. 307.  
 Sesbania, economic products  
 of, ii. 523.  
 Sesquioxide of Iron, i. 12.  
 Seth, the son of Adam, in the  
 Legend of the Cross, ii. 217.  
 'Seven brothers,' a family of  
 birds so called, i. 367.  
 Seville orange, ii. 596.  
 Shahin falcon, i. 403.  
 Shallot, ii. 128.  
 Shama of India, i. 371.  
 Shan vegetable black dye, ii.  
 357.  
 Sharks, i. 284.  
 Sharks' fins, value of, i. 284.  
 Sharks' flesh considered nu-  
 tritious, i. 203.  
 Sharks, the oil produced from,  
 substituted for "cod liver  
 oil," i. 186.  
 Shea butter, ii. 363.  
 Sheba, the Queen of, ii. 218.  
 Shell-eaters, i. 398.  
 Shell lac, i. 37.  
 Shelly marine worms, i. 23.  
 Sheriff, Dr. M., on a substi-  
 tute for ipecacuanha, ii.  
 338; quoted, ii. 313; on  
 Randia in dysentery, ii.  
 426.  
 Shieldrakes, i. 399.  
 Ship-worm, i. 139.  
 Shoe flower, the, ii. 613.  
 'Shola' hats, ii. 502.  
 Short-winged thrushes, i. 368.  
 Showers of fish, explanation  
 regarding, i. 185.  
 Shrews, species described and  
 their dentition, i. 339-341.  
 Shrikes, i. 380.  
 Shrimps, i. 25.  
 Shrubby bamboos, ii. 97.  
 Signatures, the doctrine of, ii.  
 329, 381.  
 Silica, i. 13.  
 Silicate of Aluminum and  
 Glucinum, i. 14.  
 Silk, early knowledge of, in  
 China, 80; little known to  
 the ancients, *ibid.*  
 Silkworms, i. 52.  
 Silk-yielding moths, i. 79.  
 Siluroid fishes, i. 184.  
 Silver, i. 10.  
 Silver-backed fern, ii. 68.  
 Silver fern, ii. 59.  
 Silver flower, ii. 156.  
 Silver pheasant, i. 390.  
 Silver stone, i. 12.  
 Silvery-leaf monkey, i. 479.  
 Sinarubææ, ii. 588-590.  
 Sinapine tissue a pleasanter  
 application than a mustard  
 poultice, ii. 649.  
 Singhara of India, as a food  
 supply, ii. 451.  
 Sirens, the, perhaps traceable  
 to musical fish, i. 495.  
 Sitaris, evolution of, i. 110.  
 Sitsyahn shales, i. 4.  
 Siwalik Group of rocks, i. 3.  
 Skent, W. W., quoted, ii. 224.  
 Skinner, a bird, i. 401.

- Skin diseases, remedies for, ii. 323, 340.
- Skip jacks, i. 111.
- Skirrets, ii. 439.
- Skua gulls, i. 400.
- Sky-lark of India, i. 385.
- Sloe, ii. 485.
- Slow loris, i. 474.
- Slugs, i. 161.
- Slym, Mr., on native mode of girdling timber, ii. 690.
- Small-clawed otter, i. 464.
- Smaller mouse-deer, i. 455.
- Smilacaceæ, ii. 127.
- Smith, E. E., i. 123.
- Smith, Capt. L., his collection of beetles, i. 114.
- Smut, ii. 90.
- Snails, sounds produced by, i. 171; slug-like, i. 174.
- Snake birds, i. 402.
- Snake bite and its antidotes, i. 316; treatment for, i. 323-326; Nicholson on, i. 326; inadequacy of a supposed cure for, ii. 408.
- Snake charmers, i. 809.
- Snake-head fish, i. 237.
- Snake-nut, ii. 554.
- Snake poison, there is no antidote to, i. 316.
- Snakes, i. 297 *et seq.*; native superstition concerning, i. 298; their poison apparatus explained, i. 314; mode of killing, i. 315; means of distinguishing between poisonous and non-poisonous, i. 322.
- Snapdragon, ii. 323.
- Snapping turtles, i. 339.
- Snipes, i. 394.
- Soapstone, ii. 5.
- Soap-words, ii. 561.
- Sodium Carbonate, i. 14.
- Sodium Chloride, i. 11.
- Sott crabs, i. 25.
- Soft turtles, i. 339; character of, summed up, i. 343.
- Soja, ii. 513.
- Solanales, ii. 324.
- Solanaceæ, ii. 324; value of the order, ii. 326.
- Solanine, narcotic principle of the potato, ii. 327.
- Solid-billed hornbill, i. 351.
- Solomon, building the Temple, ii. 218; his Court, ii. 587.
- Soma juice of the Vedas, ii. 310.
- Sōnā mung, ii. 491.
- Sonnerat, mentioned, i. 371.
- Soor fish, 213-14.
- Sound-producing fish, i. 186.
- Sour sop, ii. 664.
- South Andaman Island, i. 481.
- South Sea Island cotton, ii. 616.
- Southern booby, i. 401.
- Sow bug, i. 24.
- Sowerby's 'Thesaurus Conchyliorum,' i. 123.
- Sow thistles, ii. 403.
- Soy, or Soya, Japanese, ii. 513.
- Spanish fly, i. 109.
- Spanish moss, ii. 36.
- Sparrows, i. 383.
- Spathodea, as food, ii. 319.
- Spear grass, ii. 112.
- Spearmint, ii. 295.
- Species, the difficulty of deciding where one ends and another begins, i. 130.
- Specific distinctions, nicety as to, i. 370, 384; animal-verted on, 391, 395, 407.
- Specular iron, i. 12.
- Sperm whales, i. 445.
- Spermaceti, i. 445.
- Sphagna, ii. 92.
- Spicer, Mr., referred to, i. 493.
- Spider claws, i. 152.
- "Spider" of Prov. xxx. 28 = "Gecko," i. 331.
- Spider-shaped tick, infesting the flying-fox bat, i. 424.
- Spiders, i. 33; their peculiar marital habits, i. 35.
- Spinach, ii. 291.
- Spindle strombs, i. 152.
- Spined eels, i. 184, 235.
- Spinel, i. 12.
- Spirit-Fire, Duff's account of the, i. 486.
- Sponges, i. 17.
- Spoonbills, i. 398.
- Sportsmen pestered by laughing thrushes, i. 367.
- Sprains, remedy for, ii. 645.
- Spring beetles, i. 111.
- Spurred geese, i. 399.
- Squids, i. 181.
- Squills, i. 25.
- Squirrel, instance of 'mimicry' in a species of, i. 442.
- Squirrels, i. 412; an inherent tendency of, i. 413; various species fully described, i. 412-417.
- St. Margaret, ii. 381.
- St. Mary, ii. 381.
- St. Michel's day, curious custom on, ii. 227.
- Staggers, i. 21.
- Stalactite, i. 14.
- Stalagmite, i. 14.
- Stalked barnacles, i. 24.
- Star-apple, ii. 361.
- Star-fish, i. 19.
- Starch, ii. 206.
- Starlings, i. 385.
- Stephenson, the engineer, referred to, i. 121.
- Sterculia, a particularly offensive smelling species of, ii. 619; products of the genus, ii. 621.
- Sterculiaceæ, ii. 619; products of, ii. 625.
- Stevenson, Capt. J. F., his description of hot-springs near the Pai River, i. 7.
- Stibnite, i. 10.
- Stiltshanks, ii. 396.
- Stinging ants, i. 118.
- Stinging nettles, ii. 266.
- Stink-wood of South Africa, ii. 288.
- Stints, i. 394.
- Stoliczka, Dr. Ferdinand, quoted, mentioned, and referred to, i. 28 *et passim*.
- Stone implements found in Burma, i. 504.
- Stonechats, i. 382.
- Stonecrops, ii. 484.
- Stone plovers, i. 392.
- Stony corals, i. 18.
- Storax, ii. 357.
- Storks, i. 394, 397.
- Strauss, referred to, ii. 689.
- Strawberry, ii. 485, 490.
- Stridulatory apparatus in *Hyssine*, i. 86.
- Striped-squirrel snake, i. 301.
- Strombs, i. 152.
- Strychnine, the use of, in destroying animals, ii. 342.
- Strychnos-eaters, ii. 342.
- Strychnos-tree, ii. 312.
- Stumpy-tailed monkey, its tail described, i. 475.
- Stylidæ, ii. 376.
- Styracææ, ii. 355; economic products of, ii. 357.
- Subzi, a beverage, ii. 263.
- Sucking fish, i. 221.
- Sugar, i. 115.
- Sugar-cane, ii. 115.
- Suicide, fish used as a means of, i. 187.
- Sulphantimonite of copper, i. 11.
- Sulphide of Antimony, i. 10.
- Sulphide of Copper and Iron, i. 10.
- Sulphide of Lead, i. 10.
- Sumatran rhinoceros, i. 453; Bartlett's remarks on the birth of one, *ibid*.
- Sun-bear, i. 462.
- Sun birds, i. 360.
- Sunflower, erroneous notion of the, ii. 403.
- Sun-god, the, ii. 224.
- Sun hemp, ii. 491, 519.
- Sun raisins, ii. 363.
- Sun, the, reason why male in hot and female in cold countries, ii. 225.
- Superstition, curious instance of, ii. 688.
- Surma, i. 10.
- Suvananadi, old name of the Irrawaddy, i. 8.
- Savana-thumi, the old name of Pegu, i. 8.
- Swallows, i. 356.
- Swallow shrikes, i. 380.
- Swamp Forests, ii. 6.
- Sweet basil, ii. 295.

- Sweet cane of the Scriptures, ii. 133.  
 Sweet Cicely, ii. 439.  
 Sweet potato, ii. 330.  
 Sweet wood of Jamaica, ii. 288.  
 Swifts, i. 337.  
 Swinhoe, Mr., i. 394.  
 Sword beans, ii. 491, 510.  
 Sword-fishes, i. 214.  
 Symbolism of the soma plant, ii. 340; of the fruit of the pomegranate, ii. 459.  
 Symes, Colonel, ambassador to Ava, ii. 2.
- T.
- Tabasheer, ii. 102.  
 Tabooed subject of religious symbolism, ii. 192.  
 Taceaceæ, ii. 147.  
 Taceales, ii. 147.  
 Tail-less arboreal apes, i. 171.  
 Tailor birds, i. 372.  
 Tal palm of Bengal (not a pun), i. 383, 502.  
 Talpideæ, i. 439.  
 Tamarind fish, i. 188, 221.  
 Tamariscineæ, ii. 639-40.  
 Tamarix galls, ii. 640.  
 Tannin, mode of extracting, ii. 476.  
 Ta-ok Pass, discovery of a new *Rafflesia* at, ii. 228.  
 Tape-worm, i. 21; remedies for, ii. 245-247, 353, 615.  
 Tapioca, ii. 251.  
 Tapirs, dentition of, i. 453; habits of, i. 454.  
 Tapsi mûch, a fish, derivation of the name, i. 211.  
 Tarragon, ii. 409.  
 Tartarian Lamb, ii. 61.  
 Tât, sacking so called, ii. 606.  
 Tattooing, amongst the Andamanese, i. 483.  
 Tavoy potato, ii. 115.  
 Tavoy River, the locality where the Rev. C. Parish heard his musical fish, i. 493.  
 Tavoy red wood, ii. 552.  
 Taylor, on the respiration of *Amphipnoots*, i. 277.  
 Taylor, W., 'Historic Survey of German Poetry,' ii. 225.  
 Tea, ii. 633; substitutes for, ii. 457, 570.  
 Teak, experiments on forty-four samples of, ii. 689.  
 Teal, i. 399.  
 Teasel, ii. 404.  
 Tectibranchiate mollusks, description of, i. 140.  
 Tej pat of Indian bazaars, ii. 288.  
 Teleological arguments, not to be absolutely depended on, i. 106; to be received with caution, i. 171.  
 Telinga potato, ii. 131.  
 Tellens, mode of catching for food, i. 135.  
 Tenasserim Avifauna, i. 376.  
 Tenasserim caoutchouc creeper, ii. 319.  
 Tenasserim, proper orthography of, i. 508; ii. 139.  
 Tenasserim River, adventure with a snake on the, i. 310.  
 Tenasserim sole, i. 249.  
 Tennent, Sir E., description of musical fish, i. 494.  
 Ternary Compounds, i. 13.  
 Terns, i. 400, 401.  
 Ternstroemiaceæ, ii. 630-633.  
 Terra orellana, ii. 611.  
 Terrapins of America, i. 336.  
 Tetanus, a remedy for, ii. 263.  
 Tetrahedrite, i. 11.  
 Teutonic legends, ii. 684.  
 Thakamillora, ii. 601 *et seq.*  
 Thallogens, ii. 15 *et seq.*, 86.  
 Thamen, or *Panolia*, full description of, i. 156; formerly more abundant, i. 458.  
 Thatching grass, ii. 114.  
 Thatch rat, i. 119.  
 Thatung, derivation of, i. 8.  
 Theophrastus, i. 238.  
 Thelyphonida, i. 35.  
 Thingadaw pagoda, tame fish at, i. 252.  
 Thomson, Sir C. Wyville, i. 17; his 'Depths of the Sea,' quoted, i. 129.  
 Thomson, Dr., ii. 502.  
 Thorn-apple, ii. 326.  
 Thorny bamboos, ii. 98.  
 Thoron, M. de, his comparison of musical fish, i. 193.  
 Thracian rhubarb, ii. 292.  
 Thread-worm, i. 22.  
 Three Pagodas, discovery of an orchid at, ii. 181, 188.  
 Three-striped paradoxure, i. 468.  
 Thrushes, i. 363.  
 Thugs, narcotics used by, ii. 326.  
 Thunder-bolt of the Burmese, i. 501.  
 Thwaites, Mr., spiders from Ceylon, i. 34; quoted, mentioned, and referred to, i. 110 *et seq.*  
 Thyme, ii. 295.  
 Thymelacææ, products of, ii. 280.  
 Tie polonga, Ceylon name of Russell's viper, i. 312.  
 Tickell, on fish, quoted, i. 196 *et seq.*; figure of a rare turtle, i. 341; remarks on water-hens quoted, i. 396; states that an adjutant he shot disgorged the head of a child, i. 397; account of flying foxes quoted, i. 423.  
 Ticks, in sheep, and other animals, ii. 657.  
 Tiger beetles, 111; aptness of the name, *ibid.*  
 Tiger, the, measurements, etc.—usually kills its own prey (an exception to this rule quoted)—diffusion of—usual food of—attack by one on a pony—occasionally attacks elephants, i. 470; danger of robbing one—traps for catching—when most dangerous—the two races of, i. 471; unpleasant rencontre with one, mentioned as a warning, i. 473.  
 Tigers, method of catching with birdlime, ii. 224.  
 Tiliacææ, ii. 601-608.  
 Timber, girdling of, condemned, ii. 690.  
 Tin, Binoxide of, i. 12.  
 Tinstone, i. 12.  
 Titmice, i. 377.  
 Toad-flax, ii. 323.  
 Toads, i. 296; sad end of a tame toad, *ibid.*; Günther's remarks on, *ibid.*  
 Tobacco, ii. 326.  
 Toddy, palm, ii. 140.  
 Tollies, i. 351.  
 Tomato, ii. 325.  
 Tom cats, habit of, i. 473.  
 Toon of India, ii. 586, 702.  
 Tooth-ache, remedy for, ii. 616.  
 Torpedo fish, i. 187, 286.  
 Tortoise beetles, i. 108.  
 Tortoise-shell turtle, i. 341.  
 Toucans, i. 349.  
 Tounge-ong palm, its economic uses, ii. 111.  
 Tourmaline, i. 14.  
 Trachyte, i. 6.  
 Tragacanth, ii. 491; a gum resembling, ii. 211.  
 Trap, i. 5.  
 Traveller's tree, ii. 204.  
 Tree Fern, ii. 59.  
 Tree frogs, i. 294, 497.  
 Tree galangal, ii. 288.  
 Tree lizard, i. 331.  
 Tree of life, Semitic legend of the, ii. 689.  
 Tree pipit, i. 375.  
 Tree shrew, i. 441.  
 Tremmenheere, Capt., on the occurrence of tin, i. 12.  
 Tremmenheerite, i. 13.  
 Tremolite, i. 13.  
 Triassic Group of rocks, i. 2.  
 Trimeresurus, fascinated by a light, i. 311.  
 Tripe de Roche, ii. 35.  
 Tripoli, the, of Bilin, in Bœhemia, origin of, ii. 17.  
 Tritons, i. 112.  
 Trochla, on the Salween, ii. 536; where *Amherstia*, was first discovered, ii. 313.

- Troglons, i. 354.  
 Tropical Forests, ii. 6.  
 True Wagtails, i. 374.  
 Truffles, ii. 90; Juvenal and Martial on, ii. 91.  
 Trumpet-shaped shells, i. 176.  
 Tulips, i. 129.  
 Tulsi leaf, ii. 298.  
 Tunnies, i. 221.  
 Turkey opium, ii. 653.  
 Turmeric, ii. 205.  
 Turneraceæ, ii. 449.  
 Turnip fly, i. 43.  
 Turnips, ii. 649.  
 Turnsole, the dye, ii. 232.  
 Turnstones, i. 393.  
 Turtles at Chowmook, i. 342.  
 Turtle soup at the Bengal Club, Calcutta, ii. 344.  
 Turtles, mode of catching, i. 221; their world-wide celebrity as food, i. 336; Dr. Gray's remarks on, i. 311; difficulty of killing, i. 342; best method of killing, i. 343; advisability of cooks being able to distinguish between good and bad, i. 344.  
 'Turtle's tail,' i. 280.  
 'Turtle's stomach,' i. 240.  
 Tusser silk moth, i. 80.  
 Tusser silk, i. 79.  
 Tsittoung whale, measurements of, i. 445.  
 Tween, Mr., his analysis of the water of the Pai, i. 8.  
 Twilight owls, i. 407.  
 Two-headed snake, i. 297.  
 Tyndall, Prof., i. 490.  
 Tyrian purple, i. 144.  
 Tyther, mentioned, i. 315.
- U.
- Ulcers, dressings for, ii. 331, 646.  
 Ulmaceæ, ii. 279.  
 Umbellales, ii. 432.  
 Umbelliferæ, ii. 435; the valuable plants of the order, ii. 439.  
 Unarmed bamboos, ii. 98.  
 Unicorn of the English Bible, its synonym in the Latin Vulgate, i. 451.  
 Uno, distribution of, i. 129.  
 Upas tree, ii. 275.  
 Upper Mixed Forests, ii. 11.  
 Urside, i. 462.  
 Urticales, ii. 262.  
 Urticæ, a fibre-producing order of plants, ii. 263-266.  
 Utricularæ, ii. 321.
- V.
- Vaccine lymph, ii. 25.  
 Vacciniaceæ, ii. 371.  
 Vallisneria, remarkable fertilization of, ii. 210.
- Van Beneden, i. 21, *et seq.*  
 Vau Oort, the artist, and the offensive bat, i. 439.  
 Vanilla-pod growing, experiments in, ii. 186.  
 Vayâsa, author of the 'Mahabharata,' ii. 341.  
 Vedas, Cox's remarks on the, ii. 684.  
 Vedas, soma juice of the, ii. 340.  
 Vegetable brimstone, ii. 57.  
 Vegetable butters, ii. 363, 636.  
 Vegetable emetic, ii. 343.  
 Veitch, H., quoted, ii. 189.  
 Veitch, Messrs., the Orchid growers, referred to, ii. 166.  
 Velain, M., mentioned, i. 181.  
 Ventral, definition of meaning in Cephalopoda, i. 180.  
 Venus flower-basket, i. 17.  
 Venus fly-trap, ii. 483.  
 Venus navels, i. 168.  
 Verbena, anciently held in high esteem, ii. 305.  
 Verbenaceæ, ii. 298-306.  
 Vertebrata, i. 183 *et seq.*  
 Vervain, ii. 305.  
 Vespertilio, preyed on by Megaderma, i. 430.  
 Vetches, ii. 491.  
 Vicious fish, i. 232.  
 Victoria Institute, question for examination by the, i. 483.  
 Vine, quotations from the classics on the, ii. 566.  
 Vingar eels, i. 22.  
 Violaceæ, ii. 646-7.  
 Violet fluid, ejected from *Aplysia*, i. 140.  
 Violet snails, i. 179.  
 Violina, an emetic, ii. 647.  
 Viperine snakes, i. 312.  
 Vipers, i. 312.  
 Viper's bugloss, ii. 329.  
 Virgil, on *Asilus*, i. 49; on silk, i. 80; on bees, i. 120; quoted, 296; on homage paid to Ceres, ii. 117; quoted, ii. 152, 306, 438; on the cultivation of the vine, ii. 566; quoted, 587.  
 Vitex, entombed by a Peepul, ii. 149.  
 Viverridæ, i. 466.  
 Voight, quoted, ii. 204.  
 Volcanoes and Mud Volcanoes, ii. 6.  
 Von Hueglin, discovers the egg of *Dryomas*, i. 391.  
 Voracity of fish, i. 239.  
 Vultures, useful birds, i. 402; the controversy as to their powers of sight and scent, *ibid.*
- Walden, Viscount, mentioned and quoted, i. 345 *et seq.*  
 Walker, H., 'Catalogue of Assam Mammalia,' i. 421.  
 Walking corals, i. 490.  
 Walking fishes, i. 184, 228.  
 Walking leaf insects, i. 44.  
 Walking stick insects, i. 44.  
 Wallace, on the habits of the flying lemur, i. 344; views on the racial affinities of the Mincopies, i. 482.  
 Wallich, Dr., his catalogue of Burmese plants, ii. 2; on *Amberstia*, ii. 536.  
 Walnut, derivation of the name, and curious tales connected with, ii. 226.  
 Warblers, i. 371.  
 'Warburg's drops,' the active ingredient of, ii. 288.  
 Ward, Swinburne, on basking sharks, i. 496.  
 War-clubs, the wood they were made from, ii. 258.  
 Waring, E. J., 'Manual of Therapeutics,' quoted, ii. 206; purgative prescriptions, ii. 241, 256, 326 *et seq.*  
 Watchmakers' oil, ii. 648.  
 Water-beetles, i. 113.  
 Water-boatman, i. 40.  
 Water-breathing fishes, i. 185.  
 Water-centipede, i. 25.  
 Water-cockroach, i. 41.  
 Water-cress, ii. 484.  
 Water-elephant, i. 446.  
 Water-frogs, i. 289.  
 Water-hemlock, ii. 439.  
 'Water-hen,' a species of *Sypia*, i. 181; Col. Tickell's remarks on, i. 396.  
 Water, means of clarifying, ii. 342.  
 Water monkey, i. 181.  
 Water-nut, a valuable source of food, ii. 354.  
 Water, obtained from trees, ii. 579.  
 Water ouzels, i. 363.  
 Water parsnips, ii. 439.  
 Water skipper, i. 41.  
 Watering-pot shell, i. 138.  
 Wasps, i. 118.  
 Wax, ii. 258.  
 Weasel, the, of Leviticus, a mole, i. 465.  
 Weasels, i. 464.  
 Weddings, rice at, ii. 108.  
 Weeping crinum, ii. 208.  
 Weeping-willow, legends of the, ii. 257.  
 Weevils, i. 109.  
 West Indian arrowroot, ii. 206.  
 Westwood, O., quoted, mentioned and referred to, i. 50 *et seq.*; on *Buprestis*, i. 114; estimate of the numbers of bees, i. 121.
- W.
- Wad, i. 13.  
 Waders, i. 392.

- Whales, measurements of, i. 445.  
 Wheat, ii. 96.  
 Wheel animalcules, i. 23.  
 Whimbrel, i. 395.  
 Whistling teal, i. 399.  
 White ants, their remarkable architectural capabilities, i. 46.  
 White-bellied rat, Mason's remarks on the i. 417.  
 White-browed gibbon, i. 474.  
 White cockcomb ii. 292.  
 White, Dr., quoted, ii. 241.  
 White-eared paradoxure, i. 469.  
 White-eyed duck, i. 400.  
 White-handed gibbon, i. 474.  
 White gourd, a present for new-married couples ii. 449.  
 White pepper, ii. 231.  
 White pomfret, i. 220.  
 White-rumped munia, i. 384.  
 White 'Shah,' ii. 236, 700.  
 White teak, ii. 302.  
 Whiting, fish, i. 214, 223.  
 Whiting as a head-covering for elephants, i. 451.  
 Whortleberries, ii. 372.  
 Wight, Dr., 'Icones,' quoted or mentioned, 140 *et seq.*  
 Wild bees, method of taking their honey, i. 120.  
 Wild buffalo, its pedigree, i. 129; 461.  
 Wild cats, i. 472, 473.  
 Wild dog, i. 465; Hodgson's remarks on wild dogs kept in confinement, *ibid.*  
 Wild elephant, i. 447.  
 Wild goats, i. 459.  
 Wild hogs, killing a python, i. 454.  
 Wild mangosteen, ii. 583.  
 Wild nutmeg, seeds of the, used for planting after passing through a pigeon, i. 388.  
 Wild yam, ii. 145.  
 Will of the Wisp phenomenon, i. 488; description of, 489.  
 Willow, Christian legends relating to, ii. 256.  
 Wilmer, Capt., quoted, i. 124.  
 Wilson, Prof., H. H., on the native names for *Rottlera*, ii. 244.  
 Wind-ball, ii. 411.  
 Window oyster, i. 125.  
 Winter green, ii. 373.  
 Witches in Europe, i. 488.  
 Wizards in Burma, i. 488.  
 Woad, ii. 649.  
 Wolt's-bane, ii. 340.  
 Women, a weakness in, ii. 399.  
 Woodcock of the sea, i. 204.  
 Woodford, Dr., slain by a tiger, i. 471.  
 Wood ibises, i. 398.  
 Wood-Mason, G. J., his list of Burmese Crustacea, quoted or referred to, i. 25 *et seq.*  
 Wood louse, i. 24.  
 Wood oil, ii. 625, 627.  
 Wood oil tree, ii. 628.  
 Woodpecker, regarded as a bird of ill omen, i. 501.  
 Woodpeckers, i. 346; different species going about in troops, i. 347; a species of, breeding in ants' nests, i. 348.  
 Wood pigeons, i. 388.  
 Wood, various specimens of, noted, with their weight per cubic foot, together with Kurz, Brandis, and Gamble's remarks, ii. 217 *et seq.*; 693-704.  
 Woodward's 'Manual of the Mollusca,' mentioned, i. 123.  
 Woolly blights, i. 38.  
 Wormwood, curious etymology of, ii. 382.  
 Worms in the human body, horrible effects of, i. 21.  
 Worsley's Homer, i. 120.  
 Wrens, i. 362.

## X.

Xyridæe, ii. 123.

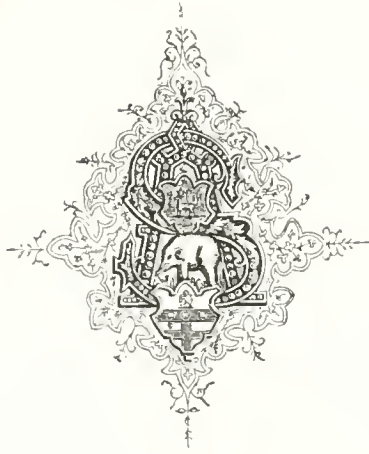
## Y.

Yams, ii. 145.  
 Yankee notion of a smart boat, i. 239.  
 Yeast plant, ii. 90.  
 Yellow dyes, ii. 351, 357.  
 Yellow oleander, ii. 344.  
 Yengyaing, the plain of, the home of the Thamen, i. 457.  
 Yucca, ii. 129.  
 Yule, Col., adventure with a Hamadryad, i. 310.  
 Yunzalen, discovery of a wild *Amherstia* in the valley of the, ii. 537.

## Z.

Zebra wood, ii. 547.  
 Zinziberaceæ, 205; economic products of, ii. 208.  
 Zollinger, H., a genus of plants named in honour of, ii. 564.  
 Zoology and Botany, their twin relationship, ii. 1.  
 Zuleika's tomb, ii. 214.  
 Zwägaben, wild goat shot at, measurements of, i. 459.  
 Zygophylleæ, ii. 600.

STEPHEN AUSTIN AND SONS,



PRINTERS, HERTFORD.

















































































New York Botanical Garden Library

QH183.M38 1883 v.2  
Mason, Francis/Burma, its people and pro gen



3 5185 00082 0264

