To

With the

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Straits Settlements & F. M. S.
THE FLORA OF THE MALAY PENINSULA
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INTRODUCTION

Area.—The Malay Peninsula as understood in this work comprises the whole area of mainland south of Lat. 7° N. to the island of Singapore, and the small islands within twelve miles of it in Lat. 1° N. Included in it are also the islands of Penang, Lankawi, Terutau and the Pulau Adang group on the west coast and the numerous small islands adjacent to the coasts both east and west. The whole area is approximately 52,820 square miles.

Climate.—Lying so near the equator, the climate is hot and very wet. The average maximum temperature throughout the peninsula is 90° Fahr., the average minimum (just before sunrise) is 70° Fahr. The variation in temperature in Singapore is between minimum 71° and maximum 87°. At each rise of 1000 feet elevation there is roughly a decrease of 3°, and at 7000 feet the maximum is about 70°, the minimum 50°. However, as much as 93° has been recorded at a height of 6335 feet.

Rainfall.—Taking the rainfall for nine years, the highest average at Thaiping was 163-53 inches per annum, the lowest average 70-22. In Singapore the rainfall varies from 82 inches to 123 inches in the year, and in the low country in the Federated Malay Straits it is about 90 inches. The North-East Monsoon commences about November, the South-East in the end of April or May. Rain falls on most days of the year, and in the south of the Malay Peninsula south of 6° N. there is no dry season, the only variation being that the heaviest rainfalls take place in December to the first fortnight of February, and in May there is often a short dry spell.

The air in the very dense and lofty forests which cover the centre of the Malay Peninsula is very humid at all times, the sun hardly penetrating the thick foliage.

North of Lat. 6° there is a considerable change of climate and a marked dry period occurs. I have seen the herbaceous plants in the rice-fields of Alor Sta quite dried up in February, but at present there have been no records kept of temperature or rainfall in this part of the peninsula.

Geology.—The Geology of the Malay Peninsula is as yet very incompletely known, but some valuable papers on it have been
published by Mr. Scrivenor, notably one in the *Quarterly Journal of the Geological Society*, vol. lxix, p. 343, June 1913, from which I condense the following brief account.

The oldest rocks *in situ* are the limestone rocks of the Raub series associated in Pahang with volcanoes. These, together with some calcareous shales, are apparently of Carboniferous age. The limestone rocks of the Malay Peninsula form detached masses on both sides of the main masses of granite from the north as far south as the Batu caves in Selangor on the west side and to Gunong Senyum in Pahang on the east side; north of the Batu caves we find these masses at Goping, Kwala Dipang, Ipoh, Lenggong in Perak and Gunong Geriang in Kedah, and in the northern part of our area a great part of the Lankawi islands and Terutau and many rock masses in Perlis near Kanga are of the same formation; on the east side we have also Gunong Senyum and Kota Glanggi in Pahang, and Biserat in Jalor. Beyond our area we find great masses of limestone running through Trang and southern Siam to Tenasserim, Mergui, and up to Burma, the Shan States, Tonkin, and Laos, and limestones of the same age are known to occur in Sumatra, Borneo, Timor, and Rotti islands.

From north of Alor Sta in Kedah commences the main granite range which occupies the centre of the peninsula with outlying branches to Penang, the Dindings, Gunong Keledang, and as far south as Jelebu. Another granite ridge, the Benom Range, runs parallel to this on the east side from south of Kelantan into Negri Sembilan, and between these runs a range of foothills of quartzite; smaller granite ranges lie south of the end of the main range. Quartzite hills occur from the Kinta Valley to the Klang river mouth, and from the middle of Tringganu, including Gunong Tahan, lies an outcrop of quartzite running to the south of Rumpin. The quartzite forms also the main rocks of Pulau Tiuman and Singapore. The hills of Bukit Timah and Bukit Mandai, however, are of granite.

These quartzite masses are called by Scrivenor the Gondwana rocks, while the granite is Mesozoic, dating sometime after the Trias and before the Eocene period. The weathering of the main Gondwana outcrop of quartzite and shales in Pahang accounts for the large area of sandy country on this coast.

Some Tertiary coal-deposits occur in Selangor, the flora of which, so far as I have seen it, much resembles that of the present-day Malay flora.

The great alluvial flat on the west coast of Selangor and Perak appears to be of very modern geological date. It extends westwards from the main chain for about thirty-six miles to the sea and consists mainly of stiff clays, generally yellow and ferruginous, containing masses of ironstone, formed by the iron-depositing bacterium, *Crenothrix*. The soil of the west coast-line, being thus argillaceous with but few sandy spots, accounts for the large area of mangrove
swamp and the absence of the sandhill flora so well represented on the east coast, where mangroves are nearly absent. The western alluvial flat is covered with a dense low-lying forest, while on the eastern coast the flat country forest is more open, and sandy plains covered with scattered bushes and patches of wood cover considerable areas. These sandy patches occur from Kelantan southwards to the east corner of Singapore, and bear a very different flora from that of the west coast.

Botanical Areas.—The whole area of the Malay Peninsula as included in this work falls botanically into two divisions, differing largely in climate, soil, and flora. The northern portion from the above-mentioned boundary line southwards to the mouth of the Kedah River, including the islands of Lankawi and Terutau, possesses a very distinct flora, having close relations with that of the Siamese territory south of Tenasserim and Mergui, upwards of forty genera being represented in this area which are unknown south of this line, while more than sixty genera well represented in the south part of the peninsula are missing. A few of these northern plants have crept down the coast as far as Province Wellesley and Pahang, probably (speaking geologically) in recent years, while some of the southern types have travelled as far north as Burma, where they are scantily represented. “One can gather from the flora that at no great distance of time the Malay Peninsula (the Golden Chersonese) was cut off from Burma south of Kedah by the sea” (Ridley, “Account of a Botanical Expedition to Lower Siam,” Journ. Roy. As. Soc. S. Br. 57, p. 59). This is confirmed by the geology of the country so far as is known, and by early tradition. The soil of this area is sandy, with scattered masses of limestone rocks, and there appears to be a regular dry season which is absent from the south of the peninsula. The Pulau Adang group of islands, lying west of Terutau, however, contains more features of the southern flora and but little of the northern. The northern portion of our area is much smaller than the southern, and has only been botanically explored on the west side.

South of this line the whole flora and climate is altered. The greater part of this area is or was one continuous dense forest of large trees, many of which are 150 feet tall, making a thick canopy of foliage through which the sun’s rays penetrate only here and there. On the highest boughs are many epiphytes, orchids, ferns, and other plants, while below is a dense mass of shrubs, seedling trees, palms, both erect and climbing, and a certain number of herbaceous plants. The proportion of trees and shrubs to herbaceous plants is very large, whereas in the northern part the plants are largely herbs and low shrubs, with very few trees over 80 feet high, while ferns, abundant in the south, are scarce. The climate is very wet, rain falling nearly every day, in fact this region is a typical example of the Tropical Rain Forest region, such as occurs also in Western
Africa and South America, but the Malayan forests are much denser than in either of these countries. This forest continues approximately uniform from the alluvial plains to about 3000 feet altitude, where the trees usually become smaller and do not attain the loftiness and bulk of those of the lower hills and plains, and many orders, such as Anonaceae, Dipterocarpaceae, Myristicaceae, and Aroideae, disappear.

The highest mountains that have been botanically explored, and which are believed to be the highest in the peninsula, are Gunong Tahan in Pahang, 7188 feet, and Gunong Kerbau in Perak, 7160 feet. The upper part of the former is a large sandstone plateau bearing a very distinctive flora, having the closest affinities with that of Mt. Kinabalu in Borneo. The flora of Gunong Kerbau is typically Malay peninsular. There is no trace in either of these mountains of the Himalayan palæarctic plants so characteristic of the lofty hills of Java and Sumatra, but this flora appears in the Telom valley in the Batang Padang district at 4000 feet altitude, where occur Viola, Sanicula, Ophiopogon, Disporum, and several other plants of this flora. Such evidence as there is goes to show in this a former connection with Sumatra rather than directly with the Himalayas.

Along the coast-line on the west are often extensive patches of mangrove swamp, the flora consisting of Rhizophoras two species, Bruguieras four, Carapa, and Avicennia, behind which is usually a patch of sand with Lumnitzera, Podocarpus, Cynometra, etc. On the east coast the country is more sandy and mangroves are scarce, only occurring in patches in the river-mouths. The characteristic trees here are Casuarina and Thespesia, bushes of Scavola, and the porcupine grass Spinifex, with Ipomoea biloba creeping over the sand.

Distribution, etc.—Some attempt has been made in this work to indicate the comparative abundance of the different species and their distribution, but it is impossible, without a much more complete census of the flora than is or will be practicable for many years, to get a real idea of the abundance or rarity of most species. Many trees especially, by no means rare, have been seldom collected on account of the rarity of their flowering or of some difficulty (such as their immense height) of procuring specimens. Where a plant is recorded from all or nearly all the States it may be considered common.

It must be remembered that the parts of the peninsula which have been explored by any botanist are but a very small proportion of the whole area, and though Singapore, Malacca, Penang, and a good part of Selangor and Perak have been fairly well examined, most of the rest of the peninsula has been either explored on short expeditions or not visited at all. Where a species is known definitely to occur outside the Malay Peninsula its distribution is given, where no such data are given it is to be understood that so far as is known
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The plant is endemic, i.e. confined to the Malay Peninsula. The number of these endemics is exceptionally large, being upwards of 3000 species, or about half the species recorded. But the adjacent lands, especially Sumatra, west and south Borneo and the southern Siamese regions, have as yet been very scantily explored, and further investigations will probably reduce the number of endemics considerably.

Owing to the very extensive clearing of the forests, especially in Singapore and Malacca and parts of Selangor and Johor, since the evolution of the cultivated rubber industry, a certain number of species have been either rendered very rare or probably entirely exterminated. Considerable areas which in 1890 were covered with a continuous almost impenetrable forest, probably now would not be found to bear a single indigenous plant.

All flowering plants known certainly to occur or to have occurred in the peninsula in a wild state are recorded and described, as well as all aliens which have established themselves sufficiently to propagate themselves naturally, but plants only known to occur in gardens are excluded, though the more conspicuous and well-known garden plants are mentioned where necessary.

Names of Places.—The names of localities given are in most cases readily found on the map of the Malay Peninsula as published by the Straits Branch of the Royal Asiatic Society, but I have failed to trace a few given by Kunstler and Scortechini. The latter collector seldom gave any specific locality on his collecting tickets, and his spelling and script where he did so make it difficult to identify his localities, e.g. one locality often given by him is quoted in books as Horum; I have reason to believe this means Arang Para near Gunong Bubu, in Perak. In a few cases I have given the English name instead of the Malay name where it is better known, e.g. Kedah Peak for Gunong Jerai, and Mt. Ophir for Gunong Ledang. The latter mountain is all through referred to Malacca territory, as it always was formerly included in Malacca; politically, however, it is now in the State of Johor.

The following Malay words for localities, etc., are constantly used:—

- Bukit - Hill
- Gunong - Mountain
- Sungei - River
- Kwala - Mouth of river
- Ulu - Source of river
- Tanjong - Cape
- Pulau - Island
- Ginting - Pass
- Tasek - Lake
- Teluk - Bend in a river
- Dusun - Orchard
Kampong, campong  .  .  .  .  .  .  .  Village
Padang  .  .  .  .  .  .  .  .  .  .  .  Field, flat place
Rimbah  .  .  .  .  .  .  .  .  .  .  .  Forest
Hutan  .  .  .  .  .  .  .  .  .  .  .  Woods
Belukar  .  .  .  .  .  .  .  .  .  .  .  Secondary jungle

Native Names and Uses.—Where they have been obtained, the Malay names of plants as used in the peninsula have been given, as these are often useful to local botanists, for many of them are thoroughly well known to all Malays and strictly used for definite plants. To every name as given here the affix Poko (tree or shrub) or Akar (climber) is to be added, according to the habit of the plants. Grasses and small herbaceous plants are usually known as Rumput.

Pakis signifies a fern, and is supposed to be a variant of Paku, also used for ferns, which literally means a nail, and refers to the circinate vernation of a fern, and as a cycad has a similar vernation it is also called Pakis. Lumut (moss) is sometimes applied to moss-like plants, as the aquatic Utricularias. Sakal signifies an epiphyte, but the Javanese word Angrek is now generally used for epiphytic orchids. Buah (fruit), Daun (leaf), Bunga (flower), Akar (root as well as climber), are commonly used when referring to these parts of a plant. The special uses of the plants described are added when of interest, but fuller accounts will be found in papers on the timbers, the fruits, poisons and materia medica of the Malays, published in the Straits Agricultural Bulletin and other local works.

Botanists and Plant Collectors in the Malay Peninsula.—I have given the names of the collectors of various species, partly on account of the interest that attaches to the older ones, and partly because the types of species are so frequently based on specimens collected in this country by certain collectors. Where no collector’s name is given, it is to be understood that the plant was collected by the author.

The earliest voyagers to mention the plants of Malacca are Linschoten ("Voyages to the East Indies," 1583) and Garcia da Orta ("Historia Aromatum," 1593), who mention in these works a number of useful plants chiefly fruits and spices that they met with in their travels.

The first regular collector of herbarium specimens was William Roxburgh, jun., son of the well-known W. Roxburgh; he collected plants in Penang in 1802.

Nathaniel Wallich, Superintendent of the Calcutta Botanic Gardens, visited Singapore and Penang in 1822, and made extensive collections there which were largely distributed and the study-set was incorporated in the Indian collections belonging to the Hon. East India Company. A lithographed catalogue (quoted Wall. Cat.) of these plants was published, and the study-set is now in the Kew Herbarium. He was assisted in this collection by several botanists, including W. Jack and G. Porter.
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William Jack, who collected in Singapore and Penang in 1819, described a number of species in the Malayan Miscellanies, published at Bencoolen, Sumatra, which rare work has been reprinted in the papers relating to Indo-China, vol. ii. p. 209, with notes by Hooker and Mr. D. F. Hervey, published by the Straits Branch of the Royal Asiatic Society.

George Porter, a schoolmaster in Penang, who was later in charge of the Botanic Gardens of Ayer Hitam in Penang, also sent plants to Wallich, which were incorporated in the Wallichian collections, and George Finlayson, a surgeon to the East India Company, during his travels on an Embassy to Siam, 1821–22, took the opportunity of collecting plants in the forests of Penang, the Dindings, and Singapore, which collections were also sent to Wallich.

Mention, however, must be made of an earlier botanist:—

Dr. William Hunter, who published an account of pepper cultivation in Penang in the Asiatic Researches in 1803. He published also an account of Gambir cultivation in Trans. Linn. Soc. in 1807. He wrote, too, a manuscript account of the plants of Prince of Wales Island (Penang) in 1802 or 1803. This paper, preserved in the British Museum, was published by the author of this work in the Journal of the Straits Branch of the Asiatic Society, No. 53, in 1909.

Mr. W. E. Phillips, who was Governor of Penang from 1820 to 1826, was interested in botany, and sent a number of plants to Sir William Hooker. These are now in the Kew Herbarium.

Lady Dalhousie, during her residence in Penang between 1829 and 1832, sent a small collection* also to Sir W. J. Hooker, which included the rare Pieris Dalhousiae and Lycopodium Dalhousiae.

Col. George Warren Walker collected plants in Singapore and Penang about 1837. His collections are at Kew and in the Natural History Museum.

Hugh Cuming (1791–1865) visited Singapore somewhere between 1835 and 1839, and was apparently the first botanist to ascend Mt. Ophir. He made very extensive collections, but at that time chiefly in the Philippines, and apparently only made flying visits to the Malay Peninsula. His collections are at Kew and the British Museum.

William Griffith, born 1810, was assistant surgeon to the East India Company in 1832, and collected plants extensively in Assam, Burma, Bhutan, and Afghanistan. He came to Malacca in 1841 and collected largely there, ascending Mt. Ophir, but returned to Calcutta after a year to take temporary charge of the Botanic Gardens there during Wallich’s absence. He returned to Malacca in December, 1844, but, attacked by hepatitis, died in February, 1845. Considering the short time—little over two years—that he spent in Malacca, the extent of his collections and
writings on the flora is surprising. His collections are mainly at Kew.

THOMAS LOBB was a plant collector for Veitch about 1847. He visited the Himalayas, Borneo, and Java, and came to Singapore and Penang in 1848. He collected a good number of herbarium specimens besides living plants, and these were distributed later labelled Singapore, Lobb, and Java, Lobb, regardless of their original localities. Some labelled Singapore were undoubtedly obtained in the Himalayas, but most are Penang plants.

SIR WILLIAM NORRIS, Recorder of Penang, was a friend and fellow-traveller of Griffith. He collected plants in Penang and Malacca and sent a collection to Gardner of Ceylon, who named the genus Norrisia after him, and he also sent specimens to Sir William Hooker in 1849.

DR. THOMAS OXLEY resided in Singapore in 1843 and left in 1857, dying in England in 1866. He wrote papers on Botany published in Logan’s Journal, and his name is associated with several plants—Durio oxleyanus, etc.

SURGEON-GENERAL ALEXANDER CARROLL MAINGAY. Born 1836. Arrived in Malacca in 1862, and was magistrate in charge of the jail till 1869, when he left for Rangoon, where he was also in charge of the jail, when he was killed in a mutiny the same year. He was in Singapore and also in Penang some part of his time, and made most important collections in all these places. His Herbarium with four volumes of botanical notes and drawings is preserved at Kew. It comprises the largest series of plants collected in the Malay Peninsula (only approached by Griffith’s collections) up to that date. Many plants he obtained in Malacca have not been re-discovered and are perhaps extinct, owing to the extension of cultivation. His name is commemorated by the genus Maingaya, and also associated with many other species.

HERMANN KUNSTLER, a German, was employed by Dr. King in collecting plants, first in Singapore and then in Perak, from 1881 to 1886. His collections, with excellent descriptive tickets, were invaluable, and were distributed to several herbaria. He collected chiefly in the Taiping Hills, near Goping, on Gunong Bubu and other localities in south Perak. He left the Malay Peninsula about 1886 and died in Australia.

FATHER BERTHOLD SCORTECHINI was a Roman Catholic missionary priest who came from Australia (where he had formerly collected plants) to Perak before 1884. He resided at the Perak Residency and collected extensively. His collections went to Calcutta and, like Kunstler’s, were distributed thence. The distribution-tickets seldom bear any notes or localities, and I have had some difficulty in identifying his localities when he does give them. He obtained many plants which have never been re-collected. He died in 1886.
INTRODUCTION.

Leonard Wray, I.S.O., was appointed Superintendent of the Government Hill Garden in 1881, and Curator of the State Museum, Thaiping, 1883. He collected plants in the Thaiping Hills and made expeditions to the Batang Padang district, to Gunong Tahan with H. C. Robinson, and to other localities. His collections were distributed from Calcutta. He retired in 1908.

Henry James Murton arrived in Singapore in 1875 and remained in charge of the Gardens till 1880. He collected a number of plants, visiting Kedah, Gunong Pulai in Johor, and Gunong Bubu in Perak. A few specimens remain in the Kew Herbarium, but the greater number and his manuscript flora of Singapore have disappeared. He died in Bangkok in 1881.

Nathaniel Cantley succeeded Henry J. Murton in charge of the Gardens in 1880 and started the Herbarium there. He employed native collectors in Singapore, Malacca, and Negri Sembilan, and also collected in Singapore and other parts. His herbarium is still at Singapore Botanic Gardens. Many of the specimens were unfortunately unlocalised, but the collection was a very valuable one. He died in Tasmania in 1888. The genus Cantleya is named after him.

Richmond William Hullett, born 1843, headmaster of the Raffles School, was a good amateur collector at about this period, 1880. He collected in Singapore, Mt. Ophir, and Johor, and also in Java and Borneo, and made important additions to our knowledge of the flora. The genus Hullettia was named after him. He ceased collecting plants about 1888 and made over his herbarium to the Botanic Gardens, Singapore. He died in England in 1914.

After the death of Cantley, the author took charge of the Botanic Gardens in Singapore in 1888 and commenced collecting plants on as large a scale as possible. Having charge of the Colonial forests from 1888 to 1902, I had large opportunities of collecting in Singapore, Malacca, the Dindings, and Penang during the forest work, and also made expeditions to Johor, Negri Sembilan, Selangor, Perak, Province Wellesley, Kedah, and as far north as Setul, on the west coast, and to Pahang and Kelantan on the east coast. I retired in 1912, but later spent several winters in the Malay Peninsula continuing my researches. During my residence in Singapore I was materially assisted by a number of persons interested in botany, as well as officials on the staff of the Gardens and Forest Departments.

Charles Curtis was in charge of the Penang Botanic Gardens from 1884 to 1903 when he retired. He collected the flora of Penang and published a list of the plants of Penang in the Journal of the Straits Branch of the Asiatic Society, vol. xxv, p. 67. He also made large collections in the Lankawi islands and Terutau and the Trang district, and also collected on the Hermitage Hill and Sungkai River in Perak. Many species of plants are named after him, as well as the genus Curtisina.
Walter Fox, assistant in the Singapore Gardens, collected a small number of plants in Muar, and Robert Derry, while in charge of the Gardens and Forest Department in Malacca, obtained a large collection of Malacca plants. Two Eurasian assistants in the Forest Department, S. Goodenough and Holmberg, added many specimens obtained during their forest work in Singapore and Malacca.

Lieut. H. J. Kelsall (now Lieut.-Col., D.S.O.) made an important collection in an expedition from the east to the west coast of Johor in company with Harry Lake in 1897, and also collected on Bukit Hitam in Selangor.


E. Rostado sent the only plants known from Tringganu.

Sir Walter Napier, Attorney-General, obtained specimens from Negri Sembilan, including Webera Napieri.

Warren D. Barnes made a collection on Kluang Terbang in Pahang in 1900. He died in Hongkong in 1911.

Dr. John D. Gimlette sent a number of plants from Kota Bharu and Kwala Lebir in Kelantan, and published a useful book on Malay poisons and charm-cures, 1915, besides other works on local diseases and materia medica.

Alfred M. Burn-Murdoch, born 1868, was Conservator of Forests in the Malay Peninsula from 1904 till his death in Selangor in March, 1914. He collected a certain number of plants and published two numbers of "Trees and Timbers of the Malay Peninsula," 1911–1912. His name is associated with Alpinia Murdocchi.

Mohammed Haniff, overseer in the Penang Gardens from 1892 and in complete charge of them from 1912. He collected plants in Penang and also in Lankawi, Kedah, and on Gunong Kerbau in Perak, and has made many valuable additions to our knowledge of the flora.

Herbert C. Robinson, director of the Federated Malay States Museums from 1903, and Mr. Charles Boden Kloss did invaluable work in their explorations of the mountains of the peninsula. Mr. Robinson was the first man to ascend Gunong Tahan in Pahang, the highest mountain in the peninsula, bringing down with him the first collection of plants made above the altitude of 6000 feet. He and Mr. Kloss also collected plants on the mountains of Perak, Selangor, and Kedah, and in Lankawi islands and other places. Without these two collectors we should have known but little of the highland flora of the peninsula. I had the pleasure of accompanying them on several of their explorations, notably to Telom and Temengoh, Gunong Tahan, and Pulau Adang. Accounts of their botanical collections are published in the Journals of the
Linnean Society and of the Federated States Museums. The genus *Klossia* and very many species are associated by name with these energetic collectors. Other plants have been contributed by Mr. J. H. Burkill, Director of the Botanic Gardens, from Pulau Tiuman and elsewhere, and Mr. J. C. Evans, of the Forest Department of the Federated Malay States, sent plants from Pahang, and Mr. F. W. Foxworthy, of the Forest Department, sent a large series from the Malay States.

*Literature, etc.*—To save space, references are only given to certain works, viz. the references to the original description of the species, references to King's "Materials for a Flora of the Malay Peninsula," and the "Annals of the Botanic Gardens, Calcutta," and to Hooker's "Flora of British India," which work contained all the species known in the Malay Peninsula at the date it was written. References are also given to good figures of the plants described.

The works mentioned give a full series of references from other works, as well as the synonyms which, unless necessary, are also excluded. King's "Materials" were published in the *Journal of the Asiatic Society of Bengal*, in different volumes, between the years 1889 and 1908, when he died, and Mr. J. S. Gamble continued the work, he previously having assisted Dr. King in some of the orders of *Ganopetalae*.

The *Leguminosae, Convolvulaceae, Labiatae*, and a few other orders were described by Sir David Prain, *Sonerila* by Dr. Stapf, *Acanthaceae* and *Gentianaceae* by Mr. C. B. Clarke, and the *Gesneraceae* by the author of this work, all of these were published in the *Journal of the Asiatic Society of Bengal*. The *Apetalae* and Gymnosperms, exclusive of the *Euphorbiaceae* and the *Urticaceae*, were described by Mr. Gamble in the *Journal of the Asiatic Society of Bengal*. The *Monocotyledons* were described by the author in three volumes independently under the title of "Materials for a Flora of the Malay Peninsula. *Monocotyledons* by H. N. Ridley, Singapore, 1907 to 1908."

The separate copies of King's and Gamble's "Materials" were paginated twice: on the top of the page is the pagination of the original article in the Journal, at the bottom of the page is the pagination of the "Materials" as a separate work. As the separate issue is rare and out of print, I have quoted the original pagination of the Journal. This is quoted as *King, Journ. As. Soc. Beng.*, the volume being given at the commencement of an Order or series of Orders.

Hooker's "Flora of British India" is quoted as *Hook. fil. F.B.I.*

The letters *l.c.* after a reference signify the last quotation of the work (*locus citatus*) referred to, thus: *Clarke, F.B.I. l.c. 27* signifies C. B. Clarke in Hooker's "Flora of British India," volume (last quoted), page 27.
Roxb. Fl. Ind.  .  .  .  .  .  .  Roxburgh’s “Flora Indica.”
Ic. Pl.  .  .  .  .  .  .  .  .  Hooker’s “Icones Plantarum.”
Wight Ic.  .  .  .  .  .  .  .  .  Wight’s “Icones Plantarum.”

I have received advice and assistance in many points from Mr. J. S. Gamble and from the various members of the Kew Herbarium Staff.

H. N. Ridley.

May, 1922.
# PLAN OF THE WORK

*Provisional—May, 1922.*

**ANGIOSPERMÆ**

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SYNOPSIS OF ORDERS
(As in May, 1922.)

Division: Angiospermae.

Flowering plants with the ovules enclosed in an ovary with a stigma.

Group: Dicotyledones.

Plants with reticulate-nerved leaves. Petals, sepals, stamens and carpels in twos, fives, or multiples of these (except Anonaceae VI, perianth segments usually in threes.) Seeds with 2 cotyledons.

Section (A.) Polypetalae.

Perianth of 2 whorls, sepals and petals (petals occasionally absent by abortion). Petals free not connate in a tube.

Sub-section (i). Thalamiflorae

Calyx free from the ovary. Petals in one or more series, inferior. Stamens usually indefinite on a torus (receptacle). Ovary free, superior. (Orders I—XXVI.)


II. Dilleniaceae. Trees or climbers, one herb. Sepals persistent. Stamens numerous. Flowers showy, white or yellow. Follicles apocarpous.

III. Magnoliaceae. Trees or shrubs. Stipules large covering buds. Flowers large, white or yellow. Stamens numerous; anthers narrow. Carpels numerous, separate spirally on an elongate axis.


SYNOPSIS OF ORDERS.

VI. Anonaceæ. Trees or lianes. Sepals and petals in threes; petals in 2 rows. Stamens indefinite, very short. Pistils several. Carpels usually stalked, drupes on a torus (in one genus follicular). Seed ruminate.


XIV. Caryophyllaceæ. Herbs. Leaves opposite. Sepals free or connate. Petals as many or absent. Stamens as many or twice as many. Placenta central. Fruit capsule.

XV. Portulacaceæ. Succulent herbs. Sepals 2 to 5. Petals 4 or 5. Stamens 8 or many. Ovary half inferior; style 3- to 8-fid; capsule many-seeded.


XVII. Flacourtiaceæ. Trees, shrubs or climbers. Flowers small usually unisexual. Petals often suppressed. Stamens 5 to many. Ovary 1-celled; styles 1 to 6. Fruit baccate or capsular.


XXIII. **Malvaceae.** Herbs, shrubs or trees. Leaves alternate often lobed. Petals 5, large. Stamens numerous joined in a tube; anthers 1-celled. Fruit capsular.

XXIV. **Sterculiaceae.** Herbs, shrubs, trees. Flowers often unisexual and petals suppressed. Stamens connate; anthers bilocular. Fruit a capsule.

XXV. **Tiliaceae.** Trees, shrubs, herbs. Leaves entire. Sepals 3 to 5. Petals as many. Stamens numerous free on a torus, 2-celled. Ovary 2- to 10-celled. Fruit, drupe, berry or capsule.

XXVI. **Gonystylaceae.** Tree. Leaves coriaceous alternate. Sepals valvate 5, connate hairy. Petals numerous linear simple, bifid or trifid shorter than the calyx. Stamens many from calyx base. Ovary 5- or 4-celled; ovule 1 in a cell. Stigma clubbed. Fruit woody dehiscing. Seeds 1 or 2, large.

Sub-section (ii). **Disciflorae.**

_Calyx free from ovary. Petals in one row. Stamens definite in or round a fleshy disc often lobed or of glands._ (Orders XXVII—XLV.)

XXVII. **Linaceae.** Climbing shrubs, trees, or herbs. Leaves alternate. Sepals 5. Petals 5. Stamens 5, 10, or 20, connate at base with 5 glands outside. Ovary 3- to 5-celled; ovules 1 to 2 in a cell; styles 3 to 5 more or less connate. Fruit capsular or drupe.

XXVIII. **Malpighiaceae.** Climbers, small trees, or shrubs. Leaves opposite. Sepals 5. Petals 5, clawed often toothed. Disc inconspicuous. Stamens 10, connate at base. Carpels 3 (2 or 4); ovules 1 in each; styles 3. Fruit of 3-winged carpels or drupe.

XXIX. **Oxalidaceae.** Trees, shrubs, or herbs. Leaves pinnate rarely simple. Flowers regular. Sepals imbricate, 5. Petals 5. Stamens 10. Ovary 5-lobed; ovules 1, 2, or many in a cell; styles 5, distinct. Fruit capsule or berry.


XXXI. **Rutaceae.** Trees or shrubs. Leaves opposite, often compound, glandular. Sepals 4 or 5. Petals 4 or 5 imbricate. Stamens as many or twice as many. Disc between stamens and ovary. Carpels 4 to 5 free or connate. Styles free or connate. Fruit, berry or of 2 or more dehiscing cocci.

XXXII. **Simarubaceae.** Trees or shrubs, bark bitter. Leaves pinnate or simple. Flowers regular. Calyx 3- to 5-lobed. Petals 5 to 5. Disc annular or cup-shaped. Stamens as many or twice as many as petals. Ovary 2- to 5-lobed or carpels free 3 to 5; ovules usually solitary; styles 2 to 3. Fruit, drupe, capsule, or samara.
XXXIII. OCHNACEÆ. Shrublets, shrubs, or trees. Leaves alternate, simple, coriaceous often serrulate. Flowers usually showy. Sepals 4 or 5, imbricate. Petals 5 (or 4 or 10). Torus large. Stamens 4 to many. Ovary 2- to 10-lobed, 1- to 10-celled; style 1. Fruit 3 to 10 drupes on enlarged torus, or berry.

XXXIV. BURSERACEÆ. Trees or shrubs. Resinous. Leaves pinnate. Flowers small racemed or panicled. Calyx 3- to 5-lobed. Petals 3 to 5. Disc annular or cup-shaped. Stamens usually twice the petals on edge or base of disc. Ovary 2- to 5-locular; ovules 2 in a cell; style short. Fruit drupe or capsular.

XXXV. MELIACEÆ. Trees. Leaves pinnate. Calyx 4- to 5-lobed. Petals 4 or 5 (3 to 7). Stamens 8 to 10 in a tube on base of disc. Anthers sessile in tube mouth. Disc ringed or tubular. Ovary 3- to 5-celled; ovules usually 2 in cell; style 1. Stigma simple. Fruit capsular. Seeds few, large, round, usually arillate or (Cedrela) winged.


XXXVII. OLACINEÆ. Trees or shrubs, rarely climbing. Leaves simple, alternate, rarely opposite. Cymes or racemes axillary. Flowers small, green or white. Calyx 4- to 5-toothed. Petals 4 to 5 (rarely 6) free or connate. Stamens equal or twice as many opposite petals. Ovary 3- to 5-celled; ovules 2 to 3. Fruit a drupe, 1-celled. Seed 1.

XXXVIII. ILICINEÆ. Trees or shrubs. Leaves alternate, simple. Inflorescence axillary cymose. Flowers very small, white or pink. Calyx 4- to 5-lobed. Petals 4 (to 6) connate at base. Stamens as many attached to corolla. Anthers oblong. Disc 0. Ovary ovoid 4- to 6-celled; ovules 1 or 2 in cell; style short or 0. Berry small of 4 to 8 pyrenes.

XXXIX. CELASTRINEÆ. Trees or shrubs. Leaves simple opposite or alternate. Inflorescence cymose. Flowers small, green or white. Calyx 4- to 5-lobed imbricate. Petals 4 to 5 imbricate. Stamens 3 to 5 (rarely 2 to 10) on disc. Disc large, flat. Ovary sessile on disc, 3- to 5-celled; ovules usually 2 in a cell; style simple. Stigma entire or lobed. Fruit various.

XL. RHAMNACEÆ. Shrubs erect or climbing, often spiny. Leaves simple alternate or opposite. Flowers small in axillary cymes, green or yellow. Calyx-tube obconic with 4 to 5 small lobes. Petals 4 to 5. Stamens 4 to 5, opposite petals. Disc thick or lining calyx. Ovary 3- (or 2- to 4-)-celled, free or immersed in disc; ovule 1 in cell; style simple. Stigma simple or 3-lobed. Fruit drupe, capsule, or samara.

XLI. AMPELIDEÆ. Shrubs or climbers. Leaves alternate, pinnate, or simple. Cymes paniced or raceme, opposite leaves. Flowers small, green or red. Calyx 4- to 5-toothed. Petals 4 to 5 free or cohering. Stamens 4 to 5 opposite petals. Disc between stamens and ovary. Ovary 5- to 6-celled immersed in disc; ovules 1 to 2 in cell; style short or 0. Stigma round. Fruit a berry.
XLII. Sapindaceæ. Trees or shrubs, rarely climbing. Leaves alternate compound. Flowers small white, green, pink. Sepals 4 to 5 free or connate imbricate. Petals 0 to 5, often unequal. Disc often unilateral. Stamens usually 8 within disc. Ovary entire or lobed 3- (or 1- to 4-) celled; style 1 (rarely 2 to 3), terminal or from between lobes; ovules 1 to 2 in cell. Fruit, drupe or capsule.

XLIII. Staphyleaceæ. Trees (or shrubs). Leaves opposite, compound. Flowers small, white, panicled. Sepals and petals 5 each. Stamens 5. Disc flat or ring-like. Ovary 2- to 3- lobed; styles 3, free or connate. Fruit, a berry, 3-celled. Seeds few or many albuminous.

XLIV. Sabiaceæ. Shrub or trees, rarely climbing. Leaves alternate simple or pinnate. Flowers small or minute. Calyx 4- to 5- lobed. Petals 4 or 5 imbricate. Disc annular. Stamens 4 or 5 opposite petals, often only 2 fertile; filaments clubbed. Anther connective wide; cells dehisce transversely. Ovary 2- to 3-celled or lobed; ovules 1 to 2 in a cell; styles free or connate. Carpels in fruit 1 or 2 drupaceous.

XLV. Anacardiaceæ. Trees with caustic resin. Leaves alternate, rarely opposite, simple or compound. Flowers small, green, white or pink, often unisexual. Calyx 3- to 7- lobed. Petals 3 to 7 (or 10). Disc annular. Stamens twice the number of petals from base of disc, often some sterile. Ovary 1-celled (rarely 2- to 3-celled); styles 1 to 3. Fruit, drupe or indehiscent nut, sometimes winged with calyx-lobes.

Sub-section (iii). Calycifloræ.

(a) Calyx-tube enclosing or adnate to ovary. Petals, one row insert on calyx-tube. (Orders XLVI—LII.)


XLVII. Leguminosæ. Trees, shrubs, climbers, herbs. Leaves alternate compound stipulate. Flowers large or small, irregular (Mimoseæ regular). Sepals 4 to 5, free or connate. Petals 5 (or fewer). Stamens as many or numerous free or connate. Ovary 1-celled carpel; style 1. Fruit a pod (rarely drupaceous), 2-valved. Seeds 1 to many, hard.

XLVIII. Rosaceæ. Trees or shrubs (or herbs). Leaves simple or compound alternate. Stipules 2. Calyx tubular, 5-lobed lined by disc. Petals on edge of disc 5. Stamens many. Ovary of one or more carpels connate and adnate to calyx-tube; ovules 2 in capel; styles 1 or more. Fruit a drupe, apple, or many drupelets on a torus.

XLIX. Saxifragaceæ. Shrub, trees, or herbs. Calyx 5- to 12-lobed, free or adnate to ovary. Petals 4 to 5. Stamens as many or twice. Disc between stamens and ovary. Ovary of 2 to 5 carpels more or less separate; styles as many, more or less connate. Fruit, capsule or berry. Seeds usually minute.
L. Droseraceae. Insectivorous herbs. Leaves rosulate or scattered, covered with sticky hairs. Flowers small racemed. Calyx tubular 4- to 8-lobed. Petals 4 to 8, spatulate. Stamens as many. Ovary globose or ovoid, 1-celled; styles 3 to 5. Capsule many-seeded.

LI. Crassulaceae. Herbs fleshy. Leaves opposite or alternate. Flowers cymose. Calyx 3- to 5-lobed or tubular. Petals as many. Stamens perigynous as many or double. Carpels as many as petals, free, 1-celled. Ovules very many; follicles membranous.

LII. Haminelidaceae. Trees or shrubs. Leaves alternate. Flowers capitate. Sepals and petals various or 0. Ovary inferior or half inferior of 2 carpels connate at base, tips free; ovules 1 or many.

(b) Ovary quite inferior included and adnate to calyx-tube. Style one, rarely more. Leaves simple. (Orders LIII—LX.)

LIII. Haloragaceae. (Occurrence doubtful.) Herbs or shrublets. Flowers minute, often unisexual and incomplete. Carpels 1-seeded.


LVIII. Myrtaceae. Trees or shrubs. Leaves opposite. Stamens indefinite. Ovary 1- to 2-celled; ovules 2 to many. Fruit, drupe or capsule.

LIX. Melastomaceae. Herbs, shrubs, trees. Leaves opposite, usually 3-nerved. Sepals imbricate. Stamens definite; anthers opening by terminal pores. Berry, capsule or drupe.


(c) Ovary inferior, unilocular, placentas parietal. Styles more or less divided (except Samydaceae). Leaves often lobed. Flowers unisexual.

LXII. Samydaceae. Shrubs or trees. Flowers small. Leaves alternate. Stamens 4 to 15 with alternating staminodes or glands. Petals 0 to 15.

LXIV. **Passifloraceæ.** Climbers, bisexual (one a tree). Leaves alternate, often lobed. Petals usually large, a corona in the mouth of the tube. Stamens 3 to 5. Ovary free on a stalk; style trifid. Fruit berry or capsule, many-seeded. (*modecca unisexual.*)

LXV. **Cucurbitaceæ.** Herbs, climbing. Leaves alternate, lobed. Flowers unisexual, yellow or white. Stamens 3; anthers connate. Style divided (or simple). Ovary quite inferior.

LXVI. **Begoniaceæ.** Herbs unisexual. Leaves alternate. Flowers white or pink. Sepals 2. Petals 2, all petaloid. Stamens numerous, connate. Ovary 3- to 5-celled; styles 3 to 5. Fruit angled or winged, usually capsular.

LXVII. **Datiscaeæ.** Trees (or herbs). Leaves alternate. Flowers unisexual, small. Petals 5 or 0 (in *Sesuvium* sepals coloured). Stamens 5. Ovary inferior. Fruit capsule.

LXVIII. **Cactaceæ.** Fleshy shrubs, spiny, no leaves. Petals and stamens indefinite. Fruit berry. (Introduced only.)

LXIX. **Ficoidææ.** Herbs, some fleshy, not spiny. Leaves simple. Petals 5 or 0 (in *Sesuvium* sepals coloured). Stamens 5. Ovary inferior. Fruit capsule.

(d) Ovary inferior, 2-celled, 2-ovuled. Styles free. Flowers in umbels.

LXX. **Umbelliferæ.** Herbs. Leaves often dissect. Fruit in 2 dry indehiscent carpels.

LXXI. **Araliaceæ.** Shrubs or trees. Leaves usually alternate, palmate. Fruit fleshy with 2 seeds.

LXXII. **Cornaceæ.** Trees or shrubs. Leaves opposite, entire. Flowers in panicles. Fruit a drupe, 1- to 2-seeded.

**Section (B.) Gamopetalæ.**

Petals connate in a tube.

Ovary inferior, 2- or more-celled.

LXXIII. **Caprifoliaceæ.** Shrub, usually exstipulate. Flowers in corymb. Leaves opposite.

LXXIV. **Rubiaceæ.** Herbs, shrubs, trees. Stipules conspicuous. Flowers often axillary in cymes. Leaves opposite, entire.

LXXV. **Compositæ.** Herbs, shrubs, trees. Flowers small in involucrate heads. Ovary 1-celled, 1-ovuled. Calyx-limb reduced to a pappus or 0. Leaves alternate, often dissect.

LXXVI. **Stylideæ.** Herbs. Flowers irregular. Stamens 2 connate with the style. Leaves radical or scattered on stem, alternate.

LXXVII. **Goodenovîæ.** Herbs and shrubs. Leaves alternate. Flowers irregular. Stamens 5, free.

LXXVIII. **Lobeliaceæ.** Herbs. Flowers irregular. Stamens connate round the style. Fruit berry.


*Ovary superior. Corolla regular.*


LXXXVII. *Sapotaceae*. Big trees, laticiferous. Corolla-tube short. Stamens as many as lobes or double, attached to corolla. Fruit a berry or drupe.


LXXXIX. *Styraceae*. Trees and shrubs. Corolla-tube usually short. Stamens twice as many, or more. Ovary 1, few-seeded. Drupe.

XC. *Oleaceae*. Shrubs, erect or climbing, or trees. Stamens 2. Fruit, drupe.

XCI. *Apocynaceae*. Trees or climbers, rarely herbs, laticiferous. Corolla-tube usually long, lobes contort. Stamens and lobes 5. Fruit, drupe or capsule with seeds plumed.


XCIII. *Loganiaceae*. Herbs, climbers, or trees. Stamens and corolla-lobes 4 to 5. Ovary bilocular. Resemble *Rubiaceae*, except that the ovary is superior or half superior.


XCVI. *Boraginaceae*. Shrubs, trees, or herbs. Flowers panicled or in scorpioid cymes. Stamens as many as petals. Styles 2 or 1, two cleft. Ovary 2-celled. Fruit of 2 pyrenes, 1- to 2-seeded or 4-seeded.

XCVIII. Cardiopteridæ. Herbaceous climber or tree. Flowers small. Sepals and petals imbricate. Fruit a winged samara.

XCIX. Solanaceæ. Herbs or shrubs. Corolla plicate. Carpels many-seeded. Fruit berry or capsule. Seed small.

Corolla irregular. Upper stamens smaller or reduced to a staminode.


CII. Lentibulariæ. Aquatic or marsh herbs with minute bladders on branches at base. Ovary 1-celled; placenta basal, central.

CIII. Gesneraceæ. Herbs, terrestrial or epiphyte. Leaves alternate or rosulate. Flowers showy. Capsule usually slender. Seed small, numerous, sometimes plumed. Fruit a dry berry in Cyrtandra.


CVII. Verbenaceæ. Shrubs, trees, or herbs. Ovary entire. Fruit of 2 to 4 pyrenes in pulp.

CVIII. Labiatae. Herbs often aromatic; stems 4-angled. Ovary 4-lobed. Fruit of 4 nutlets.

Section (C.) Apetalæ.

Perianth simple of one whorl of leaves or absent.

Flowers bisexual.


CXI. Polygonaceæ. Herbs. Leaves sheathing at base. Perianth pink or white. Ovary 1-celled, 1-seeded; style 2- to 3-fid.


CXIII. Cyrtacraceæ. Leafless parasites. Ovary inferior or half inferior.
SYNOPSIS OF ORDERS.

Flowers unisexual.


CXVIII. Monimiaceae. Trees or shrubs. Flowers unisexual. Perianth cup-shaped, 2- or more-lobed. Stamens embedded in a disc lining it, very many. Ovaries many, 1-seeded. Fruit, berry or drupe.

CXIX. Lauraceae. Trees (one leafless parasitic climber), unisexual. Perianth 4- to 6-lobed in 2 series. Stamens as many or more; anthers opening by valves. Drupe.

CXX. Hernandiaceae. Trees or climbers. Leaves alternate. Flowers small, unisexual or bisexual. Perianth superior 4- to 8-lobed. Stamens 3 to 5, opening by valves or introrse. Ovary 1-celled, 1-ovuled. Fruit winged or calyx an enlarged cup.

Flowers bisexual to CXXVII.

CXXI. Proteaceae. Trees or shrubs. Leaves opposite. Perianth tubular; lobes 4 to 5. Stamens as many. Style very long. Drupe.

CXXII. Thymeleaceae. Trees and shrubs. Leaves opposite. Perianth tubular; lobes 4 or 5. Drupe.


CXXIV. Loranthaceae. Shubby parasites. Perianth often coloured, tubular splitting on one side, 5-lobed. Ovary inferior, Drupe.

CXXV. Santalaceae. Shrubs or trees. Flowers very small. Ovary inferior. Drupe or capsule.

CXXVI. Opiliaceae. Shrubs. Flowers very small, bisexual. Stamens as many as the petals and opposite them. Petals gamosepalous or free. Ovary 1-celled, 1-seeded. Fruit drupe.

CXXVII. Balanophoraceae. Fleshy parasites, leafless, red or yellow. Flowers unisexual.

CXXVIII. Euphorbiaceae. Herbs, shrubs, or trees. Flowers unisexual. Perianth single, double or 0. Stamens numerous, connate. Ovary 3-celled. Styles 3. Fruit splitting into bivalved cocci, 3-seeded or fleshy with 3 seeds. Often laticiferous.
SYNOPSIS OF ORDERS.

CXXIX. URTICACEÆ. Herbs, shrubs, or trees. Trees laticiferous. Flowers very small in unisexual heads or spikes or cymes, or mixed in a cupped receptacle (Figs). Perianth 2- to 4-lobed. Ovary 1-celled, 1-ovuled. Styles 2.


CXXXIII. Cupuliferæ. Trees. Inflorescence spicate. Perianth minute or 0. Stamens many. Ovary inferior, 3- to 5-celled, 2 ovules in cell. Nut in or on an involucre, ringed or spiny (Oaks and chestnuts).


Group: MONOCOTYLEDONES.

Embryo with a single cotyledon. Perianth trimerous. Leaves parallel-veined; vascular bundles irregularly scattered in the stem.

Ovary inferior. Perianth petaloid.

CXXXV. HYDROCHARIDÆ. Aquatic herbs. Flowers regular, usually unisexual. Stamens 3 to 12.

CXXXVI. ORCHIDÆ. Herbs often epiphytic. Flowers irregular. Stamens and pistil united in a column; anther 1. Capsule, seeds very many, minute.


CXL. LOWIACEÆ. Herbs. Flowers irregular, lip large. Stamens 5.


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SYNOPSIS OF ORDERS.


CXLV. DIOSCORACEÆ. Usually tuberous, unisexual climbers. Sepals and petals small, green. Stamens 6 or 3. Fruit trigonal or 3-winged (one genus erect, flowers larger, bisexual).

Ovary superior. Flowers petaloid.


CXLVII. LIILACEÆ. Herbs or shrubs. Sepals 3. Petals 3, similar. Ovary 3-celled. Fruit, capsule drupe or berry.

CXLVIII. PONTEDERIACEÆ. Aquatic herbs. Flowers regular. Sepals and petals 6 similar, blue or pink. Stamens 6. Fruit capsular.


CL. XYRIDEÆ. Herbs. Leaves radical grassy. Flowers in a head of brown bracts. Sepals glumaceous, 3, 2 or 0. Petals 3, yellow, connate below in a tube.

CLI. COMMELINACEÆ. Herbs. Sepals herbaceous 3. Petals very thin 3. Stamens 6 (or less). Capsule containing 1 to few seeds.

Carpels free.


Ovary superior. Perianth small, rigid or fleshy, not petaloid.

CLV. FLAGELLARIACEÆ. Herbs or woody climbers. Leaves entire. Stamens 6.

CLVI. PALMACEÆ. Trees or shrubs. Leaves rigid, pinnate or fan-shaped, lobed. Sepals and petals coriaceous or fleshy, 6. Stamens 6 or more. Ovary 1- to many-celled, usually 3-celled. Fruit a drupe or berry.

Ovary superior. Sepals and petals none or reduced to scales.

CLVII. PANDANACEÆ. Shrubs. Leaves stiff, thorny, linear. Flowers unisexual in spadices (elongate or compact spikes), no perianth. Carpels solitary or connate, numerous in heads, woody.

CLVIII. AROIDEÆ. Herbs or shrubby erect or climbing. Leaves not stiff or armed. Spadices solitary in a convolute spathe. Flowers unisexual on the same spike or bisexual. Perianth 0, or 3 to 9 scales.
CLIX. Lemnaceae. Minute lenticular or sub-globose floating herbs, no stem. Flowers minute in a spathe. Stamens 1 to 2. Flowers sessile in heads or spikelets. Bracts glumaceous. Perianth lobes glumaceous or o, very small.

CLX. Eriocaulaceae. Herbs. Flowers unisexual, crowded in globose white involucrate heads. Perianth segments 4 or 6 in 2 whorls, minute. Ovary 3- or 2-celled.


CLXII. Cyperaceae. Herbs. Culms triangular or terete, pithy. Flowers unisexual or bisexual in spikelets, numerous. Glumes (bracts) imbricate. Perianth usually o (occasionally 3 to 6 scales or bristles).

CLXIII. Gramineae. Grasses, herbaceous except the bamboos, culms terete, hollow (except Saccharum, etc.). Flowers in spikelets usually bisexual. Glumes usually several in a spikelet. Perianth o. Stamens 3 to 6, elongate. Ovary 1-celled, 1-seeded.

**Division: Gymnospermeae.**


CLXV. Coniferae. Trees or shrubs. Leaves usually linear entire. Female flowers in a catkin or cone or solitary. Fruit a cone, seed winged or when flowers solitary, drupe.

CLXVI. Cycadaeae. Stem a thick trunk. Leaves pinnate, at top only. Inflorescence a large cone. Male scales covered with 1-celled anthers. Female scales usually woolly, toothed with ovules in the notches. Drupe large.
Order I. RANUNCULACEÆ.

Perennial herbs or climbing shrubs. Leaves (alternate) or opposite, simple or compound. Flowers regular, bisexual. Sepals 4, 5 or more, often petaloid. Petals 5 or more or absent. Stamens indefinite, free. Carpels numerous, distinct, each with a solitary pendulous or erect ovule. Seed with a minute embryo in abundant endosperm. Only section in our area Clematideæ, climbing shrubs with opposite leaves. Abundant in temperate and cold regions, rare in the tropics and usually at high altitudes. Genera 30. Species 300.

1. CLEMATIS, L.

Woody climbers. Leaves opposite, simple (or compound) climbing by the petiole. Sepals 4 to 8, valvate, petaloid. Petals 0. Stamens numerous. Carpels many with long feathery tails. Species about 100, chiefly in temperate climates.


A slender climber with simple ovate leaves, rarely pinnate, blunt, base broad, sub-cordate, 5- to 9-nerved, coriaceous, entire or serrate, 3 to 10 in. long, 1-5 to 5 in. wide; petioles as long. Panicles axillary, few-flowered, 6 to 12 in. long. Flowers 1 to 1-5 in. wide. Sepals 4 or 5, oblong, pale brownish yellow, tomentose outside, deep purple within. Filaments linear, yellow. Achenes flat, pubescent with feathery tails, 2 in. long. Hab. Low country in open places, rare. Johor, Kota Tinggi; Pulau Tinggi. Penang; Road to Sungei Penang at 1000 ft. altitude (Curtis). Distrib. India, Siam, Malay islands.

2. NARAVELIA, DC.

Woody climbers, slender. Leaves opposite, tri-foliate, terminal leaflet forming a tendril. Sepals 4 or 5. Petals 6 to 12, narrow,
linear, longer. Achenes long, stipitate, with long bearded tail. Indo-Malaya, species 3.

Flowers in panicles; leaves 4 to 6 in. long . . . . (1) N. laurifolia
Flowers solitary or in threes, axillary; leaves 2 in. long  (2) N. axillaris

(1) N. laurifolia Wall. Cat. 4685; Hook. fil. F.B.I. i. 7; King, Journ. As. Soc. Beng. l.c. 360.
Long climber young parts only pubescent. Leaflets broadly ovate, acuminate entire, 4 to 6 in. long, 2 to 3 wide, deep green. Panicles lax many-flowered, 6 in. long, 8 in. across. Sepals lanceolate, ·1 in. long, blunt glabrous. Petals linear narrow, ·5 in. long,


A pretty climber, flowers scented like orange blossom.

Slender pubescent climber. Leaflets ovate, 2 in. long, 1½ in. wide or solitary toothed, or trilobed larger; nerves pubescent. Flowers solitary axillary or in threes. Sepals ·1 in. long, green.

**Order II. Dilleniaceae.**

Trees, shrubs or climbers, rarely herbs. Leaves alternate simple, toothed or entire exstipulate. Flowers in panicles or racemes, yellow or white, often large and showy. Sepals 5, imbricate persistent. Petals 5, rarely 3 or 4, deciduous. Stamens many, hypogynous, multiseriate, anthers introrse. Pistils hairy. Fruit of coriaceous dehiscent or indehiscent follicles. Seeds 1 to many, usually arillate, albuminous. Tropics of both hemispheres. (*King, Journ. As. Soc. Beng.* lviii. (2), 4.)

**Tribe 1. Delima.** Woody climbers; filaments diluted upwards.

- Carpels 1
- Carpels 2 to 5

**Tribe 2. Dilleniac.** Herb, shrubs or trees; filaments not diluted.

- Herb, stemless; leaves radical
- Trees or shrubs; follicles dehiscing expanding; seeds conspicuously arillate
- Trees; follicles not expanding nor dehiscing enclosed in the thickened pulpy sepals; seeds not arillate

**1. Delima, L.**


(1) *D. sarmentosa* L. DC. *Prodr.* i. 69; *Bot. Mag.* t. 3058; *Hook. fil. F.B.I.* i. 31; *King, l.c.* 362.

Leaves obovate, ovate or lanceolate-entire or serrate, pilose scabrid; nerves 11 to 9 pairs, 2½ to 3½ in. long, 1 to 2 in. wide; petioles 4 to 5 in. Flowers very numerous, fragrant, ½ to ¾ in. across, in large spreading panicles. Sepals rounded, hairy on edge. Petals ovate-orbicular, white. Stamens and pistil white, the latter becoming red. Follicle ½ in. long, ovoid, beaked, hairy. *Hab.* River banks and forest edges. Common over the whole peninsula (except Singapore) from Johor, Sungei Tebrau, north to Siam. *Distrib.* India, Malaya, China. *Native names:* Ampelas putih; Ampelas hari betina; Ampelas Tikus. *Use:* Leaves used for smoothing wood.

Only the form *hebecarpa,* with hairy fruit occurs here. *D. laevis,* Maingay, *King, l.c.* is *Tetracera borneensis,* Miq.
2. TETRACERA, L.

Climbing shrubs with scabrid leaves. Flowers in terminal or lateral panicles, moderately large, white. Sepals 4 to 6. Petals as many. Stamens many, filaments dilate upwards, anther-cells distant. Carpels 3 to 5 rarely 1, developed only. Ovules many, in 2 series. Follicles coriaceous ovate or fusiform, seeds 1 to 5, aril fimbriate. Species about 30, all tropical regions.

**Follicles ovoid 3 to 5 developed; medium sized.**
Leaves lower ones at least 3 to 6 in. wide.
Leaves glabrous; panicles short pubescent . . . . (1) *T. macrophylla*
Leaves pubescent beneath; panicles long velvety . (2) *T. grandis*
Leaves small up to 2 in. wide.
Leaves obovate pubescent beneath; panicle short . (3) *T. lucida*
Leaves elliptic-lanceolate glabrous; follicles 5 in. long, shining.
Leaves toothed; panicles terminal 5- to 6-flowered . (4) *T. assa*
Leaves entire; panicles dense 1 to 2 in. axillary . (5) *T. sylvestris*

**Follicles small 2; panicles lax, many-flowered, flowers smaller.**
Leaves very stiff shining entire; panicle terminal 6 to 9 in. long.
Nerves beneath rather prominent, transverse nerves inconspicuous; panicles very lax 9 in. long (6) *T. sumatrana*
Nerves beneath strongly elevate, nerves invisible; panicle lax 6 in. long . . . . . (7) *T. fagifolia*
Leaves thin toothed; panicles axillary and terminal 4 in. long or less . . . . . (8) *T. fragrans*
Leaves stiff coriaceous entire, transverse nerves conspicuous.

**Follicles 1 or 2 long fusiform and beaked . . . . . (9) *T. borneensis***

(1) *T. macrophylla* Wall. Cat. 6628 (T. macrocarpa Wall. in sched.); Hook. fil. F.B.I. i. 32; King, l.c. 363.

A rough climber. Leaves broadly elliptic, lower ones very large, 5 to 7 in. long, tip rounded almost truncate, base cuneate 3·5 in. wide; nerves 13 pairs, strong, glabrous, stiffly coriaceous; petioles 1·6 in. long, stout. Panicle 9 in. long, rather dense, pubescent. Flowers numerous, nearly 1 in. across. Sepals obovate obtuse, ribbed, short pubescent, edges ciliate, inside silky. Follicles 2 to 3 ovoid beaked smooth, glabrous, hardly longer than the sepals. *Hab.* Edges of forests and dry woods, very common but rarely flowering. Singapore to Penang. *Distrib.* Sumatra. *Native names:* Ampelas (Mempelas) Rimbah; A. Lidah Kuching; A. Gajah; A. Rimau.


A large tree. Young branches and inflorescence velvety tomentose. Leaves large, coriaceous, elliptic to slightly obovate, tip truncate, edges crenate or undulate towards tip, base rounded glabrous above, tomentose beneath; nerves 14 pairs; 8 to 10 in.
long, 5·5 in. wide; petioles 5 in. long. Panicle lateral or terminal, over 1 ft. long, velvety, flowers peduncled. Sepals 5, ovate, sub-acute, ribbed and tomentose, 5 in. long. Petals as long, narrower. Follicles ovoid, glabrous, with a slender curved beak. Hab. Perak, no locality (Scortechini), very rare, only once collected.

If, as Scortechini says, this is a tree, it is the only one in the genus. The specimens somewhat resemble T. macrophylla Wall., but the whole inflorescence is velvety.

(3) **T. lucida** Wall. Cat. 6631. T. euryandra Hook. fil. F.B.I. i. 32 (not Vahl) King, l.c. 362.

Woody climber, young parts pubescent. Leaves stiff, obovate to oblong obtuse, entire, lower ones large, 6 in. long, 2·5 in. wide, upper ones crowded, 1 in. long and as wide, apex truncate or rounded, base broad; nerves 5 pairs; above glabrous, beneath strigose on midrib and nerves; petioles 1 in. long, pubescent. Panicles terminal and axillary compact, few branched 1 to 3 in. long, pubescent. Sepals elliptic to oblong, 2 in. long, hairy on both surfaces. Petals oblong, little longer, obtuse, white. Follicles 1 or 2, ovoid, 2 in. long. Hab. Borders of woods. Singapore and Malacca. Common but seldom flowering.

var. *lanuginosa* Ridl. 20 to 30 ft. long, epiphytic, leaves narrowed at the base, obovate, margins sinuate; panicles and sepals thickly red woolly. Hab. Perak, Larut below 200 ft. altitude (Kunstler).

Apparently confined to the Malay Peninsula, *T. euryandra* Vahl., is a very different species from New Caledonia.


A rather slender woody climber never tall, often forming bushes in open country. Leaves ovate-lanceolate obscurely sinuate or toothed, glabrous except the nerves beneath, 2 to 5 in. long, 1 to 1·5 in. wide. Panicles axillary and terminal, 1 to 2 in. long, few-flowered. Sepals glabrous within, obovate, usually tipped red. Petals obovate, pure white or flushed pink, 3 in. long. Stamens numerous long, tipped rose pink. Carpels usually 2, ovoid beaked glabrous, 5 in. long. Hab. Common over the whole peninsula in open ground, orchards and in hedgerows. Distrib. Java, Siam, Cochin-China. Native names: Ampelas; P'las payah; Mempelas Minyak. Use: The stems are twisted into ropes.

*T. trigyna* Roxb., collected in Penang, was erroneously referred by Hooker to *T. laitis* Vahl., of India and Ceylon. Types in Herb. Kew show that it was *T. assa*.


A tall woody forest climber 60 ft. long. Leaves oblong cuspidate not scabrid, entire narrowed to the blunt base, 3 to 6 in. long, 1·5 to 3 in. wide; petioles 2 in. long. Panicles axillary and terminal,


A tall woody climber. Leaves coriaceous, smooth lanceolate, base cuneate, scabrid above; quite glabrous, 3 to 5 in. long, 2 in. wide; nerves 8 pairs; petioles 5 in. long, slender. Panicle lax, 6 to 8 in. long, tomentose, branches few distant. Sepals silky, hairy on the edge and in the middle on the inner side. Petals as long, orbicular. \textit{Hab.} Rare in forests, Singapore, in the Garden Jungle and at Selitar. Penang on Government Hill (Curtis). \textit{Distrib.} Sumatra.


A low sarmentose shrub. Leaves elliptic or oblanceolate, edges at the tip sinuate or dentate, 3 to 6 in. long, 2 to 2.75 in. wide; nerves 9 to 11 pairs. Panicle lax, 6 to 10 in. long, hairy. Flowers half an inch across, numerous, fragrant. Sepals ovate, glabrous except the ciliate margin. Petals oblong, white. Carpels 2, glabrous. \textit{Hab.} North region, Perlis and Setul on open heaths. \textit{Distrib.} Siam.


Climber. Leaves oblong-lanceolate to narrowly elliptic acute, entire base cuneate or rounded, coriaceous, glabrous above, pubescent beneath, midrib strigose; nerves 8 to 9 pairs, prominent; 5 to 7.5 in. long, 2 to 2.5 in. wide; petioles 8 in. long, winged. Panicles longer than the leaves, dense, not spreading, many-flowered, 6 in. long, tomentose. Sepals rounded, silky within, edge ciliate. Petals short. Follicles 1 or 2, elongate, conic, acuminate with a long point 5 in. long, 12 in. through at the base, glabrous. \textit{Hab.} Very rare, only collected by Maingay in Malacca, April 10, No. 1570. \textit{Distrib.} Borneo.

A true \textit{Tetracera} with only one or two follicles, which are peculiar in their unusual length and form.
3. ACROTREMA, Jack.

Herbs with woody rhizomes and large, rosulate, membranous leaves with sheathing stipules. Scape short axillary. Sepals 5, hairy. Petals 5, fugacious, yellow. Stamens numerous in three bundles alternating with the carpels; filaments filiform; anthers with porous dehiscence. Pistils 3. Styles subulate recurved. Ovules 2 or more. Follicles 3, irregularly dehiscing. Seed with membranous aril, testa crustaceous, pitted. S. India, Ceylon and Malay Peninsula, 10 species, 8 of which are Cinghalese.

(i) A. costatum Jack, Mal. Misc. i. No. 5, p. 36; King, l.c. 363.
Stem usually short to 6 in. long. Leaves obovate dentate ciliate, base narrowed sagittate, hairy, deep green often with a grey central line, or marked with red, 4-5 to 12 in. long, 2-3 to 4 in. wide, spreading flat. Scape 2-5 to 3-5 in. long, erect 8- to 10-flowered, setose reddish. Flowers opening singly, an inch across, bright yellow. Sepals ovate-lanceolate acute, hairy, setose. Hab. In dense wet forest on rotten leaves or on rocks. Common from Johor to Kedah, Lankawi islands and Kelantan. Absent from Singapore and Malacca.

4. WORMIA, Rottb.

Trees or shrubs. Leaves broad, coriaceous, ovate or obovate; nerves many, parallel; petioles winged or not. Flowers large, yellow, rarely white, in terminal racemes or few-branched panicles. Sepals 5, persistent closing over the fruit after fertilization, and expanding again with the dehiscence. Petals 5, obovate, thin. Stamens indefinite in several series, outer row usually longer than the inner; anthers linear, opening by 2 pores. Carpels 5 to 10. Ovules numerous. Follicles cartilaginous, dehiscent along the inner face and widely expanded, pink or more rarely white. Seeds black with a red aril. Species about 20, tropical Asia to Australia, one in Madagascar.

A. Alatae. Petioles strongly winged enclosing bud.

- Flowers large, yellow, young parts nearly glabrous . (1) W. subsessilis
- Flowers large, yellow, young parts white floccose . (2) W. suffruticosa
- Flowers small, white . . . . (3) W. albiflos

B. Exalatae. Petioles terete, not winged; plant quite glabrous.

- Flowers 3 to 4 in. across . . . . . . . (4) W. oblonga
- Flowers 2 in. across . . . . . . . . . . (5) W. pulchella
- Midrib beneath and petiole hairy . . . . (6) W. parviflora
- Leaves hairy beneath . . . . . . . . . (7) W. tomentella

A very large shrub 20 ft. tall, rooting by its branches and forming large thickets. Shoots and leaves (except for a few hairs on the midrib) glabrous. Leaves ovate or oblong-ovate, obtuse mucronulate, distinctly serrate, base broad, 8 to 12 in. long, 6 to 7 in. wide; petioles 1½ in. long, strongly winged. Raceme of 5 or 6 flowers. Bracts lanceolate, pink, ½ in. long. Flowers 5 in. across. Sepals 5, ovate-obtuse, ciliate, outer pair red. Petals 5, obovate, yellow. Stamens white, outer row shorter, yellow. Carpels 7. Follicles when expanded conspicuous, rose pink, sutures white, 1 in. long. Seeds ½ in. long, black, aril scarlet. 

_Hab._ Common in swampy open country in the south, in Singapore and Johor and Pahang. _Distrib._ Banca and Borneo. _Native names:_ Simpoh Gajah; Simpoh Ayer.

(2) **W. suffruticosa** Griff. _Notulae_ iv. 706; _Ic._ iv. t. 6496; _Ridl._ l.c. 5; _King, Journ. As. Soc. Beng._ l.c. 364 (in part).

_A shrub, straggling up to 10 ft., not rooting by the branches,

A large pubescent shrub. Leaves elliptic, obovate-narrowed to the rounded base, tip acute, edges serrate; nerves 24 pairs; 7 to 10 in. long, 3 to 4 in. wide, pubescent above, densely tomentose beneath; petioles 1 to 1.5 in. long, sheathing softly pubescent. Panicles from upper axils; peduncles 3 in. long with 2 branches, pubescent. Sepals 5, obovate rounded, pubescent, 3.5 in. long. Petals obovate, glabrous, white, 5 in. long. Stamens numerous, subequal, glabrous. Carpels silky. Hab. Rare in wet woods at Tebing Tinggi, Johor (Ridley).

(4) *W. oblonga* Wall. Cat. 951; Hook. fil. F.B.I. i. 35. 
A tree about 40 ft. tall, glabrous except the sparsely tomentose young branches. Leaves obovate or elliptic acute at both ends, deep green, entire to serrate; nerves 9 to 12 pairs; 6 to 8 in. long, 3 to 5 in. wide; petioles 1.5 in. long, channelled. Racemes terminal or axillary, few-flowered, tomentose. Flowers 3 to 4 in. across. Sepals oval, tomentose. Petals obovate, clawed, light yellow. Carpels 8 to 10. Hab. Open lowland country and edges of woods. A very handsome floriferous tree. Pahang, Malacca (very common), Selangor, Perak, Prov. Wellesley and Kedah. Distrib. Sumatra. Native names: Simpoh Ayer; Kambai hutan; Simpoh Padi.

(5) *W. pulchella* Jack, Mal. Misc. ii. 70; Hook. fil. F.B.I. i. 36; King, l.c. 865. 
A much-branched spreading tree about 40 ft. tall. Leaves obovate to obovate-oblong obtuse entire coriaceous, dark green shining, retuse, glabrous; nerves 5 to 7 pairs; 2.5 to 4 in. long, 1.5 to 2.5 in. wide; petioles channelled, 2.5 in. long. Pedicles slender, 2 in. long. Flowers 2 in. across, solitary axillary, pale yellow. Sepals broadly ovate, glabrous. Petals ovate. Stamens short, oblong, blunt, 4 in. long, rose pink. Seeds with red aril. Hab. Damp places in open country, Singapore, Malacca, Pahang, Perak. Distrib. Sumatra and Borneo.

A small tree. Branches pubescent. Leaves broadly lanceolate or obovate-lanceolate, membranous, base narrowed, tip acute, edge nearly entire; nerves 18 pairs, reticulations conspicuous, glabrous above except midrib, beneath hairy; petioles slender, 5 to 1 in. long, pubescent. Flowers few, small on short peduncles, 5 in.


A tree 40 ft. tall, stem 2 to 3 feet through, with a large crown; branches pubescent. Leaves elliptic, obtuse at both ends, entire; nerves 13 pairs; glabrous above, hairy beneath; 6 to 10 in. long, 5 in. wide; petioles 1 to 2 in. long, pubescent, channelled. Racemes axillary, 6 in. long, pubescent. Sepals oblong obtuse, dull red, glabrous, 1 in. long. Petals broad spatulate, rounded, 1-5 in. long, 7 to 75 in. wide, light yellow. Stamens yellow, inner series longer, reddish, with 2 pores. Carpels 7, glabrous, red. Follicles widely expanding, white. Hab. Borders of jungle, Singapore, Bukit Timah; Garden Jungle. Johor, Tebrau Road. Distrib. Borneo.

5. DILLENIAS, L.

Trees or large shrubs, resembling *Wormia*, but the flowers are more often solitary, and the carpels more numerous. The sepals after fertilization close over the carpels, and do not spread again, becoming often pulpy. The follicles do not expand and are indeliscent, cohering, the seeds exarillate. Species about 10, tropical Asia, Australia.

Flowering with the leaves, flowers large.
Flowers 6 to 9 in. across, white; fruit very large . (1) D. indica
Flowers 2 to 5 in. wide, yellow, flowering before leaves.
Leaves 4 in. long, oblong, blunt, velvety beneath . (2) D. ovata
Leaves 8 in. long, elliptic rounded, sparsely pubescent
Leaves 18 in. long, lanceolate denticulate, many
nerved . (3) D. aurea
Leaves 10 to 18 in. long, obovate-elliptic, many
nerved . (4) D. grandifolia
Flowers small, 1 in. across, appearing with leaves.
Leaves hairy; petals yellow; small tree . (5) D. reticulata
Leaves glabrous; petals o; big tree . (6) D. meliosmæfolia
Flowers 2 to 3 in. long. Sepals orbicular, concave, green, fleshy. Petals white, obovate-oblong,

(2) **D. ovata** Wall. Cat. 945; Hook. fil. F.B.I. i. 36; King, *l.c.* 366.

A rather straggling laxly branched tree, about 15 ft. tall; branchlets tomentose. Leaves coriaceous ovate or obovate rounded, tip rounded or emarginate, minutely toothed or entire; nerves 16 to 20 pairs, pubescent above, otherwise glabrous, beneath tomentose, 3-7 to 7 in. long, 2-75 to 3-5 in. wide; petioles 1 in. long, tomentose. Flowers solitary, 6 to 8 in. across, very showy, on tomentose peduncles 2-5 in. long. Sepals ovate, tomentose outside. Petals obovate, brilliant yellow, caducous. *Hab.* Rare on sandy or rather dry spots. Pahang, Tahan river. Selangor, Kwala Kubu. Perak, Temengoh. Penang (Wallich).


A low wide-branched tree, young parts silky. Leaves obovate blunt or acute crenate dentate, glabrous above except the nerves, 20 pairs, pubescent puberulous beneath, 5 to 8 in. long, 3 to 4-5 wide; petioles 1-25 to 2 in. long, sheathing at base. Flowers solitary on shortened branches, 4 to 5 in. across, bright yellow on 1 in. peduncle. Sepals oblong-obtuse, pubescent when young, later glaucous. Petals obovate. Stigmas ro. *Hab.* North of the peninsula on open rocky spots. Setul and Pulau Adang (Ridley). *Distrib.* Siam, India.

(4) **D. grandifolia** Wall. Cat. 946; Hook. fil. F.B.I. i. 38; King, *l.c.* 368.

A low straggling tree (or fide Keith, 45 ft. tall), shoots densely silky. Leaves oblong-lanceolate-acute, serrate glabrous above except the pubescent midrib, densely softly tomentose beneath, nerves 50 pairs; 14 in. long, 6 in. wide; petioles 3 in. long, pubescent. Flowers produced before the leaves, showy, axillary solitary. Sepals oval rounded, hairy. Petals oblong, spatulate, 2-5 in. long, 1 in. wide at tip, bright yellow. Carpels 12, greenish yellow. *Hab.* Rare, north of the peninsula on dry hillsides. Kedah, near Alor Sta. "*Mons convalt. dula*" Penang (Wallich); Malacca (Griffith). *Distrib.* Siam.

Griffith's specimens are leaves only, and therefore doubtful. Wallich's locality may mean Former Convalescent Hill.

(5) **D. reticulata** King, *l.c.* 367.

A medium-sized or large tree. Leaves very coriaceous, obovate-
elliptic, base truncate cordate, above glabrous except nerves, beneath pubescent midribs and nerves very prominent, reticulations conspicuous; nerves 32 to 36 pairs; 10 to 18 in. long, 7 to 12 in. wide; petioles 2 to 3 in. long. Panicles axillary and terminal, 10- to 12-flowered, pubescent outside. Petals oblong, 1.5 in. long. Carpels 9, puberulous. Hab. Rare. Province Wellesley. Perak (Scortechini). Distrib. Tongka.

A tall slender tree. Leaves soft bright green, glabrous above, pubescent beneath, obovate-lanceolate to elliptic-acute, entire or minutely serrate base acute; nerves 14 to 18 pairs, 5 to 8 in. long, 3 to 4 in. wide; petioles 1 in. long. Flowers axillary, solitary, 3 in. across, on peduncles 2 in. long, tomentose. Sepals 5, ovate silky. Petals 5, oblong obtuse narrowed at base 1.5 in. long, 5 in. wide, lemon yellow. Stamens outer 2 or 3 rows shorter, yellow, inner longer, white. Carpels 10, white. Fruit, sepals swollen pulpy acid yellow, not spreading. Carpels soft sweet, with 6 seeds, exarillate. Hab. Thick forests, not rare. Malacca to Pahang and Perak. Native names: Simpoh Bukit; Simpoh hutan; Simpoh jantan. Uses: The acid sepals and sweet carpels eaten by Sakai.

(7) D. Scortechinii Ridl. l.c. 7. Wormia Scortechinii King, l.c. 366. W. Kunstleri King, l.c. 366.
A tall tree 60 ft. high with red bark, emitting stilt-roots at the base. Leaves coriaceous obovate-oblong, undulate crenate, base narrowed, shining glabrous above except nerves, 26 to 30 pairs, pubescent minutely pubescent beneath; 4 to 6.5 in. long, 2 to 3 in. wide; petioles 5 to 2 in. long. Panicles pubescent 4 in. long, of which the peduncle is 2.5 in.; pedicels 2 in. long. Flowers 1 in. across apetalous. Sepals 5, green ovate coriaceous silky puberulous. Stamens short and broad subequal. Carpels 3 to 5, usually 4. Fruit as in meliosmæfolia but green, glabrous and less pulpy, 1 in. long. Hab. Dense forest, Singapore, Garden Jungle. Perak (Scortechini); Goping (Kunstler).

This plant has apparently no petals.

Order III. Magnoliaceæ.

Trees or shrubs. Leaves alternate. Stipules large, deciduous, protecting the buds. Flowers large solitary white or yellow (rarely purple). Sepals and petals in whorls of 3 or more. Stamens indefinite, free; anthers introrse, long, narrow. Carpels indefinite, spirally arranged on an elongated axis, free. Ovules solitary. Fruits follicular woody rarely connate in a fleshy mass, axis much elongated. Seed, 1 in a carpel, often pendulous on a long funicle,
endosperm oily, embryo minute. Chiefly in temperate regions, and in the mountains in the tropics.

Carpels persistent on the axis, dehiscing dorsally, woody.

Carpels contiguous with stamens. Flowers terminal.

Fruit cylindric, ovules 2
Fruit ovoid, ovules 6 or more

Carpels separate from stamens by an internode. Flowers axillary.

Carpels separating from the axis, dehiscing ventrally.

Flowers terminal
Fruit pulpy, indehiscent carpels not separate.

1. MAGNOLIA, L.


(1) M. Maingayi King, l.c. 369; Ann. Bot. Gard. Calc. iii. (2), 208, pl. 45B.

A shrub about 6 ft. tall, occasionally a tree up to 20 ft. Young branches and inflorescence hairy. Leaves membranous oblanceolate-oblong to obovate, acuminate, base narrowed, rounded above light green glabrous, beneath glaucous; midrib villous; nerves 16 to 20 pairs, 6 to 8 in. long, 2-5 to 3 in. wide; petioles 3 in. long. Flowers solitary terminal shortly peduncled. Bud ovoid, stipules villous. Sepals 3, oblong blunt, 1-5 in. long. Petals 6, oblong, white, 2 in. long, 5 in. wide. Ovaries villous. Fruit cylindric, 1-5 in. long, 6 in. through. Follicles ovoid, 35 in. long, villous. Hab. Dense forest, usually at high altitudes, but occurring at little above sea level, up to 4500 ft. Not common. Singapore: Garden Jungle, one plant, perhaps introduced. Perak: Thaiping Hills and Gunong Batu Putih at 4500 ft. altitude (Kunstler). Penang Hill at 3000 ft. altitude.

2. MANGLIETIA, Bl.

Trees or shrubs of the habit of Magnolia but with ovoid fruits and carpels 6-ovuled. Sepals 3. Petals 6 or more, 2 or more seriate. Stamens very numerous; anthers linear adnate introrse. Carpophore sessile. Ovaries many in an ovoid head. Carpels persistent, dehiscing dorsally. Tropical Asia, species about 5.

Leaves 7 in. wide; nerves deep, sunk above strongly, elevate beneath . . . . . . . (1) M. Sebassa
Leaves obovate 3 in. wide; nerves fine hardly prominent.
Leaves 3 in. or less long, 1 in. wide.
Flowers •5 in. long.

(2) M. glauca


A shrub. Young branches, petioles and hood of calyx villous. Leaves coriaceous oblong or oblong-lanceolate-acute, narrowed at base, glabrous, bullate; nerves 14 to 20 pairs; 11 to 14 in. long, 4.5 to 7 in. wide; petioles 1 in. long, thickened at base. Flowers solitary, terminal on villous peduncles 2 to 3 in. long. Sepals and petals about 9, fleshy obovate to oblong clawed, nearly 2 in. long, pale yellow. Filaments very stout. Pistils about 20. Carpels oblong. Hab. Rare. Once collected at Ulu Kal in Perak by Kunstler at 1500 ft. altitude. Distrib. Sumatra.


A tall glabrous tree. Leaves coriaceous oval to obovate-oblong glauescent beneath; nerves 12 to 14 pairs; 5 to 7 in. long, 2.5 to 3 in. wide; petioles 75 to 1.5 in. long. Flowers terminal solitary, 1.5 in. long on pedicels 1 to 1.5 in. long. Sepals and petals 9, greenish yellow, oblong, sub-acute. Filaments short. Pistils numerous. Fruit ovoid as big as a hen's egg, glabrous. Seeds with a red fleshy aril. Hab. Rocky Hills, from 200 to 3000 ft. altitude. Perak: Taiping Hills, at 3000 ft. altitude (Kunstler), Kedah Peak at 500 ft. at Geroon (Bell and Haniff). Penang, The Spout (Haniff). Distrib. Java, Sumatra, Celebes and Cochin-China.


A tree. Young branches, stipules under surface of leaves pubescent. Leaves thinly coriaceous lanceolate narrowed to both ends, shining, reticulations distinct minute; nerves 12 pairs, 3.5 in. to 4 in. long, 1.25 in. wide; petioles 3 to 4 in. long. Flowers solitary, axillary on ringed peduncles, short, hood rufous, silky. Sepals and petals about 12 similar, 5 in. long, linear-lanceolate. Stamens linear. Fruit ovoid on a short carpophore, pubescent, carpels 6 to 8. Ovules solitary. Hab. Perak. No locality (Scortechini).

Noticeable for its very small leaves and flowers.

3. MICHELIA, L.

Trees. Leaves as in Magnolia. Flowers axillary, solitary and terminal small. Sepals and petals narrow linear acute, all similar 9 to 15 in 3 or more rows. Stamens numerous. Carpophore stalked, carpels usually many. Ovules 2 or more. Follicles woody, 1 to many in a lax or dense spike dehiscing dorsally. Seeds 6 or
fewer, Indo-Malaya. Two species are common in gardens, *M. champaca* L., the Chempaka with narrow lanceolate leaves and yellow fragrant flowers, a native of India, and *M. longifolia* Bl., the white Chempaka, Chempaka with larger and broader leaves and longer white flowers, a native of Java.


A glabrous tree 20 to 30 ft. tall. Leaves thinly coriaceous obovate narrowed at both ends dark green; nerves 12 pairs, 6 to 7-5 in. long, 4 in. broad petioles 75 in. long. Flowers white, fragrant, 1-5 in. across, solitary axillary or terminal peduncle 5 in. long. Sepals and petals 8, oblanceolate or lanceolate-acute. Stamens 18 to 24. Pistils 3 to 4. Follicles usually 1, subglobular pyriform, woody 3 in. long, walls 5 in. thick. Seeds 4 or 5. *Hab. Mountains. Rare. Perak at Goping (Kunstler). Kedah Peak at Geroon (Bell and Haniff).* *Distrib.* Himalaya and Java.


Trees or shrubs. Leaves and inflorescence as in *Magnolia*. Flowers usually large, white. Sepals 3. Petals 6 or more in 2 or more whorls. Stamens numerous in many whorls; anthers linear introrse. Carpophore sessile; ovaries indefinite 2-ovuled, spicate. Stigmas deciduous. Carpels woody separating from the axis at the ventral suture and dehiscing, so that the seeds remain attached to the axis by a cord. Species about 20, tropical Asia and S. America and West Indies.

Carpels pubescent or woolly.

Leaves over 4 in. wide, obovate or elliptic.

- Flowers 2 in. long; peduncle woolly . . . . (1) **T. lanigera**
- Leaves 3 in. wide, elliptic.
  - Flowers 1 in. long; peduncle glabrous . . . . (2) **T. mutabilis**
  - Leaves oblong-lanceolate; peduncle glabrous . . . . (3) **T. Kunstleri**

Carpels glabrous.

Leaves very large, stiff coriaceous.

- Petals 3 in. long . . . . . . . . . . . . . (4) **T. Singapurensis**
- Leaves narrow lanceolate, thin.
  - Petals 75 in. long . . . . . . . . . . (5) **T. longifolia**


A tree about 20 ft. tall, with erect branches. Young leaves, branches and petioles, peduncles, stipule covering the bud and ovaries brown villous. Leaves coriaceous oblong-oblanceolate abruptly cuspidate base narrowed, deep green shining glabrous except midrib beneath, 9 to 12 in. long, 2-5 to 4 in. wide; petioles 1 to 1-5 in. long. Sepals and petals white. Sepals 2 in. long, acuminate obtuse. Petals smaller. Pistil woolly. Fruit 3 to 4 in. long, 2 in.
through. Carpels woolly on the back. Hab. In mountain districts, Malacca, Mt. Ophir (Maingay, Griffith). Perak, Thaiping Hills (Kunstler). Penang Hill, Moniot's Road, etc. (Maingay, Curtis).

(2) **T. mutabilis** Bl. Fl. Jav. Magnoliaceae, 35, t. 10–11, 12, fig. b.; **King**, l.c. 373; **Ann. Bot. Gard. Calc.** iii. (2), 203, pl. 44.

A shrub about 6 ft. tall, glabrous. Leaves oblong-lanceolate-acute at each end sub-coriaceous shining light green; nerves 12 pairs, 5 to 8 in. long, 2-25 to 2-75 in. wide; petioles -75 to 1 in. long minutely muricate. Flowers solitary, terminal; on a glabrous peduncle 1-5 in. long. Stipular bracts fuscous villous. Sepals 3, broadly ovate. Petals 6 in 2 whorls broader, obovate, concave, 1-25 in. long, *5 in. wide. Fruit ovoid 1-5 to 2 in. long, pubescent at first, then glabrous, follicles rhomboid lenticelled with recurved beaks. Hab. In hill woods. Perak, Penang on West Hill (Curtis 1022). Kedah Peak (Bell and Haniff) at 2500 ft. altitude. Distrib. Malay Archipelago. Cultivated in Gardens, Singapore.

(3) **T. Kunstleri** **King**, l.c. 373; **Ann. Bot. Gard. Calc.** iii. (2), 204, pl. 41B.

A tree 25 to 30 ft. tall, glabrous except the peduncle and pistils. Leaves oblong-lanceolate; acuminate at both ends, shining; nerves 10 to 14 pairs; 6 to 9 in. long, 1-75 to 2-5 in. across; petioles *5 to 1-25 in. long, slender, base thickened. Flower terminal, ovoid, on peduncles, pubescent, -85 in. long. Sepals 3, and petals 6, broadly elliptic, waxy white, fleshy. Anthers sessile -5 in. long. Carpels 6 to 8 linear, pubescent. Fruit ovoid, acute, 1-25 in. long, -75 in. through, green, follicles -75 to 1 in. long, beaks short, stout, sub-terminal. Hab. Mountains at from 3000 to 4000 ft. altitude. Perak, Larut Hills. Kedah, on Kedah Peak (Kunstler).


A big shrub about 20 ft. tall. Leaves large, stiffly coriaceous, young ones and midrib of adults hairy, oblanceolate-acuminate; nerves 14 to 15 pairs sub-horizontal, reticulations conspicuous on both sides, 15 to 16 in. long, 4-5 in. wide; petioles 1 to 1.5 in. long. Pedicel stout, 3 to 4 in. long, brown silky hairy. Sepals broad ovalate-lanceolate silky. Petals lanceolate-acuminate, fleshy, 3 in. long, -75 in. wide at base, white. Stamens 1-5 in. long, acuminate. Ovaries glabrous. Fruit 3-2 in. long. Carpels 1-5 in. long, base broad, pubular, woody. Style convolute at tip. Seeds 2, irregularly elliptic or flat, smooth, pale brown. Hab. In low-lying forest swamps. Singapore, Selitar district (Ridley).

This has the habit of **T. gigantifolia** Miq., of Sumatra and Borneo, but has longer petioles and the pistils are quite glabrous.


Shrub 10 to 12 ft. tall. Leaves thin coriaceous glabrous lanceolate long acuminate narrowed to base; nerves 7 pairs, fine,
reticulations fine conspicuous, 6 to 8 in. long, 1·7 to 2·5 in. wide; petioles 0·5 in. long. Bud ellipsoid beaked appressed, silky. Petals oblong, blunt, cream or pale yellow, 0·7 in. long, 0·3 in. wide. Fruit glabrous, pustular 1·5 in. long. Carpels about 6, beaked. Hab. Mountains. Kedah Peak, about 3900 ft. altitude (Robinson, Haniff). Distrib. Moulmein, Pungah, Java.

5. AROMADENDRUM, Bl.


Referred by Miquel and Bentham to Talauma, but very distinct in the numerous, narrow petals, resembling those of Michelia, and the pulpy indehiscent fruit, and connate carpels. One species, native of the Malay Peninsula and Java.


A lofty straight-stemmed tree about 60 to 80 ft. tall. Leaves finely reticulated dark green elliptic acuminate at each end, thinly

ORDER IV. WINTERACEÆ.

Trees or shrubs. Leaves alternate, often aromatic, gland-dotted exstipulate. Flowers small, pink or white in axillary fascicles. Sepals 1 (or 2) series. Petals in several series. Stamens several, anthers small, sub-globose. Carpels in 1 whorl, few. Fruits capsular. Seeds shiny, endosperm copious, embryo minute. Species about 35, Australia, Malay Isles, S. America to Florida.

ILLICIUM, L.

Shrubs or treelets. Leaves usually small coriaceous or membranous entire. Flowers bi- or uni-sexual, solitary or fascicled in the axils, or on the stem, yellow, white or rose-pink, small. Sepals 3 to 6. Petals 9, 3 or many seriate. Stamens indefinite; filaments thick; anthers introrse. Pistils indefinite in 1 whorl, 1-ovuled. Fruit of radiating leathery green follicles. Seeds compressed with hard shining testa. North America, China, Cambodia.

Leaves thin coriaceous distinctly nerved.
Stamens 9 to 13 . . . . . . (1) I. cambodianum

Leaves thick coriaceous nerveless.
Stamens 30 to 50 . . . . . . (2) I. evenium


A large shrub, very variable. Leaves opposite or in whorls of 3 or 4, dark green ob lanceolate to obovate-lanceolate-acuminate, 3 to 4½ in. long, 1 to 2 in. wide; petioles under ½ in. long. Flowers axillary or in old plants fascicled on the stem, rose colour or white, 1 in. across or less; pedicels stout or slender. Sepals 3 or 4, ovate round edge ciliate or not. Petals 9, ovate-oblong blunt. Stamens 9 to 13 in a single row. Follicles 8 to 12, radiate beaked, 4 to 5 in. long. Seeds flat ovoid, base truncate, polished brown. Hab. In woods on mountains, especially near streams from 3000 to 5000 ft. altitude. Common and variable.

var. tenuifolia Ridl. Leaves lanceolate or ob lanceolate thin almost membranous; pedicels very slender. Flowers small ½ in.
across. Sepals 3 small ones at the base, 3 to 4 upper much larger, edges ciliate. *Hab.* Shady spots. Pahang, Telom cascade; Gunong Tahan; Selangor, Menuang Gasing (Kloss). Perak, Thaiping Hills (Kunstler). Kedah Peak (Bell and Haniff), form with white flowers in fascicles on trunk.

var. *crassifolia* Ridl. Leaves lanceolate to obovate, thick, coriaceous. Pedicels short, fleshy, thick. Flowers larger up to 1 in. wide. Lowest sepals broad, as big as the upper ones, often glabrous. *Hab.* On more exposed spots. Malacca, Mt. Ophir; Pahang, K’luang Terbang (Barnes); Gunong Berembun, near Telom; Gunong Tahan. Selangor, Bukit Kutu (flowers fascicled on stem);

![Fig. 4.—Illicium cambodianum.](image)

Gunong Menkuang (Robinson); Sempang mines, Semangkok Pass. Perak, Gunong Kerbau (Haniff); Gunong Batu Putih (Wray).

This is the typical form from Cambodia.

(2) *I. evenium* King, *l.c.* 374.

A small glabrous tree. Leaves very coriaceous smooth; nerves invisible opposite in whorls of three, oblanceolate to obovate-oblong, tip shortly acuminate, base elongate cuneate to a short thick petiole; 3.5 to 5 in. long, 1.25 to 2 in. wide; petioles 3 in. long. Flowers unisexual globular, 2 in. across on pedicels 1 in. long, solitary or in few-flowered racemes. Sepals 8 or 9, round fleshy similar. Stamens 30 to 50 in several rows; filaments shorter than anthers. *Hab.* Perak (Scortechni). Very rare, only once collected, in male flower only.
Order V. Schizandraceae.

Climbers shrubby. Leaves alternate, exstipulate. Flowers axillary solitary unisexual small pink. Sepals and petals 9 to 15, outer sepaloid. Stamens numerous, more or less connate into a fleshy mass. Anthers short. Carpels numerous, few ovuled, in fruit crowded into a fleshy mass. Species about 27 in 2 genera, Indo-Malaya, China, Japan, Southern United States.

Kadsura, Kaempfer.

Glabrous leaves, with entire leaves. Flowers unisexual, rose pink, white or yellow, small, axillary or from the stem on short bracteolate peduncles. Sepals and petals 9 to 12 imbricate in 3 rows. Male flower. Stamens 5 to 15 or more in a spiral; filaments very short, free, or sub-connate; anthers free or connate. Female flower, ovaries many, densely imbricate. Stigma sessile, ovules 2 to 4. Fruit a globose fleshy head of 1-seeded carpels. Seeds 1 to 2. Temperate and tropical Asia, species about 7.

Stems stout smooth; leaves ovate, base cuneate.
Flowers pink
(1) K. scandens
Stems stout corky; leaves ovate, base rounded.
Flowers pink
(2) K. cataliflora
Stems slender; leaves smaller lanceolate.
Flowers cream colour
(3) K. lanceolata

A big liane 30 to 40 ft. or more long, bark dark striate. Leaves coriaceous broadly ovate to ovate-oblong-acuminate, base rounded sub-decurrent; nerves 5 pairs, dark green, 4 to 6 in. long, 2 to 4 in. wide; petioles 1 in. long. Flowers axillary and from the trunk on bracteolate peduncles, rose pink, 5 in. wide. Sepals 3, triangular connate at base. Petals ovate-oblong blunt, fleshy. Stamens in males numerous short cuneate equal on an ovoid fleshy receptacle. Ovaries in females numerous. Stigmas sessile elongate. Fruit 2 to 2.5 in. through, sub-globose. Carpels sessile globose beaked less than 5 in. in diameter. Hab. Common in forests at low elevations. Singapore; Malacca (Griffith). Negri Sembilan, Tampin Hill (Burkill). Perak, Larut Hills (Kunstler). Penang Hill (Curtis). Distrib. Malay Islands. Native names: Akar Kapala Patong; Akar Dama Daura. Use: A decoction of the roots is used for rheumatism.

(2) K. cauliflora Bl. Fl. Ind. Schizandracea, ii. t. 2; King, l.c. 375; Ann. Bot. Gard. Cal. iii. (2), 222, pl. 72.
A big liane with pale corky bark, 80 ft. or more long and about 3 in. through. Leaves ovate rounded, tip shortly acuminate, base rounded; nerves 3 to 7 pairs; 6 to 7 in. long, 3:4 to 4:5 in. wide; petioles 1 to 1:5 in. long. Flowers from the trunk. Sepals and

The flowers look like very small pink roses.

(3) \textbf{K. lanceolata} King, \textit{l.c.} 376.

Slender woody climber. Leaves thin coriaceous ovate to ovate-lanceolate-acuminate; nerves 12 pairs, faint; 3 to 4 in. long, 1.5 in. wide; petioles 35 in. long. Flowers solitary, axillary globose, 2.5 in. through. Sepals 3, triangular. Petals 9, larger round or ovate, cream colour. Ripe fruit 75 in. through. Carpels numerous ovoid. \textit{Hab.} Perak, Thaiping Hills, 500 to 1000 ft. altitude (Kunstler, Scortechini).

\textbf{Order VI. ANONACEÆ.}

Trees rarely very large, shrubs or lianes. Leaves alternate, simple, entire. Flowers solitary or in fascicles, bisexual, rarely unisexual, seldom large, purple, green, white or yellow. Sepals 3, usually valvate, free or connate. Petals 6 hypogynous, in 2 whorls, often unequal, inner whorl occasionally absent (flowers dimerous in \textit{Disepalum}). Stamens usually indefinite, crowded on the torus; filaments short or 0; anthers oblong, the connective produced into
VI. ANONACEÆ.

an appendage. Pistils 1, or usually more, apocarpous; style very short or o; ovules one or more. Fruit of 1, usually many, sessile or stalked carpels 1- or many-seeded, usually baccate, very rarely dehiscent (Anaxagorea, Xylophia). Seed large more or less flattened, testa crustaceous, usually shining. Albumen dense, ruminate, with several series of horizontal plates, embryo small. Tropics, chiefly of the Old World; genera 45, species 500 to 600, abundant in the lowland forests of the Malay region, becoming very scarce about 2000 ft. altitude. Commonly known by the Malays as Pisang-Pisang or variants of this (lit. bananas), on account of the bunch of carpels suggesting bananas. The uses of the plants of this order indigenous here are very limited. They have few medicinal properties, and the timber is usually too small to be of value, the only really big tree being Mezettia leptopoda. Drepananthus, Xylophia, some Polyalthias, etc., are used in house-building, for rafters or poles. Cultivated here for their fruits are the Anonas of South America: A. squamosa, Nona Srikaya; A. muricata, Durian B'landa; Sri Kaya Blanda; Nona blanda; A. reticulata, Nona Kapri, and, as a roadside or village tree for its flowers, Canangium odoratum, the Kenanga, probably native of the Philippine Islands. Its soft timber is also used for tom-toms. Artabotrys odoratissimus, a climber cultivated for its fragrant flowers, is also to be found in Chinese gardens. The Anonaceæ of the peninsula were described in the "Materials" for a Flora of the Malay Peninsula, by Sir George King, in the Journal of the Asiatic Society of Bengal, lxi. (2), in 1892, and in the Annals of the Botanic Gardens of Calcutta, iv., quoted Journ. As. Soc. Beng. and Ann. Bot. Gard. Calc., respectively.

i. Uvariæ. Petals 2 in 2 rows, one or both rows imbricate in bud; stamens many, anther-cells concealed by a flat appendage; ovaries indefinite. Sepals imbricate; trees or shrubs.

   Flowers small globular, usually unisexual on the older branches or trunk; ovules 6, indefinite.

   Ovules many; torus conic . . . . . . 1. Stelechocarpus
   Ovules 6 to 8; torus flat . . . . . . 2. Sageræa
   Flowers large, bisexual . . . . . . . . 3. Griffithia

   Sepals valvate; climbers.

   Flowers small, on trunk or branches; ovules 6 to 8.

   Flowers usually large, expanding flat on branches.

   Ovules many . . . . . . . . . . . . . . . 4. Cyathostemma
   Ovules 1 to 2; flowers rather small . . . . . . 5. Uvaria
   Flowers medium, petals not expanding; ovules 1 to 2 . . . . . . . . . . . . . . . . . . . . . . . 6. Uvariella

   7. Ellipeia

ii. Unoneæ. Petals valvate in bud flat, or base only concave, inner petals similar to outer; stamens many, with overlapping appendages; ovaries indefinite, rarely few.
VI. ANONACEÆ.

Flowers trimerous.
Petals connivent at concave base, covering stamens and ovaries.
Trees; ovaries 1 to 3, ovules many; flowers rather large.
Trees; ovaries many; ovules 4 or more; flowers small.
Climbers with hooked peduncles; flowers rather large.

Petals flat; carpels indehiscent.
Trees; ovules many in 2 rows; stamens appendages acute.

Shrubs, half climbing; flowers solitary rather large.

Inner petals clawed.
Inner petals connivent, not vaulted; flowers rather large.

Inner petals vaulted, longer than outer; stamens 6.
Inner petals vaulted, little longer than outer; stamens numerous.
Inner petals not clawed.

Flowers small, globose; petals sub-equal.
Climbers; flowers long; petals narrow, inners much shorter.

Flowers dimerous; sepals 2; petals very narrow.

iii. MITREPHOREÆ. Petals valvate, outer spreading; inner concave connivent different, arching over stamens; stamens and pistils numerous and anther appendages overlapping except Orophea.

Trees.

Inner petals clawed.

Inner petals connivent, not vaulted; flowers rather large.

Inner petals vaulted, longer than outer; stamens 6.

Inner petals vaulted, little longer than outer; stamens numerous.

Inner petals not clawed.

Flowers small, globose; petals sub-equal.
Climbers; flowers solitary rather small.

Shrubs; fruit follicular dehiscent.

Flowers dimerous; sepals 2; petals very narrow.

iv. XYLOPIÆ. Petals valvate thick connivent, outers long, narrow or broad, inners small but similar.

Climbers; outer petals triangular-ovate or long, yellow, pubescent.
Scandent; petals ovate, blunt; ovules many.
Trees; outer petals narrow linear, sub-glabrous.

Flowers small, globose; petals sub-equal.
Climbers; flowers long; petals narrow, inners much shorter.

All petals valvate, linear; gigantic trees.

v. MILIUSEÆ. Petals valvate, outers often very small; stamens definite loosely imbricate; ovules 1 or many; flowers usually solitary; trees or shrubs.

Ovaries indefinite.

Sepals and outer petals very small, inner petals large.
Ovules 1 to 2; stamens numerous with broad appendages; flowers solitary.
Ovules 1 to 4; stamens often few; appendage compressed, small; flowers usually solitary.
Petals all larger than sepals saccate at base.

Ovaries solitary or 2; fruit large; flowers very small, clustered on boughs.
Outer petals valvate, inner imbricate, petals ovate.

All petals valvate, linear; gigantic trees.

8. Cyathocalyx
9. Drepananthus
10. Artabotrys
11. Canangium
12. Desmos
13. Polyalthia
14. Sphærocoryne
15. Anaxagorea
16. Disepalum
17. Goniothalamus
18. Orophea
19. Mitrephora
20. Popowia
21. Oxymitra
22. Melodorum
23. Rauwenhoffia
24. Xylopedia
25. Phæanthus
26. Miliusa
27. Alphonsea
28. Kingstonia
29. Mezzettia
1. STELECHOCARPUS, Bl.

Trees with coriaceous leaves. Flowers unisexual, fascicled on the old wood. Sepals 3, small, elliptic to orbicular, imbricate. Petals very coriaceous, round, concave. Stamens in male indefinite ovoid. Ovaries 6 or more. Stigma sessile. Carpels globose berried, 4 to 6 seeds. Torus conical. 3 to 4 species, Malayan.

Leaves pellucid-punctate membranous . . . . (1) S. punctatus
Leaves coriaceous not pellucid-punctate . . . . (2) S. nitidus


A tree 20 to 30 ft. tall, branchlets puberulous. Leaves membranous elliptic-ovate acuminate, base rounded, above glabrous except the pubescent midrib; beneath puberulous or glabrous, reticulations distinct; nerves 12 to 14 pairs, bold beneath; 7 to 10 in. long, 3 to 4 in. wide; petioles ·15 to ·2 in. long, pubescent stout. Male flowers in fascicles from trunk; buds turbinate, ·5 in. across; peduncles 1 to 1·5 in. long, stout, puberulous. Sepals very coriaceous rounded concave pubescent outside. Petals very coriaceous rounded glabrous; outer 3 puberulous outside; inner smaller. Anthers sessile flat connective not produced. Hab. Perak (Kunstler), not seen.

S. Burahol Bl., a native of Java, is recorded from Singapore, Lobb. Lobb's localities are always unreliable, and he probably collected the plant in Java.


A tree 30 to 60 ft. tall; stem 6 to 8 in. through, glabrous. Leaves coriaceous dark green oblong-lanceolate shortly acuminate, base acute; nerves deeply impressed on upper surface, bold below, inarching within the margin; 6 to 9 in. long, ·18 to ·25 in. wide; petioles ·35 in. long. Male flowers fascicled on the trunk, pale pink tinged with black; peduncles stout, 1 to 1·5 in. long, scurfy, puberulous. Sepals very coriaceous shortly oblong obtuse connate at base, puberulous. Petals larger, outer ·5 in. long, ovate rounded, very thick and hard, inner smaller. Female flowers like the males, but no stamens, very numerous silky ovaries. Carpels broad ovoid obtuse, 2·5 in. long, 1·75 in. wide, puberulous, black. Seeds 8 in 2 rows, flat, 1·25 in. long, ·5 in. thick. Hab. Limestone rocks in forests up to 800 ft. altitude; Perak, Gunong Pondok (Kunstler). Distrib. Sumatra.

2. SAGERÆA, Dalz.

Trees glabrous. Leaves coriaceous. Flowers uni- or bi-sexual, fascicled on tubercles on the old wood (or solitary axillary). Sepals orbicular to ovate, imbricate. Petals 6, in 2 series, imbricate,
sub-equal, concave-orbicular. Stamin 6 to 21 imbricate in 2 or more series, broad oblong, fleshy; anther-cells dorsal, oblong; connective produced. Ovaries 3 to 6; style short; stigma capitate; ovules 6 to 8, on ventral suture. Carpels globose, stalked. Species 6, tropical Asia.

Leaves large, base round. 
Leaves 6 by 1-25, base narrow. 


A big tree glabrous, branchlets angled. Leaves very coriaceous large narrow oblong acute or obtuse, base rounded; nerves 14 to 16 pairs, very faint; 8 to 12 in. long, 2-25 to 3-25 in. wide; petioles 1-15 in. long, very thick. Flowers unisexual, solitary, axillary or below several fascicled on the large branches or trunk, white or red, small; pedicels 1-25 in. long. Sepals small, semi-orbicular, glabrous, edges ciliate. Petals thick ovate-orbicular concave glabrous edges ciliate, 1-25 in. long, inner smaller. Stamens 12 to 18, appendages quadrate. Ovaries in female 3, glabrous, ovules 8. Carpels sub-sessile globose 1 in. through. Seeds several. 

Hab. Rare and little known. Penang (Wallich, Maingay). Distrib. Burma.


The texture of the leaves is as in S. elliptica, but they are much smaller, lanceolate and narrowed to base.

3. GRIFFITHIA, Maing.

Trees or shrubs. Flowers axillary solitary or in pairs, large. Sepals broad, short, imbricate. Petals 6, imbricate ovate, inner 3 smaller and much thicker than the outer, excavated at the base. Stamens numerous, elongate, connective truncate; anther-cells linear dorsal. Ovaries numerous; ovules 1 or 2 basal. Style filiform. Stigma broadly clavate. Species 3, Malay Peninsula only. Allied to Polyalthia (macrantha and its allies) in form of flowers and ovaries, but with imbricate petals and sepals. Griffithia, Wight and Arnott (Rubiaceae), has long been reduced to Randia.
Leaves glabrous or glabrescent beneath.
Flowers 2-5 to 3 in. long
Flowers 1 in. long
Leaves softly pubescent beneath


A tree 30 to 40 ft. tall, 10 to 15 in. through; branchlets tomentose. Leaves thinly coriaceous obovate-oblong shortly acuminate, base rounded, above glabrous; nerves 15 to 20 pairs, sub-horizontal prominent beneath, pubescent on both sides, transverse nervules distinct, beneath glabrescent; 8 to 12 in. long, 2.5 to 3.5 in. wide; petioles 25 in. long, tomentose, stout. Sepals coriaceous connate to middle broad ovate acute tomentose. Petals white coriaceous, oval or ovate-lanceolate acute, tomentose. Ovaries hirsute. Carpels 1.5 in. long, short-stalked, obovate acuminate at each end. Hab. Dense rocky jungle at 1500 to 2500 ft. altitude. Malacca (Maingay); Perak (Kunstler).


A shrub 10 ft. to a tree 50 ft. tall; branchlets pubescent. Leaves membranous obovate acuminate slightly narrowed to the rounded base, above glabrous except pubescent midrib, beneath midrib and 12 to 14 pairs of nerves prominent puberulous; 6 to 9 in. long, 2 to 3 in. wide; petioles 25 in. long. Flowers solitary or 2, silvery white or yellow on branches, about 1 in. long; pedicels tomentose with several large sheathing orbicular bracts. Sepals semi-orbicular quiet obtuse tomentose outside greenish yellow, 25 in. long. Petals thick coriaceous tomentose, outers ovate broad obtuse 1 in. long; inners short thicker, base excavate. Ovaries 12 villous; ovules 1 or 2. Carpels ovoid or sub-globose, blunt, 8 in. long, tomentose, light brown to silvery; stalks 35 in. long. Seed 1. Hab. Low hilly ground in dense jungle. Perak, Thaiping Hills, dense jungle at 300 to 1500 ft. altitude, and Gunong Bubu range (Kunstler).


Small tree 10 to 20 ft. tall; branchlets tomentose. Leaves thinly coriaceous obovand to oblanceolate-acute, base rounded above, glabrous beneath, pubescent; nerves 12 to 16 pairs, oblique prominent, 6 to 18 in. long, 1.75 to 2.75 in. wide; petioles 2 to 3 in. long, stout. Flowers solitary extra-axillary. Sepals slightly imbricate ovate sub-acute tomentose outside. Petals thick concave ovate-oblong cream-colour or deep yellow, outer 1 in. long, inner shorter and narrower, tomentose outside. Appendages flat. Ovaries few, villous, 1-ovuled. Carpels ovoid, densely minutely tomentose, dark mauve, 1 in. long, 75 in. through. Hab. Dense mixed jungle 400 to 600 ft. altitude. Perak, Ulu Bubong (Kunstler).
4. CYATHOSTEMMA.

Big lianes. Flowers in di- or tri-chotomous cymes from the old wood, sub-globose, small. Sepals 3, connate, hirsute. Petals 6, in 2 whorls, sub-equal, bases fleshy, valvate, tips imbricate. Torus flat, edge convex. Stamens many short linear; anthers connective oblique, incurved. Ovaries many; style cylindric glabrous; ovules many. Carpels oblong-ovoid, many-seeded. Species about 6, Malayan.

Flowers all hermaphrodite.

Flowers in elongate cymes from trunk . . . . (1) C. viridiflorum
Flowers fascicled 10 to 14, or in axillary pairs; midrib pubescent . . . . (2) C. Wrayi
Flowers 2 to 3 fascicled extra-axillary; midrib glabrous . . . . (3) C. Hookeri
Flowers dimorphous, some female . . . . (4) C. acuminatum


A big woody liane 80 ft. or more long with black bark. Leaves coriaceous obovate-elliptic or oblong, base rounded minutely cordate, dull green glabrous; nerves 8 to 11 pairs; 6 to 10 in. long, 2·5 to 4 in. wide; petioles 2·5 in. long. Cymes branched 2 to 4 in. long from the lower part of the liane, tomentose. Flowers 5 in. across, few. Sepals rounded connate for most of their length tomentose. Petals ovate sub-acute puberulous coriaceous, never expanding, base green, tips orange. Stamens cinnamon brown, appendages obliquely truncate. Ovaries numerous, pubescent. Carpels orange, oblong obtuse, 1·25 to 1·5 in. long, stalk as long or shorter. Seed 8 to 10, smooth, ovoid. Hab. Low country to 500 ft. altitude. Common in woods, Singapore, Garden Jungle; Bukit Timah; Johor; Malacca (Maingay).


A liane 20 to 60 ft. long; young branches pubescent. Leaves membranous broadly ob lanceolate shortly obtusely acuminate, narrowed towards base, glabrous on both sides except the midrib; nerves 8 to 10 pairs, inarching twice within the margin; 7 to 9 in. long, 2·5 to 3 in. wide; petioles 2 in. long. Flowers in fascicles of 10 to 14 on tubercles on the old wood, or in axillary pairs 5 in. across, waxy muddy yellow; pedicels 2·5 to 4 in. long, pubescent. Sepals broadly ovate spreading rufous-puberulous outside, 1 in. long. Petals concave, outer whorl ovate-orbicular acute; inner smaller, blunter and more imbricate. Stamens numerous, appendages truncate, 4- to 5-sided, covering the anthers. Ovaries
numerous, oblong, pubescent at base only. Carpels reddish ovoid glabrous, \( \cdot 4 \) to \( \cdot 6 \) in. long; pedicels slender as long. Seeds \( 1 \) or \( 2 \), ovoid or plano-convex. Hab. Hill forests, apparently locally common. Selangor, Weld's Hill (Foxworthy). Perak, Thaiping Hills; Goping (Kunstler, Scortechini, Wray).


A liane 40 to 80 ft. long, glabrous except the inflorescence. Leaves membranous broadly oblanceolate to ovate-elliptic acute or bluntly acuminate, base rounded or sub-cuneate; nerves 9 to 10 pairs, marching; \( 5 \cdot 5 \) to \( 7 \) in. long, \( 2 \cdot 25 \) to \( 2 \cdot 75 \) in. wide; petioles \( \cdot 3 \) in. long. Flowers \( \cdot 25 \) in. across, in extra-axillary fascicles or cymes of 2 or 3, yellow, on puberulous pedicels \( \cdot 3 \) to \( \cdot 4 \) in. long. Sepals spreading broadly ovate sub-acute, \( \cdot 1 \) in. long. Petals concave; outer whorl little longer than sepals, narrower obovate contracted at base, puberulous outside; inner whorl narrower, thicker, oblique. Stamens numerous, appendages thick incurved. Ovaries numerous, puberulous. Carpels numerous, oblong or ovoid blunt glabrescent, \( \cdot 75 \) to \( 1 \cdot 75 \) in. long, \( \cdot 6 \) to \( \cdot 9 \) in. diameter; pedicel \( 1 \cdot 5 \) to \( 2 \) in., stout. Seeds 6 in one row, oblong. Hab. Local, in forest up to 1000 ft. altitude. Singapore, Garden Jungle. Perak, Thaiping Hills (Kunstler). Penang, Government Hill (Phillips, Curtis). Distrib. Borneo.


A liane; young branches puberulous. Leaves membranous oblanceolate-oblong cordate-acuminate, base acute, glabrous except the puberulous midrib; nerves 10 to 11 pairs, curved; 8 to 9 in. long, \( 2 \cdot 2 \) to \( 2 \cdot 5 \) in. wide; petioles \( \cdot 15 \) in. long, tomentose. Hermaphrodite flowers in pubescent cymes, 4 to 6 in. long; pedicel as long as the branches. Bracts numerous distichous oblong. Flowers \( \cdot 4 \) to \( \cdot 5 \) in. across; pedicels short. Sepals triangular, obtuse. Petals as in *viridiflorum*. Stamens, appendages thick, incurved. Ovaries with conical stigmas. Female flowers, cymes shorter, few-flowered, \( 1 \cdot 5 \) in. long, pubescent. Sepals broadly triangular cordate acute, pubescent. Petals, outer whorl ovate-triangular sub-acute; inner row smaller. Stamens 0. Ovaries as in hermaphrodite, but stigma larger, not conical. Hab. Very rare. Upper Perak (Wray).

5. **UVARIA, L.**

Scendent or sarmentose shrubs, often stellately pubescent. Flowers terminal or leaf-opposed, rarely axillary, cymose or solitary, crimson, purple or yellow. Sepals 3, valvate, often connate at the base. Petals 6, lanceolate-orbicular or ovate, imbricate in 2 whorls similar, sometimes connate at the base. Stamens indefinite, appendage ovoid-oblong or truncate. Torus flat or depressed, pubescent.
Ovaries indefinite, linear-oblong; styles short and thick. Ovules many in 2, rarely 1 row. Carpels many, cylindric, smooth, few- or many-seeded. Tropical Asia and Australia, a few African, about 110 species.

(a) Flowers over •5 in. wide in short sub-terminal or lateral cymes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anther appendage small, flat, oblique.</td>
<td>(1) U. Larep</td>
</tr>
<tr>
<td>Flowers 1 in. across, yellow; leaves beneath glabrous except nerves.</td>
<td></td>
</tr>
<tr>
<td>Flowers over 1 in. long, cream; petals broad; leaves beneath tomentose.</td>
<td>(2) U. dulcis</td>
</tr>
<tr>
<td>Flowers over 1 in. long, red, petals broad; leaves glabrous, coriaceous.</td>
<td>(3) U. Lobbiana</td>
</tr>
<tr>
<td>Anther appendage half as long as anthers, flat, oblique truncate.</td>
<td></td>
</tr>
<tr>
<td>Flowers 1-5 in. across, red; leaves sub-glabrous beneath.</td>
<td>(4) U. macrophylla</td>
</tr>
<tr>
<td>Flowers 3 in. across, purple red; leaves stellate tomentose beneath.</td>
<td>(5) U. purpurea</td>
</tr>
<tr>
<td>Anther appendage slightly or not produced.</td>
<td></td>
</tr>
<tr>
<td>Whole plant stiffly hairy; flowers red.</td>
<td>(6) U. hirsuta</td>
</tr>
<tr>
<td>Whole plant soft, tomentose.</td>
<td>(7) U. Curtisisi</td>
</tr>
<tr>
<td>Anther appendage broad quadrate, outer anthers staminodes; bush or climber, tomentose; flowers 1 in. long, purple</td>
<td>(8) U. Ridleyi</td>
</tr>
</tbody>
</table>

(b) Flowers terminal racemes umbellate.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves rather small, glabrous.</td>
<td>(9) U. pauci-ovulata</td>
</tr>
<tr>
<td>Leaves large, strong reticulate and tomentose beneath.</td>
<td>(10) U. Scortechinii</td>
</tr>
</tbody>
</table>

(c) Flowers small under •5 in. wide.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves small, lanceolate-acute, glabrous.</td>
<td>(11) U. micrantha</td>
</tr>
<tr>
<td>Leaves large, oblong glabrous when adult.</td>
<td>(12) U. excelsa</td>
</tr>
<tr>
<td>Leaves 4 in. long, pubescent beneath, minutely pustular above.</td>
<td>(13) U. astrodicta</td>
</tr>
<tr>
<td>Dubious species. Flowers axillary, very small, resembling those of Cyathostemma</td>
<td>(14) U. sub-repanda</td>
</tr>
</tbody>
</table>


A liane 20 to 40 ft. long; young branches and petioles covered with scaly stellate hairs. Leaves membranous, elliptic or ovalate, short, acuminate, base rounded, glabrous except on the midrib on both faces and nerves beneath tomentose; nerves 10 to 12 pairs inarching, 5 to 8 in. long, 2 to 3 in. wide; petioles •2 to •3 in. long. Peduncles half-way between the leaves •1 in. long, •1-2flowered. Pedicels •75 in. long. Bracts •2 in. long, reniform. Flowers •1-5 to •1-75 in. across. Sepals small, •2 in. long, reniform connate, pubescent, reflexed. Petals oblong-lanceolate, sub-acute, •75 in. long, puberulous, pale yellow. Anthers sessile in few rows, appendages short, oblique. Pistils numerous, angled, puberulous. Carpels numerous, cylindric-oblong, pubescent, •2-5 to •1-5 in. long, •5 in. through. Stalks •1-25 to •1-5 in. long, tomentose. Seeds 10,


A big liane 100 to 150 ft. long, young parts pubescent. Leaves sub-coriaceous oblong or oblong-lanceolate acute or shortly acuminate, base rounded sub-cordate, glabrous except midrib on both sides; nerves 13 to 16 pairs, 4 to 7 in. long, 1-5 to 2-25 in. wide; petioles ·25 in. long. Peduncles ·25 in. long, 2- to 3-flowered, terminal or leaf opposed, tomentose, with a large round amplexicaul bract to each flower. Flowers 1 to 1-2 in. across, red. Sepals connate into a cup, tomentose. Petals coriaceous (often 7 or 8), nearly equal, oval-ovate blunt, minutely tomentose. Anthers ·1 in. long, appendages obliquely truncate, outer row sterile. Pistils pubescent, 4-angled. Carpels numerous, globular to ovoid pubescent, 1 in. long, ·5 to ·75 in. wide; stalks slender, 1-5 to 2 in. long. Seeds 4 to 10 plano-convex. Hab. In forests, not rare. Singapore, Garden Jungle. Malacca, Pringit (Griffith, Maingay). Selangor; Perak, Goping (Kunstler), Penang Hill. Distrib. Sumatra.


A woody liane from 10 to 60 ft. or more long, young branches and petioles tomentose. Leaves coriaceous elliptic-oblong or obovate blunt or shortly acuminate, base rounded sub-cordate, above glabrous, except midrib and nerves tomentose, beneath tomentose; nerves 11 to 18 pairs; 4-5 to 10 in. long, 2-5 to 4 in. wide; petioles ·25 in. long. Peduncles tomentose, extra-axillary or terminal, 3- to 5-flowered; bracts oval, rounded. Flowers dark


A climbing or sarmentose liane, never very thick, bark black, young parts stellate pubescent or tomentose. Leaves thickly membranous glabrous above, stellate-tomentose beneath, deep green shining, oblong-lanceolate or elliptic acute or acuminate, base rounded or cordate; nerves 14 to 17 pairs, 4-5 in. to 11 in. long, 2-5 to 3-75 in. wide; petioles hairy, 15 to 25 in. long. Peduncles 1 to 1-5 extra-axillary, 1- to 2-flowered. Flowers showy, 3 to 3-5 in. across. Sepals ovate-obtuse, pale green, hairy. Petals spreading flat coriaceous lanceolate or oblong-acute, 1-75 in. long and 7 in. wide, nearly equal, deep madder red. Anthers 3 in. long brownish flesh colour, appendages conspicuous, oblong, irregular. Pistils numerous, tomentose. Stigmas covered with a waxy yellow gum. Torus depressed hemispheric, pubescent. Carpels numerous, oblong-cylindric obtuse minutely tomentose, orange colour, stalked, 1-5 to 2-5 in. long, 5 in. through; stalks 5 to 1 in. long. Hab. Borders of woods and roadsides, a sarmentose plant; in dense forest climbing high on the trees. Common often in open country. Singapore, Changi. Malacca, Ayer Panas and Ching (Griffith); Nyalas (Derry); Selandor; Pahang. Selangor, Kwala Lumpur. Perak, Kwala Rumpin (Wray). Ulu Bubong and Larut (Kunstler). Prov. Wellesley, Krian. Penang (Porter, Jack); Batu Feringhi. Singora (Annandale). Distrib. Malay Islands, S. China. Native name: Pisang-Pisang.

The most showy and conspicuous in the genus. King’s variety tuberculata has rough tubercled fruit. It was collected at Goping by Kunstler.


A tall slender liane twining by twisting its branches round supports to 80 ft., or more. Young branches, petioles and most of the other parts of the plant covered with stiff red hairs. Leaves


A large liane; young branches tomentose. Leaves oblong-lanceolate-acuminate, base rounded, above glabrous except the tomentose midrib, beneath stellate-tomentose; nerves 7 to 12 pairs, 4 to 9 in. long, 1-7 to 3-25 in. wide; petioles ±15 to ±2 in. long. Flowers solitary or in pairs axillary white; pedicels ±1 to ±1-75 in. long, tomentose. Bract ovate. Sepals broadly ovate spreading, tomentose outside, puberulous inside, ±35 in. long. Petals thinly coriaceous white, subequal ovate-oblong blunt, ±5 in. long, puberulous. Stamens connective truncate; no appendages. Ovaries numerous, tomentose; ovules 12 in 2 rows. Hab. Rare in forests. Muar; Biawak (Curtis); Perak, on Ulu Bubong (Kunstler); Penang, Government Hill at 2000 ft. altitude (Curtis).


A bush in open country, a rather slender climber about 15 to 20 ft. long, on edges of woods; young parts stellate-tomentose. Leaves sub-coriaceous elliptic-oblong-acuminate, base round, stellate hairy all over; nerves 10 to 15 pairs; 3 to 5 in. long, 1-3 to 2 in. wide; petioles ±15 in. long; stellate-tomentose. Flowers usually dull purple, 2 or 3 in extra-axillary cymes, ±75 to ±1-2 in. across; pedicels ±3 to ±4 in. long. Bract large orbicular amplexicaul. Sepals orbicular connate into a 3-toothed cup stellate-tomentose outside. Petals sub-ovariculor or oblong blunt sub-equal pubescent. Stamens, outer row sub-quadratc, sterile, appendages broad. Carpels ovoid or obovoid blunt pubescent pulpy and sweet, ±1-2 to ±1-5 in. long, stalks ±1 in. long. Seeds numerous in 2 rows, oblong. Hab. On heathy open country a bush, on edges of woods a climber. Singapore, Toas; Bukit Mandai. Johor, Sungei Tebrau. Pahang, Pekan (Ridley). Setul, Batu Bunga (form with deep red flowers).

The fruit is quite sweet and eatable.

A lofty climbing liane, forming a large mass on tree-tops; young branches densely stellate-tomentose. Leaves coriaceous, stiff, narrowly elliptic to oblong obtuse or bluntly acuminate, base round or cordate, above glabrous, below pubescent; nerves 10 to 14 pairs; 2·5 to 6 in. long; 1·25 to 3 in. wide. Racemes terminal, umbellate, few-flowered, 1·5 to 2·5 in. long, tomentose. Bracts numerous imbricate, round or ovate tomentose. Flower 1·5 in. across. Sepals small, 3 in. long, orbicular connate half-way, tomentose outside, puberulous within. Petals much larger connivent ovate rounded blunt, inner 3 narrower, tomentose outside, pubescent inside. Anthers cuneate, appendages short truncate. Pistils longer stellate hairy; ovules 1 to 3. Carpels numerous, sub-globose mucronate tomentose, '35 to '5 in. through, stalk ·5 to ·75 in. long, slender. Seeds 1 or 2. Hab. In dense forests probably common, but difficult to get. Johor; Gunong Pulai. Malacca (Maingay). Penang, highlands (Curtis).


Sarmentoise, flexuous shrub; young branches and petioles densely rusty-flocose. Leaves coriaceous elliptic to elliptic-round, blunt, base rounded, above glabrous except nerves, tomentose beneath; nerves and reticulations prominent, red-hairy; nerves 10 to 12 pairs, doubly inarching within the edge, 4 to 7 in. long, 2·5 to 4 in. wide; petioles ·2 to ·4 in. long. Flowers 1·5 in. across in terminal umbels of 2- to 3- or many-flowered panicles, 4 in. long; peduncles ·5 to ·75 in. long. Bracts numerous, ovate-orbicular, covered like the branches of inflorescence with flocculent tomentum. Sepals fleshy triangular sub-acute, lower third connate pubescent. Petals 1 in. long, connivent; outer 3 ovate-round, quite blunt, tomentose-pubescent on both sides, inner 3 obovate, clawed, pubescent outside, glabrous inside except a broad pubescent band. Anthers sessile, appendages truncate, almost peltate. Pistils several with a few stellate hairs. Ovules 2 to 3. Hab. Very rare. Perak (Scortechini).


Large liane; young branches tomentose, adult glabrous, dark with pale warts. Leaves thinly coriaceous oblong-lanceolate, base rounded or slightly cuneate, glabrous except pubescent midrib; nerves very inconspicuous 12 to 15 pairs; 2·5 to 5·5 in. long, ·8 to 1·4 in. wide; petioles ·15 in. long. Peduncles terminal or axillary, very short, 2- to 4-flowered, tomentose. Bracts orbicular. Flowers ·4 in. across, greenish yellow. Sepals round pubescent outside. Petals broadly ovate sub-obtuse minutely tomentose outside, pubescent inside. Anthers very pale rose. Carpels numerous, ovoid globose, round at each end stalked, glabrous, 2- to

**Fl.M.P., 1.**


A liane 30 to 100 ft. long; young parts stellate-pubescent, soon glabrous. Leaves coriaceous oblanceolate obovate-oblong to elliptic acuminate, base minutely cordate, above glabrous except the puberulous midrib, beneath tomentose; nerves 10 pairs; 3·5 to 7·5 in. long, 1·5 to 4 in. wide; petioles 3 to 5 in. long, pubescent. Flowers white, 1·35 to 1·4 in. across, axillary or in contracted cymes, below the leaves; pedicels 2 in. long, tomentose. Bracts large close to flower. Sepals semi-orbicular acute valvate, tomentose outside. Petals imbricate only at tips thick concave pubescent on both faces, outer broadly ovate acute, little larger than the sepals, inner about as large as the sepals. Anthers numerous, appendages thick sub-quadrature pubescent. Carpels sub-globular obovoid blunt tomentose, 1·1 in. long, 1·9 in. wide. Seeds 14 in 2 rows, flat, half-oval. Hab. Forests. Perak; Goping and Larut (Kunstler). Malacca; Selangor. Penang (Wallich, Curtis). Distrib. Cochin-China.

Aberrant in the petals being imbricate at the tips only.


Young branches deciduously stellate-tomentose with hairs intermixed. Leaves coriaceous oblong-lanceolate acuminate, base rounded above scaberulous, nerves sometimes pubescent, beneath tomentose, later stellate pubescent; nerves 12 to 16 pairs, 4 to 6 in. long, 1·5 to 1·8 in. wide; petioles 2 in. long. Peduncle extra-axillary, 3 in. long, 2- to 3-flowered, stellate-tomentose with 2 or 3 sub-rounded bracts. Flowers 6 in. across. Sepals reniform sub-acute united half-way. Petals nearly 3 times as long, broadly oval slightly obovate sub-acute pubescent. Anthers 3 outer ones barren, appendages flat, truncate. Torus hairy. Hab. Very rare. Perak (Scortechini). Distrib. Sumatra.


Tree. Young parts pubescent, branches very slender. Leaves thin obovate-oblong acute, base round cordate, midrib above pubescent, otherwise glabrous; nerves 10 to 14 pairs, fine elevate beneath; 5 to 7·5 in. long, 2 to 2·5 in. wide; petioles 1·5 to 2·5 in. long, scaly. Flowers axillary stellate-tomentose 1·5 in. across; pedicel 1·75 in. long. Bracts sub-orbicular. Sepals broad and short,

The habit and foliage are very like that of Cyathostemma Hookeri, but the flower is tomentose. Curtis describes this as a tree; I do not think it is an Uvaria at all, but I have seen no really adult flowers nor fruit. The stellate pubescence is peculiar.

6. UVARIELLA, Ridl.

Climbers with the habit and flowers of Uvaria. Flowers small extra-axillary solitary or few. Petals sub-similar. Stamens numerous with short broad appendages. Pistils hairy, 1-ovuled. Style 0. Carpels oblong or ovoid; stigma terminal. Seed 1. Species 4, India, Cambodia, Malay Peninsula.


A liane, 50 to 70 ft. long; young branches and petioles covered with ashy tomentum. Leaves coriaceous obovate-oblong blunt, or with a short blunt point, narrowed to the cordate base, above sparsely stellate-pubescent when young, glabrous except the midrib when adult, beneath softly densely tomentose; nerves 10 to 12 pairs; 3-5 to 5 in. long, 2-25 to 2-5 in. wide; petioles 2 to 2-5 in. long. Peduncles extra-axillary, 2-5 in. long. Flowers 3 to 4 on short pedicels. Bracts round hooded, all with the sepals stellate-tomentose. Flower 75 in. wide. Sepals often 4, semi-orbicular, blunt, connate below. Petals three times as long as the sepals, ovate-round obtuse pubescent on both sides, dark crimson. Anthers very small, appendages flattened oblique. Carpels numerous ovoid-rounded oblique, with a lateral beak, ashy pubescent, stalks slender, 1-5 to 2-5 in. long. Seed ovoid, flattened on one side. Hab. Rare. Johor at Pinerong (Cantley). Perak, Larut to 300 ft. altitude (Kunstler).

7. ELLIPEIA, Hook. and Thom.

Climber. Flowers yellow in terminal racemes. Petals connivent not spreading, outer 3 much larger than inner 3, all foveolate at base. Stamens numerous, appendages large. Pistil hairy; ovule 1 ventral. Style distinct and rather large. Carpels 1-seeded, stalked; style lateral. Species 1, Malayan.

The other species referred to this genus later by Hooker and by King are separated, E. nervosa Hook., and E. pumila King, being Popowias, E. glabra Hook., a Polyalthia and E. leptopoda an Uvariella.


A very lofty liane, as long as 150 ft.; young branches tomentose,
VI. ANONACEÆ.

[Ellipeia.

at length glabrous. Leaves thinly coriaceous, oblong or obovate-oblong abruptly shortly acuminate, base rounded or sub-cordate, above glabrous light green shining, midrib and nerves tomentose, below puberulous or glabrescent; nerves 16 to 19 pairs, conspicuous beneath; 4 to 7 in. long, r·5 to 3 in. tomentose. Flowers 1·75 to 1 in. across, yellow in short tomentose panicles. Bracts ovate, bracteoles round; pedicels 1·25 to 4 in. long. Sepals small, sub-orbicular connate below, yellow tomentose. Petals connivent in a cone-shaped mass; outer 3 much larger than sepals, round pubescent on both sides; inner 3 not much larger than sepals, round pubescent outside, glabrous inside. Anthers sessile, short, appendages broad round truncate. Carpels numerous, ovoid oblique blunt yellow tomentose, stalks long. Seed ovoid. Hab. Dense forest. Common. Singapore, Garden Jungle. Malacca (Maingay); Tabong (Griffith). Selangor, Semangkok Pass, 2000 to 3000 ft. altitude (Curtis). Perak, Goping (Kunstler).

8. CYATHOCALYX, Champ.


Flowers small; petals narrow lanceolate-acuminate . . (1) C. virgatus
Fruit oblong . . . . . . . . . . . . . . . (2) C. Maingayi


A tree 20 to about 60 ft. tall, nearly glabrous except the flowers. Leaves membranous, elliptic-oblong to oblong-lanceolate, light green, above glabrous shining, beneath pubescent on the 8 or 9 pairs of nerves, 4 to 6·5 in. long, r·25 to 2·75 in. wide; petioles 2·25 to 3·5 in. long, pubescent. Flowers in axillary sub-sessile fascicles of 2 or 3. Sepals connate at base, ovate or ovate-lanceolate, tomentose, short. Petals tomentose-silky cream colour, tinted with purplish at base, eventually widely expanded, outer 1·75 in. long, lanceolate long-acuminate, inner base orbicular concave long-acuminate 5 in. long. Stamens purplish, appendages short, obliquely truncate. Pistils 4 to 6, hairy. Torus conic truncate pubescent. Carpels 1 or 2, divergent, oblong-ovoid blunt at both ends, tomentose black, 2 to 3 in. long, r to r·5 in. through. Seeds 8 to 10, elongate, sub-reniform. Hab. In woods, often by streams, usually a small tree with slender twiggy branches. Singapore, Bukit Timah. Malacca (Maingay). Perak, Larut (Kunstler). Penang. Distrib. Java.

Tree 50 to 60 ft. tall, branches puberulous, otherwise glabrous. Leaves elliptic to oblong, often caudate-acuminate, base round or cuneate; nerves 13 to 15 pairs; 5-8 in. to 8-8 in. long, 2-75 to 3-75 in. wide; petioles .3 in. long. Flowers 1 to 3, racemose axillary; pedicels .05 to .75 in. long. Sepals ovate sub-acute puberulous .4 in. long. Petals green, with a reddish yellow spot at base, obovate shortly clawed puberulous, inner row sub-concave. Stamens, appendages flat orbicular oblique. Ovaries 3, pubescent; style lateral. Carpels brown, 1 or 2 globular, 1-75 in. through, pubescent. Seeds 10. **Hab.** In low country forest. Malacca (Maingay); Ayer Panas (Derry and Griffith). Perak, Larut (Kunstler). Penang, Telok Bahang (Curtis). **Native name:** Medang Tanjong.


Tall, slender, straight trees with straight projecting branches. Leaves large pubescent beneath. Flowers small yellowish white in crowded racemes on very short tubercles, on the old wood of the branches. Sepals 3. Petals 6, valvate in 2 series sub-equal, bases concave connivent, limb erect ovate or cylindric. Stamens many cuneate; anthers linear, cells lateral, appendages very small. Pistils 4 to 12. Stigma sub-sessile. Ovules 4 or more in 2 rows. Carpels globose. Seeds several. Species 3, Malay Peninsula and Sumatra.

Petals and sepals sub-equal; petals ovate-oblong broad (1) **D. pruniferus**
Petals longer than sepals, sub-cylindric narrow . . (2) **D. ramuliflorus**
Petals linear-oblong narrow keeled . . . . (3) **D. carinatus**


A tree 40 to 50 ft. tall, with stout spreading branches, pubescent at first. Leaves coriaceous elliptic to oblong acute or obtuse, base rounded sub-cordate, above glabrous except the tomentose midrib and 14 to 16 pairs of nerves, pubescent beneath, finally glabrous, 7-5 to 14 in. long, 3 to 6-5 in. wide; petioles .5 to 1-5 in. long, stout. Racemes 6- to 8-flowered; pedicels .5 to .75 in. long, tomentose. Bracts ob lanceolate. Flowers .75 in. long, yellowish white. Sepals and petals sub-equal, or petals little longer, tomen tose. Sepals ovate-oblong. Petals outer ovate-oblong broad sub-acute, constricted above the claw; inner closely connivent, much constricted above the claw, tips broad. Pistils silky. Carpels 6 to 8, sessile globose pubescent, 1 to 1-25 in. through. Seeds oblong, numerous, flat. **Hab.** In lowland forest. Common. Singapore. Perak, Larut (Kunstler). Pahang, Kwantan (Foxworthy), Penang Hill (Curtis). **Native names:** Antoi hitam and Antoi kuning. **Use:** In house-building.


(3) *D. carinatus* Ridl.

Tree, softly hairy. Leaves sub-coriaceous ovate or oblong acute, base round, above smooth, beneath glaucescent and glabrous, shortly thickly hairy; nerves 10 pairs, 6 in. long, 2-75 in. wide; petioles ’3 in. long. Flowers solitary on branches; peduncle short thick hairy ’25 in. long with a large round convolute bract. Sepals broad, almost reniform, ’12 in. long, ’25 in. wide, hairy. Petals oblong-linear blunt, keeled on back, pubescent constricted above the silky claw; ’75 in. long, ’12 in. wide. Stamens short oblong, appendages small. Ovaries 5, hairy; stigmas longer than stamens. Fruit very young, small, silky. *Hab.* Selangor, Sungei Buluh (Foxworthy). *Native name*: Malak.

10. ARTABOTrys, R.Br.

Sarmentose or climbing shrubs, seldom very stout. Leaves coriaceous usually small, dark green shining. Flowers solitary or more often fascicled on flattened, woody, recurved peduncles by which the plant climbs. Sepals 3, valvate. Petals 6 in 2 series, white or yellowish rarely green or pink, bases concave, connivent; limb lanceolate or sub-terete, generally narrow. Stamens oblong or cuneate, appendages short or long; anther-cells dorsal. Pistils few or many; style oblong or columnar. Ovules 2, erect. Carpels baccate. Species 40, tropical Africa and East Asia. Easily recognized by the peculiar flattened hooked branches by which the plants climb.

i. Platypetala. Petals broad, flat, lanceolate.

Flower under 1 in. long.

- Petals very fleshy, elliptic, blunt; leaves thin, 8 to 14 in. long
- Petals coriaceous lanceolate-acuminate; leaves thick, 2 in. long
- Petals elliptic, blunt; leaves thin, lanceolate, caudate

- Flowers 1 in. long.
- Leaves elliptic, coriaceous, 3 to 6 in. long

(1) *A. grandifolius*  
(2) *A. Scortechinii*  
(3) *A. pleurocarpus*  
(4) *A. venustus*
Leaves elliptic hairy strong-nerved, 6 to 8 in. long. 


A big liane 60 to 80 ft. long, glabrous except the flowers. Leaves thinly coriaceous pellucid-punctate elliptic-oblong to obovate sub-acute; base cuneate; nerves 10 to 12, inarching 1·25 in. from the edge; 8 to 14 in. long, 3 to 5 in. wide; petioles 1·4 in. long, stout. Petals very fleshy tomentose, outer 3 broadly elliptic, sub-acute, 1·75 in. long, 1·4 in. broad, inner 3 obovoid, tips incurved, shorter light brown. Carpels on a hemispheric torus, 1 in. across, on a stout 3 in. long peduncle, numerous elliptic-ovoid mammillate 1·5 in. long, 1 in. through; stalk 5 in. long, pericarp hard. Seed 1, ellipsoid blunt pale wrinkled. Hab. Low country forest, rare. Perak, Goping at 500 to 800 ft. altitude (Kunstler).


A glabrous liane. Leaves thinly coriaceous ovate-lanceolate shortly acuminate, base cuneate; nerves 9 to 11 pairs inarching 1 in. from the edge, 2·25 in. long, 0·9 to 1·3 in. wide; petioles 2 in. long. Peduncle 3- or 4-flowered; pedicels 0·5 in. long, puberulous. Bracts at base small ovate. Flowers 0·6 to 0·8 in. long. Sepals very coriaceous triangular acuminate connate at base, pubescent, 2·25 in. long. Petals coriaceous broadly lanceolate acuminate tomentose, inner 3 smaller. Appendages of anthers broad. Torus flat silky. Pistils glabrous. Hab. Very rare. Perak (Scortechini), Lankawi (Curtis).


A liane, glabrous except the flowers. Leaves coriaceous oblanceolate-oblong, tip abruptly shortly acuminate, base narrowed, shining and reticulate; nerves 10 pairs; 4 to 6·5 in. long, 1·5 to 2·25 in. wide; petioles 0·15 in. long. Peduncles flat stout much hooked densely pubescent. Flowers 1·5 in. long. Sepals broad ovate


A big liane 30 to 80 ft. long; young parts at first puberulous. Leaves coriaceous glabrous shining elliptic to elliptic-oblong, shortly acuminate, base rounded; nerves 7 to 10 pairs inarching •1 to •2 in. from edge; 3•5 to 6 in. long, 2 to 3 in. wide; petioles •2 to •25 in. long. Peduncles extra-axillary, rather slender in flower, thicker in fruit, tomentose, with 3 or 4 flowers; •75 in. to 1 in. long; pedicels slender, •5 to •1 in. long. Sepals broadly triangular sub-acute green with red hair outside, glabrous inside, •15 in. long. Petals tomentose outside, outer 3 ovate-lanceolate, sub-acute, inner 3 shorter, narrower, all pale yellow. Anthers short, appendages orbicular flat green. Pistils 10, oblong green. Carpels about 6, obovoid narrow at the base sessile, 2 in. long, green ribbed. Seeds 2, plano-convex, flesh colour, about 1 in. long and •6 in. wide. Hab. In hill forests. Perak; Thaiping Hills at 1000 ft. to 1500 ft. altitude; Goping (Kunstler). Distrib. Siam.


A big climber; young branches rufous-tomentose. Leaves thinly coriaceous large oblong-elliptic or elliptic shortly acuminate, base rounded, boldly reticulate, sub-bullate beneath, softly pubescent; nerves 10 to 12 pairs, inarching within the edges; 8 to 12 in., 2•75 to 5 in. wide; petioles •35 in. long, stout tomentose to glabrescent. Peduncles short, sometimes straight when young and curving in fruit, glabrous, pedicels •1 in. long, tomentose. Flowers •1 in. long. Sepals broadly ovate acuminate, •5 in. long, silky, tomentose outside, glabrous within. Petals sub-equal, ovate-oblong sub-acute contracted above the claw, silky except inside of the claw. Pistils numerous. Carpels obovoid tapering to base, tip mucronate, sessile densely tomentose, nearly •1 in. long. Hab. Low country; Singapore, Garden Jungle and roadsides near Tanglin. Perak, Waterfall, Thaiping.

Remarkable for its large leaves.


A big climber; young branches rusty-tomentose. Leaves very coriaceous elliptic to oblong blunt or shortly mucronate, base acute or rounded, above glabrous, beneath pubescent, becoming glabrous; nerves 9 to 10 pairs, 6 to 6•5 in. long, 1•75 to 2•75 in. wide; petioles •3 to •4 in. long, stout. Peduncles stout flat much
hooked; pedicels .3 to .4 in. long, tomentose thick. Bracts ovate. Flowers 1.25 in. long, yellow. Sepals ovate-lanceolate blunt pubescent on both sides. Petals coriaceous oblong-lanceolate densely tomentose on both sides, outer three larger. Carpels 8 sessile on a sub-globose torus on a very stout peduncle, ovoid or obvoid glabrous 1.25 to 1.65 in. long, .75 to 1.15 in. through. Seeds 2 oblong compressed .9 in. long and 6 in. wide. Hab. Not very rare in dense forest. Singapore, Bukit Timah. Malacca (Maingay). Perak, Thaiping (Kunstler). Distrib. Burma.


A glabrous climber 50 to 70 ft. long, young branches and inflorescence only pubescent. Leaves coriaceous oblong acuminate, base acute; nerves 10 to 12 pairs, inarching twice or thrice within the edge; 6.5 to 9 in. long, 2.5 to 3 in. wide; petioles .4 in. long. Peduncles stout, pubescent with 3 or 4 pedicels, 1 in. long. Flowers 1.35 in. long, light yellow. Sepals triangular acute red-pilose on both sides, .25 in. long. Petals base saccate, blade lanceolate subacute, tomentose on both surfaces, claw partly glabrous, partly white-haired. Anther-appendages flattened, oblong. Ovaries few, glabrous. Hab. Lowland forest. Rare. Perak, Larut Hills at 500 to 800 ft. altitude (Kunstler).


A stout climber, glabrous except the flower. Leaves thinly coriaceous, oblong-lanceolate, caudate-acuminate, base cuneate; nerves 8 to 10 pairs, inarching .2 in. within the margin; 3.5 to 6 in. long, 1.25 to 1.75 in. wide; petioles .25 in. long. Peduncles extra-axillary, 2- to 3-flowered; pedicels .5 to .75 in. long, all glabrous. Sepals triangular acute glabrous, .25 in. long. Petals puberulous elliptic-lanceolate obtuse, 3 outers 1.75 in. long, inners smaller. Appendages of anthers rounded. Pistils many, glabrous. Carpels sessile, ovoid. Hab. Perak (Scortechini). Very rare.


A stout climber 60 to 80 ft. long, glabrous except the flower. Leaves oblong-lanceolate, base cuneate; nerves 6 to 8 pairs; .3 to .5 in. long, 1.25 to 1.5 in. wide. Peduncles .75 in. long, glabrous; pedicels 2.75 in. long. Flowers green, turning yellow 1.5 to 1.75 in. long. Sepals small broadly ovate acute, .2 in. long. Petals much longer lanceolate obtuse pubescent, inner 3 smaller. Torus small silky. Pistils glabrous. Carpels numerous sessile glabrous narrowly elliptic tapering to both ends, tip caudate, 1 to 1.2 in. long, .4 in. through. Seeds 2, plano-convex, .25 in. long. Hab. Not common in forests. Perak, Larut Hills, 500 to 1000 ft. altitude (Kunstler). Kelantan, Chaning Woods (Ridley).

A slender climber 60 to 80 ft. long, glabrous except the petals. Leaves thinly coriaceous ovate-lanceolate acuminate, base cuneate; nerves 7 to 8 pairs inarching within the edge; 2-5 to 3 in. long, 1 to 1-75 in. wide; petioles 1-15 to 2 in. long. Peduncles much hooked, 4- to 6-flowered; pedicels 1-35 in. long. Flower 3 to 4 in. long. Sepals very coriaceous, semi-orbicular, concave. Petals sub-equal curved tomentose, outer 3 flattened linear thick, inners obtusely 3-angled base swollen, smaller. Appendages of anthers broad. Pistils 3 to 4, oblong; stigmas large. Torus villous. Carpels 3 to 4 sessile yellow obovoid glabrous, 8 in. long, 7 in. through. Seeds 2 compressed-ovoid. *Hab*. Lowland forests. Johor, Kota Tinggi. Selangor near Kwala Lumpur. Perak, Thaiiping, and Ulu Selama (Kunstler).


A climber 40 to 80 ft. long, glabrous except the flowers. Leaves thinly coriaceous deep shining green elliptic acuminate at both ends; nerves 7 to 9 pairs; 3-5 to 6 in. long, 1-35 to 2 in. wide; petioles 1-25 to 5 in. long. Peduncles flat curved glabrous. Flowers yellowish white, 1 in. long fascicled; pedicels to 1-5 in. long, pubescent. Sepals small, obtuse, 2 in. long. Petals, outer linear-oblone obtuse, the saccate base small, 1 to 1-25 in. long, 25 to 35 in. broad, inner smaller and narrower. Pistils 3 to 4 ovoid. Carpels sessile elliptic-globose mammillate glabrous yellow, 2-5 in. long, 1-5 in. through. Seeds 2, plano-convex, testa stony. *Hab*. Common in the south in woods, but seldom flowering. Singapore, Garden Jungle; Malacca (Maingay).


A tall climber 50 ft. or more long; stem black, usually glabrous except the petals, occasionally puberulous on the underside of the leaves and peduncles. Leaves thinly coriaceous dark shining green oblong-lanceolate to ovate-lanceolate-acute shortly acuminate, base acute, 3-5 in. long; petioles short. Peduncles thin hooked at first, thickening strongly as they age, glabrous or puberulous, with 5 to 15 flowers on pedicels, 3 to 45 in. long. Flowers 4 in. long, white creamy, tomentose. Sepals ovate acute, 1 in. long. Petals dilate at base, limb cylindric or clubbed erect, tips incurved. Anthers brown, appendages broad oblique. Carpels few, ellipsoid, obtuse, base narrowed, glabrous, 4 to 5 in. long, 25 in. through. Seed 1, ellipsoid, testa granular. *Hab*. The commonest species, very floriferous in October in forests. Singapore (abundant) to Penang. *Distrib.* Chittagong, Mergui, Burma, Malay islands. **Native name**: Akar Chenana.

A climber 15 to 80 ft. long; young branches pubescent. Leaves thinly coriaceous elliptic-oblong or ob lanceolate shortly acuminate, base cuneate above, glabrous shining, midrib tomentose, beneath puberulous when young; nerves 12 to 14 pairs, boldly inarching 3 in. from the edge with an outer series of arches; 7 to 9 in. long, 2·5 to 3·25 in. wide; petioles 2 in. long. Peduncles rather small hooked. Carpels 2 to 5, sessile, ellipsoid, glabrous. Seeds 2. Hab. Burma to (3) (i). young Gunong (-) flowers 43 glabrescent, pubescent; base ing Bot. black, green, peninsula, pubescent plant flowered. Aublet It into Leav es Philippines. many, ovules Leav es valvate. small, Leav es pendages valvate. (Kunstler).

11. CANANGIUM, Baill.

Tall trees with large membranous leaves. Flowers large or small, solitary or fascicled in short axillary cymes. Sepals 3, ovate-valvate. Petals 6, thin sub-equal green or yellow long flat, valvate. Stamens linear; anther-cells approximate extrorse; appendages lanceolate acute. Pistils many; stigmas sub-capitate; ovules numerous in 2 rows. Carpels many juicy stalked. Seeds many, testa black, crustaceous pitted, sending spinous processes into the albumen. Species 3, Burma to New Guinea and Philippines.

Leaves glabrous; flowers over 2 in. long . . . (1) C. odoratum
Leaves glabrescent; flowers 1 in. long . . . (2) C. Scortechinii
Leaves ovate to orbicular, woolly beneath deciduous;
flowers large

Dubious, glabrous; flowers 1 in. long; petals blunt . . (3) C. latifolium

(4) C. monosperma

(1) C. odoratum Baill. Hist. des Planies, i. 213.

The well-known Kenanga of the Malays, is not wild in the peninsula, only occurring in gardens and orchards, where planted. It is readily known by its large flaccid fragrant flowers, at first green, gradually becoming yellow, and its dark green, eventually black, pulpy fruit with the black-pitted seed.

Rumphius’ genus Cananga was pre-Linnean and thus is not retained, as Aublet unfortunately transferred this suitable name to a South American plant of a different genus.


A tall tree 30 to 40 ft. high, with puberulous branchlets becoming soon glabrous and dark coloured. Leaves membranous ovate base broad rounded, apex acuminate, at first pubescent, later glabrescent, gland-dotted; midrib and nerves 6 to 7 pairs appressed-pubescent; 2·5 to 6 in. long, 1·5 to 3 in. wide. Cymes short, few-flowered. Flowers 1 to 1·25 in. long; pedicels under 1 in. long pubescent; bracteoles median ovate -25 in. long. Sepals ovate
sub-acute pubescent, \( .35 \) in. long. Petals sub-equal linear-obtuse, claw short thickened pubescent. Stamens with bulbous appendages tapering to a point. Pistils numerous, oblong, glabrous except the base. Ovules 6 to 8. \( \text{Hab.} \) Rare in forests. Malacca, at Sungei Hudang (Derry). Perak, Kwala Dipang (Scortechini). \text{Native name:} Kasidang.


Tree 30 to 50 ft. tall; branchlets grey tomentose; leafless when in flower. Leaves membranous ovate to orbicular blunt, base round, glabrescent above, grey, tomentose beneath; nerves 7 to 9 pairs, 2 to 5 in. long, 1.65 to 3.5 in. wide; petioles \( .4 \) in. long. Flowers 1 to 2, extra-axillary; peduncle \( .5 \) to 1 in. long, with a lanceolate bract. Sepals oblong ovate acute connate at base. Petals oblong-lanceolate, inner row shorter, green tomentose. Stamens few; appendages ovate acute erect. Styles elongate. Carpels 20, oblong, \( .5 \) in. long; stalks thick, \( .4 \) in. long. Seeds 3. \text{Hab.} In dry places in the north in open country. Lankawi isles (Curtis). Perlis at Kanga. \text{Distrib.} Burma and Cambodia.

Pierre named this after Sir Dietrich Brandis. Safford, unfortunately, in putting it into the genus \text{Canangium}, altered \text{Brandisianum} into the meaningless \text{Brandesanim}.

(4) \text{Cananga ? monosperma} Hook. fil. F.B.I. i. 57.

Large tree with thick stem, half-way up the hill and about 5 ft. tall and as thick as the thumb at the top, glabrous, bark pale. Leaves thinly coriaceous broadly elliptic shortly bluntly acuminate, base cuneate oblique, glabrous; nerves 10 to 12 pairs, very slender and faint, midrib channelled and elevate beneath; 3.5 to 4.5 in. long, 1 to 3 in. wide; petioles \( .2 \) in. long, thick. Flowers solitary axillary on short \( .2 \) in. long peduncles. Sepals small ovate obtuse connate at base. Petals, outer valvate coriaceous broad ovate pubescent narrowed at base \( .4 \) in. long; inner rather narrower, more oblong. Anthers short broad cuneate, cells dorsal, appendages broad truncate. Style 0. Ovules numerous in 2 rows. Disc hairy. Fruit fusiform 1-seeded, \( .25 \) in. long, pedicel very short. \text{Hab.} Penang Hill (Maingay).

I have failed to find this plant on Penang Hill, nor has any other collector met with it. I hardly think it can be a \text{Cananga}, perhaps nearer \text{Cyathoealyx}.

12. \text{DESMOS}, Lour.

\text{Unona Hook. fil. and King}, not of Linné.

Shrubs, erect or scandent. Flowers solitary axillary or leaf-opposed, pedicelled. Sepals 3, valvate. Petals 6 or 3, sometimes 2, valvate. Stamens many cuneate; appendages globose or truncate,
ovaries many. Style ovoid or oblong, ovules 2 to 8 in 1 row. Carpels many, long and constrict between seeds. Seeds 2 to 6. Species 20, tropical Asia.

i. **EUDESmos.** Petals 6 in 2 rows.
   - Flower axillary; leaves glabrous
   - Flower opposite leaf; leaves glabrous.
   - Pedicel 4 to 6 in. long; leaves hardly glaucous beneath
   - Pedicel 1 to 2 in. long.
   - Leaves quite glaucous beneath
   - Leaves hairy, tomentose

   (1) **D. Dunalii**

   (2) **D. Cochinchinensis**

   (3) **D. chinensis**

   (4) **D. dumosa**

   (5) **D. dasymaschala**

   (6) **D. filipes**

ii. **DASYMASchALON.** Petals 3 or 2, long and often connate.

   Flowers broad 3 in. long; carpels many-seeded; pedicels short
   - Flowers narrow, 6 in. long; pedicels very long; carpels 1-seeded


A climber 60 to 100 ft. long. Leaves thickly membranous elliptic-oblong to oblong-lanceolate acute or acuminate, base rounded above, glabrous beneath and slightly glaucous, with occasionally a few hairs on the midrib; nerves 10 to 12 pairs; 3 to 4 in. long, 1-2 to 1-75 in. wide; petioles 1-2 in long. Flowers axillary solitary, 1-25 to 1-4 in. long on pedicels 35 to 5 in. long, slender pubescent, a minute bract in the middle. Sepals broadly ovate acute puberulous, 1-25 to 3 in. long. Petals narrowly oblong-lanceolate, sub-acute puberulous or glabrous yellow, 1 to 1-25 in. long, inner ones smaller. Carpels numerous, glabrous, 1-25 to 1-75 in. long, constricted between the 3 to 5 ovoid joints, yellow turning black, on stalks 1 in. long. *Hab.* Dense jungle and tops of limestone hills. Malacca (Griffith). Penang (Wallich and Curtis), Muka Head. Perak, Trong; Goping and Kol, 500 to 1800 ft. altitude (Kunstler). Distrib. Chittagong.


A slender climber 20 to 30 ft. long, or an erect shrub. Leaves thinly coriaceous oblong-acute or acuminate, base rounded, glabrous beneath pale; nerves 12 to 14 pairs; 4-8 to 8-8 in. long, 1-65 to 3-25 in. wide; petioles 35 in. long. Flowers solitary extra-axillary 1-35 to 1-75 in. long, green to dark yellow on a slender peduncle 4 to 6 in. long. Sepals ovate acuminate pubescent, 1-3 in. long. Petals ovate-lanceolate pubescent; the outer ones 2 in. long, 85 in. wide, inner ones smaller. Carpels numerous, 5 to 75 in. long, glabrous constrict between 2 to 5 oval joints, stalked. *Hab.* Open places and thickets. Malacca, Brisu (Derry). Pahang, Kwala...

Use: A decoction of roots for fever.


A shrub or climber 40 to 80 ft. long. Leaves membranous oblong to oblanceolate acute, base rounded, above glabrous, beneath glaucescent glabrous or pubescent; nerves 8 to 10 pairs; 3 to 7.5 in. long, 1 to 2 in. wide; petioles 0.25 in. long. Flowers solitary extra-axillary, 2 to 2.5 in. long, at first green becoming yellow; peduncle 1 to 2 in. long, slender pubescent. Sepals ovate-lanceolate, nearly glabrous, 0.4 to 0.6 in. long. Petals narrow lanceolate, glabrous or silky. Pistils oblong, hairy. Carpels numerous, 0.75 to 1.5 in. long, glabrous or pubescent, constricted between the 2 to 5 oval joints; stalks 0.25 in. long. Hab. Open country and borders of woods and thickets. Common up to 1800 ft. altitude. Singapore, Reservoir woods; Garden Jungle. Malacca, Bukit China Road (Maingay); Ayer Panas (Goodenough). Pahang, Kwantan (Foxworthy). Perak, Waterloo (Curtis); Kwala Dipang (Curtis); Batang Padang (Kunstler). Kedah. Lankawi, Tasek Enak (Hanifi). Jalar, Biserat (Gwynne Vaughan). Distrib. East Himalaya, Burma, Malay isles, China. Native names: Kenanga hutan; Akar Darah; A. Mariam; A. Singa; Poko Sikenchong. Use: A decoction used for dysentery.


A large climber; young branches tomentose. Leaves membranous broadly-ovate to oblong-ovate or oblanceolate-oblong blunt or sub-acute, base rounded, when young purplish tomentose on both sides, when adult glabrescent, except midrib; nerves 10 to 12 pairs; 2 to 5.25 in. long, 1.25 to 2.5 in. wide; petioles 0.15 to 3 in. long. Flowers solitary, leaf-opposed or extra-axillary, 2 to 2.5 in. long, greenish yellow, on pedicels 0.5 to 0.75 in. long, tomentose. Bracts near the base ovate. Sepals cordate or ovate acute tomentose 0.4 in. long. Petals obovate-spathulate to broadly ovate-lanceolate acuminate at both ends, densely pubescent at first. Carpels numerous glabrous, 0.75 to 1.4 in. long, constricted between the 2 to 3 ovoid joints, yellow turning dark purple. Hab. Not rare in open country and thickets. Singapore in Tanglin. Malacca; Perak at Thaiiping and Relau Tujor (Wray); Goping (Kunstler); Dindings, Lumut; Kelantan, Chaning Woods. Distrib. Assam. Native names: Akar Pisang-Pisang Padi; Akar Kinching Juhu.

(5) D. dasymaschala Safford l.c. 507. Unona dasymaschala

A shrub or treelet, about 12 ft. tall, glabrous or pubescent. Leaves thinly coriaceous oblong or elliptic-oblong acute or acuminate, base round or narrow, above glabrous dull green, beneath glaucous, midrib pubescent velvety; nerves, 10 to 12 pairs, 4.5 to 6 in. long, 1.5 to 3 in. wide; petioles 1 in. long, pubescent or brown velvety. Flowers axillary solitary pendent; pedicels 7.5 to 1.75 in. long. Sepals short broadly triangular, 1.5 in. long, pubescent. Petals 3, light orange cream colour ovate acute to lanceolate-acuminate, often twisted and usually connate for the greater part of their length, usually glabrous, 3 in. long, 0.4 to 0.5 in. wide. Anthers oblong, tips cuneate, white tipped with pink. Pistils densely villous. Carpels numerous, moniliform, joints 5 or 6 oval, 0.35 in. long, pubescent or glabrous. Hab. Woods and thickets; the commonest species, variable in amount of pubescence and size of flowers. Singapore, Garden Jungle; Bukit Timah; Jurong. Malacca (Maingay). Selangor, Sungai Buluh (Foxworthy). Perak, Thaiiping (Wray); Goping (Kunstler). Dindings, Pangkor (Curtis). Province Wellesley, Bukit Juru (Curtis). Penang, Pulau Adang. Kedah. Kelantan.

var. Wallichii Hook. fil. Branches tomentose. Johor, Tanjong Bunga; Perak, Goping (Kunstler), B'landa Mabok (Wray); Province Wellesley, Bukit Juru (Curtis). Distrib. Burma, Siam, Java, Sumatra. Native names: Jari Ayam; Kenanga Paya; Chenang hutan; Larut Api; Chin Ching.


A tree 10 to 20 ft. tall; bark black. Leaves elliptic acute, base round, thin coriaceous glaucous beneath, 9 to 10 in. long, 4 in. wide; nerves 15 pairs; petioles 0.5 in. long. Flowers solitary axillary brown or crimson on filiform pedicels 23 in. long. Sepals deltoid-ovate 1 in. long. Petals elongate linear-acuminate base wider, tips twisted, 6 in. long 0.5 in. wide at base. Stamens triangular ovate. Pistils flask-shaped, densely hairy. Carpels numerous, about 20, not moniliform, ellipsoid 1-seeded, 6 in. long, 0.4 in. through on stalks, 0.5 to 1.5 in. long. Hab. Forests; usually 2500 ft. to 3000 ft. altitude, but sometimes in the low country. Selangor, Menuang Gasing (Kloss). Perak, Thaiiping Hills (Kunstler, Wray). Kelantan, Kota Bharu.

King confused this very distinct plant with the Indian U. longiflora Roxb., and took his descriptions in the Materials and Annals of Calcutta Gardens, mainly from Indian specimens.
13. POLYALTHIA, Blume.

Trees or occasionally shrubs. Leaves usually coriaceous. Sepals 3, valvate or sub-imbricate. Petals 6 in. 2 series, ovate to linear, flat, or the inner ones slightly vaulted. Torus convex. Stamens cuneate; anther-cells extrorse. Pistils indefinite; ovules 1 to 5, basal and erect, or sub-basal and ascending. Carpels 1-seeded, drupaceous. Species 50, tropical Asia, a few in Africa and Australasia.

(a) Flowers on tubercles on the stem. Petals narrow lanceolate to linear.

- Flowers solitary, 3 in. long, glabrous; fruit 1-5 in. long.
- Flowers several, 2 in. long, pubescent; fruit 1 in. long.
- Flowers, petals very narrow, linear, crowded on trunk; fruit red, tomentose.

(b) Flowers mostly on branches (some also on stem-tubercles).

- Petals narrow lanceolate about 2 in. long.
- Leaves thin not glaucous. Trees nearly glabrous.
- Flowers yellow or orange; pedicels 1-50 in. long.
- Pedicels 5 in. long; flowers smaller.
- Branches and fruit large, short pedicelled red, hairy.
- Leaves stiff, rigid glaucous beneath.
- Dwarf shrub, leaves broad.
- Petals very narrow, linear, about 2-50 in. long, not spreading.
- Petals very narrow, linear, about 5 in. long, spreading.
- Petals very small, under 5 in. long, lanceolate; leaves glaucous.
- Flowers very small, hardly 5 in. wide.
- Leaves narrow linear acuminate; fruit and flowers glabrous.
- Leaves lanceolate, narrow; fruit glabrous.
- Leaves lanceolate-acuminate; petals lanceolate, hairy.
- Leaves lanceolate; petals oblong ovate.
- Petals hairy; fruit hairy.
- Leaves oblong-lanceolate, shortly narrowed at base.
- Leaves oblong, base minutely cordate.

(c) Flowers 1 in. long in clusters on the branches; branches hairy.

- Leaves bullate, 12 to 14 in. long; shrub.
- Leaves lanceolate 6 in. long, not bullate, hairy beneath.

(d) Flowers rather or quite large, on the boughs.

- Petals broad, thin-textured, on the boughs.
- Flowers 4 in. across (adult); leaves when young hairy.

(1) P. Wrayi
(2) P. desmantha
(3) P. stenopetala
(4) P. Beccarii
(5) P. cauliflora
(6) P. pycanatha
(7) P. cinnamomea
(8) P. sumatrana
(9) P. pumila
(10) P. angustissima
(11) P. asteriella
(12) P. hypoleuca
(13) P. dumosa
(14) P. parviflora
(15) P. hirta
(16) P. montana
(17) P. Kunstleri
(18) P. obliqua
(19) P. bullata
(20) P. velutinosa
(21) P. Scortechinii
Flowers nearly 3 in. wide (adult); leaves all glabrous.

Petals broad and blunt, oblong, coriaceous.

Flowers solitary, terminal over 2 in. long.

Flowers solitary extra-axillary, 1 in. long, pubescent.

Flowers solitary extra-axillary, golden hairy.

Flowers solitary axillary, 2 in. long; sepals and petals very broad and thick.

(e) Flowers on boughs in fascicles.

Leaves thin coriaceous; midrib above velvety.

Leaves stiff coriaceous, oblong-acuminate; nerves fine.

Leaves stiff coriaceous, broad elliptic; nerves prominent.

(f) Flowers in short-branched cymes on the boughs.

Cymes 2 in. long; flowers 1 in. long.

(g) Flowers fascicled on trunk about 1 in. long, pedicelled.

Leaves elliptic-lanceolate about 1 in. long.

Leaves very large oblong 12 to 15 in. long, over 6 in. wide.

(h) Flowers on short, stout branches on trunk.

Leaves elliptic to lanceolate, 4 to 6 in. long; fruit large, clavate.

Leaves oblong sub-cordate, 12 × 6 in.; flowers very large.

(i) Flowers on long subterranean shoots several feet long.

(2) *P. canangioides*

*P. pulchra*

*P. oblonga*

*P. chrysotricha*

*P. macrantha*

(22) *P. canangioides*

(23) *P. pulchra*

(24) *P. oblonga*

(25) *P. chrysotricha*

(26) *P. macrantha*

(27) *P. Hookeriana*

(28) *P. sclerophylla*

(29) *P. pachyphylla*

(30) *P. Curtisii*

(31) *P. glomerata*

(32) *P. lateriflora*

(33) *P. macropoda*

(34) *P. congregata*

(35) *P. hypogea*


A tree 40 ft. tall, with slender tomentose branches. Leaves thickly membranous, elliptic-oblong acuminate or obtuse, base rounded, glabrous above except the pubescent midrib, beneath puberulous; nerves 8 to 10 pairs inarching in two arches; 5.5 to 7.5 in. long, 2 to 2.65 in. wide; petioles 2 in. long, tomentose. Flowers in fascicles from tubercles on the large branches, 3 to 3.5 in. long, on slender pedicels 0.75 to 0.9 in. long, white, becoming claret colour or brick red. Sepals ovate-lanceolate sub-acute 0.3 in. long, puberulous. Petals linear-lanceolate acuminate 0.3 in. long, puberulous outside 0.3 in. wide. Pistils numerous pubescent; ovules 3 or 4, superposed. Carpels red ovoid or oblong obtuse glabrous, 1 to 1.25 in. long, on stalks 0.5 to 0.75 in. long. Seeds 3, oval, rugulose, 0.6 in. long. *Hab.* Perak, Lenggong; Kinta (Kunstler); Ulu Kenering (Wray).

Very near *P. desmantha*, but flowers solitary, longer and nearly glabrous.

Unona desmantha Hook. fil. F.B.I. i. 61; King, Journ. As. Soc. Beng. l.c. 60, pl. 83.

A small tree; young branches pubescent. Leaves coriaceous elliptic-oblong to ob lanceolate shortly acuminate, base acute above glabrous except the pubescent midrib, beneath paler puberulous, especially on nerves; nerves 8 to 11 pairs; 5 to 8 in. long, 2 to 3 in. wide; petioles 10 in. long. Flowers densely crowded on large tubercles on stem and larger branches; peduncles .75 in. long, puberulous. Sepals ovate acute, .3 in. long. Petals linear-oblong acuminate, base not dilate, 1 to 1.5 in. long; .2 in. wide, inner row narrower, orange colour. Ovules 3 to 5 superposed. Carpels globose, glabrous .5 in. through; stalks 1 in. long. Hab. Sandy woods. Singapore (Maingay); Changi; Chan Chu Kang. Johor, Sedanah. Malacca (Maingay); Selangor. Perak, Gunung Bubu and Selama (Kunstler); Dindings, Pangkor; Telok Sera (Curtis).


A slender tree 20 to 35 ft. tall; branchlets tomentose. Leaves thinly coriaceous oblong-obovate or ob lanceolate-acuminate, base narrowed cordate, glabrous except the pubescent midrib, 6 in. long, 2 in. wide; nerves 7 pairs, doubly inarching, slender; petioles very short. Flowers pedicelled in hairy tufts of 2 to 8 branchlets on tubercles on stem and branches, salmon colour or brick red. Sepals lanceolate acuminate conate at base, pubescent outside, .4 to .5 in. long. Petals narrow linear slightly wider at base pubescent, .25 to 3 in. long. Stamens numerous, connective broad flat. Ovaries 4 to 7 villous, ovules 4 or 5. Carpels sub-globular or ovate brown tomentose at first, .5 to .65 in. long, .5 in. through. Seeds 1 to 3, discoid rugulose. Hab. In dense forests, Malacca (Maingay). Selangor, KwaIa Lumpur; Petaling; Ginting Sempah. Perak, Kenering (Wray); Lenggong; Ulu Temengoh. Dindings, Brugas. 

Native name: Jambol Chichit.

(4) **P. Beccarii** King, Journ. As. Soc. Beng. l.c. 65; Ann. Bot. Gard. Calc. l.c. 81, pl. 110D.

A small tree 10 to 30 ft. tall; branchlets tomentose. Leaves sub-coriaceous, narrow oblong to oblong-lanceolate, glabrous shining; midrib pubescent above, tomentose beneath; nerves 6 or 7 pairs inarching far from the edge; 3 to 4.5 in. long, .75 to 1.35 in. wide; petioles .1 in. long, tomentose. Flowers 1-50 in. long, pendent from branches or trunk in tufts; pedicles slender, pubescent, .1 in. long. Sepals ovate obtuse .15 in. long, pubescent. Petals cinnamon brown, with a pink blotch at the base inside, linear oblong acute, pubescent. Stamens flesh colour. Ovaries pubescent 2-ovuled. Carpels numerous oval .3 in. long, white becoming red


Small tree, 12 to 30 ft. tall, 3 in. through. Leaves resembling those of *P. Beccarii*, lanceolate acuminate acute, base cuneate, glabrous, 6 in. long, 1-75 in. wide; nerves prominent beneath, 7 pairs, inarching within the margin; petioles 1 in. long. Flowers solitary or several together, pendulous from branches, yellow or orange; pedicels very slender, 1-50 in. long. Sepals ovate-lanceolate, acute, 1 in. long, pubescent. Petals narrow linear acute, base slightly wider, pubescent outside. Stamens, appendages ovate. Carpels ellipsoid 1-4 in. long, pubescent; stalks 1-5 in. long. *Hab.* Woods in the lowlands. Not rare. Singapore (Wallich *Uvaria cauliflora*, No. 6476); Bukit Timah; Garden Jungle. Johor, Kwala Tebing Tinggi. Pahang, Tahan River. Selangor, Sepang. *Distrib.* Sumatra, Borneo and Billiton.


Tree. Branchlets pubescent. Leaves coriaceous elliptic-oblong or oblong-lanceolate-acuminate, base blunt, glabrous above, beneath paler, and midrib puberulous, 6 to 9 in. long, 2-5 to 3-5 in. wide; petioles 2 in. long, pubescent. Flowers in tufts on old wood; pedicels 2-5 in long, pubescent. Sepals ovate acute, 2 in. long. Petals linear blunt, bases of inner ones concave, 5 to 7-5 in. long, silky outside. Torus flat-topped, glabrous. Ovules 2, superposed. *Hab.* Malacca (Maingay).

The flowers are in a very young state, with very short pedicels. The foliage is exactly like that of *P. cauliflora*, and I suspect that it is merely a state of this.


A tree 20 to 60 ft. tall; branchlets tomentose. Leaves thinly coriaceous narrowly oblong to oblanceolate tapering to each end, acute shining glabrous above, slightly pubescent beneath; midrib tomentose, nerves 12 to 14 pairs, inarching; 4-5 to 7-5 in. long, 1-25 to 2-25 in. wide; petioles 2 in. long, tomentose. Flowers sub-sessile solitary or in pairs on the old wood, 2 to 2-25 in. long, dull red; peduncles very short tomentose. Sepals sub-orbicular, 2-5 in. long, tomentose. Petals linear-oblong, sub-acute, pubescent outside, 2 to 3 in. long. Anthers numerous, appendages flat.


A medium-sized tree 30 to 60 ft. tall, glabrous except the flowers. Leaves coriaceous oblong-lanceolate acuminate, base acute, glabrous beneath; nerves 15 to 20 pairs, very slender; 4-5 in. to 6-5 in. long, 1.25 to 1.75 in. wide; petioles .25 in. long. Flowers green or yellowish, 1.4 to 1.75 in. long, solitary or 2 or 3 in fascicles below the leaves or axillary; pedicels .6 to .9 in. long. Sepals very small semi-ovate. Petals narrow linear-oblong sub-acute or

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**Fig. 6.—Polyalthia sumatrana.**

obtuse puberulous, outer ones slightly longer than inner ones, 1.15 to 2.2 in. wide. Ovaries glabrous with 1 ovule. Stigma hairy. Carpels ovoid, 1 in. long, 0.6 in. through, pinkish red mottled darker; stalks 5 to 6 in. long. Hab. Singapore, Selitar. Selangor, Negri Sembilan and Perak to 2500 ft. altitude, Goping and Larut (Kunstler). Distrib. Borneo and Sumatra.

A dwarf shrub 1 ft. tall; stem black hairy. Leaves nearly sessile, coriaceous, elliptic or oblanceolate, base broad, glabrous above, hairy beneath; nerves 12 pairs; 8 to 10 in. long, 3 in. wide; petioles hairy, 25 in. long. Flower solitary, axillary sub-sessile, orange colour. Sepals triangular lanceolate blunt hairy 1 in. long. Petals linear-lanceolate sub-acute, dilate at base silky, 2.25 in. long, 1 in. wide, inner ones longer (1.50 in. long) than outer ones, narrower glabrescent. Stamens minute, appendages rounded. Ovaries few. Stigmas silky. Hab. In woods Johor, Gunong Janeng (Kelsall). Drainings, Telok Scra (Ridley). Native name: Kenanga Merah.

The smallest species of any Anonaceous plant known to me.

(10) P. angustissima Ridl. Journ. Roy. As. Soc. S. Br. 54, p. 11:
Slender tree 20 ft. tall. Leaves glabrous, thinly coriaceous, 3 in. long, 1 in. across, young ones rose pink; nerves inconspicuous, 6 pairs; petioles 12 in. long, pubescent. Flowers pendulous on branches, in golden pubescent pedicels 1 in. long. Sepals 0.1 in. long, lanceolate-acuminate golden-hairy. Petals linear acuminate very narrow, base gibbous, hairy cherry pink tipped yellowish, 2.50 in. long, 0.1 in. wide. Stamens quadrate, few in 3 whorls, white. Ovaries 7 to 12, hairy. Carpels few, 2 or 3 globose, 3 in. long, glabrous red; pedicels 1 in. long. Seed 1 oblong brown. Hab. Sandy woods in the south. Singapore, Garden Jungle; Bukit Timah (Ridley). Johor, Kwala Sembrong (Kelsall). Native name: Sisik Managon.

Tree. Branchlets puberulous. Leaves thinly coriaceous lanceolate-acuminate base cuneate; nerves 10 pairs, elevate beneath, 6 in. long, 3 in. wide or less; petioles 2 in. long. Flowers few on a short pubescent hairy peduncle with small oblong bracts; pedicels hairy, 5 in. long. Sepals short ovate. Petals linear fleshy, very narrow from a broader base, 2 in. long. Stamens numerous, appendages flat. Pistils about 6, hairy; style very short. Stigma rather large. Hab. Perak: Thaiping Hills (Ridley).

The spreading short narrow blunt petals are unlike anything else.

A tree 50 to 80 ft. tall, glabrous except the flowers. Leaves
coriaceous oblong-oblanceolate or elliptic-lanceolate acuminate, base acute; nerves many pairs usually invisible when dry; 2-5 to 5 in. long, 0.75 to 1.75 in. wide; petioles 0.2 to 0.3 in. long. Flowers 0.3 to 0.4 in. long, light green or yellow, solitary or fascicled from the axils of fallen leaves; pedicels 0.15 in. long, tomentose. Sepals very small triangular pubescent. Petals linear-oblong obtuse pubescent on both sides. Carpels few, or solitary elliptic-oblong obtuse black, 0.8 in. long; stalks 0.1 to 0.25 in. long. Hab. Forests, Singapore (Maingay). Malacca (Maingay). Negri Sembilan, Perhentian Tinggi. Selangor, Klang (Foxworthy). Perak, Goping and Larut (Kunstler). Penang, Batu Feringi (Curtis). Distrib. Borneo. Native name: Melian.

(13) P. dumosa King, Journ. As. Soc. Beng. l.c. 52; Ann. Bot. Gard. Calc. l.c. 64, pl. 86A.

Shrub glabrous except the flowers. Leaves thinly coriaceous lanceolate or oblong-lanceolate acuminate, base rounded; nerves 8 to 9 pairs faint; 2.5 to 3.25 in. long, 0.5 to 0.9 in. wide; petioles less than 0.1 in. long. Flowers solitary, leaf-opposed, 0.3 to 0.35 in. long; pedicels 0.3 to 0.4 in. long. Sepals broad ovate acute or acuminate glabrescent. Petals sub-equal narrow oblong-acuminate, puberulous inside. Stamens numerous, appendages very broad rhomboid truncate. Ovaries very few pubescent. Stigma broad hairy. Carpels 1 or 2, ovoid-globose red, 0.25 to 0.3 in. long. Hab. Perak. No localities given, at 1200 ft. altitude (Wray, Scortechni).

Remarkable for its very narrow leaves.


Small tree; young parts brown hairy. Leaves thinly coriaceous glabrous except midrib, scurfy on back, lanceolate-acuminate, base cuneate; nerves 6 pairs, inarching far from margin; 3 to 4 in. long, 0.75 to 1.50 in. wide; petioles 0.12 in. long, hairy. Flowers solitary axillary sub-sessile; pedicels short hairy. Sepals ovate-lanceolate, half as long as the petals, hairy. Petals white linear oblong obtuse, 0.12 in. long, hairy on both sides. Stamens very numerous, appendages rounded. Carpels oblong to globose sessile hairy at tip, 0.3 in. long. Hab. Selangor, Menuang Gasing (Kloss). Adang Islands, Pulau Tengah, and on Lankawi Island at Kwala Malacca (Ridley).


Small tree. Branchlets hairy. Leaves lanceolate-acuminate, base round; nerves slender elevate inarching about 7 pairs; 4.5 in. long, 1 in. wide, midrib hairy, rest glabrous; petiole hairy 0.05 in. long. Flowers solitary sub-sessile, 0.5 in. wide. Sepals lanceolate acute hairy. Petals triangular lanceolate hairy outside. Stamens rather few, appendages broad. Pistils 6, hairy; style short but distinct; stigma broad sub-orbicular. Ovule 1. Hab. Penang, Pulau Betong (Curtis).
Tree. Young parts hairy. Leaves lanceolate acuminate blunt, base narrowed, coriaceous glabrous, 5 to 9 in. long, 1-8 in. wide; nerves 8 pairs; petioles pubescent, 2 in. long. Flowers solitary, 5 in. across. Sepals ovate hairy. Petals purple oblong ovate, blunt hairy outside, glabrous inside, outer shorter than inners. Stamens oblong, appendages elliptic small. Ovaries few, hairy. Stigmas glabrous. Carpels ellipsoid hairy, or pustulate when the hairs are fallen, half an inch long, on stalks 1 in. long. Hab. Selangor, Ulu Langat (Kloss).

The flower is often male only, with no pistils. It differs from P. dumosa King in the hairy petals and small oblong connectives.

A shrub or tree 30 to 40 ft. tall. Leaves oblong-lanceolate shortly and bluntly acuminate, base narrowed, above glabrous, beneath puberulous on midrib and nerves; nerves 6 to 12 pairs inarching 1 in. to 2 in. from the margin, prominent beneath, 4:5 to 8 in. long, 1:5 to 2:35 in. wide; petioles 2 in. long, pubescent. Flowers solitary or in pairs 4 in. across, tomentose; pedicels 2:5 in. long. Sepals ovate triangular obtuse broad, nearly as long as the petals. Petals broad oblong-ovate. Stamens numerous, appendages flat, truncate. Carpels numerous, ovoid-globular apiculate, 3 in. long, waxy red; stalks slender, 5 in. long, pubescent. Hab. Dense jungle on low hills. Pahang, Sungei Tahan. Perak, Batang Padang (Kunstler). Penang, Pulau Betong (Curtis).

Tree. Leaves sub-sessile, elliptic to oblong-lanceolate acuminate or acute, base unequally cordate, thinly coriaceous; nerves 7 to 8 pairs, inarching 15 in. from the edge, 4 to 6:5 in. long, 1:5 to 2:2 in. wide; petioles less than 1 in. long. Flowers small, 4 in. across, solitary, extra-axillary, very shortly pedicellate. Sepals broadly triangular blunt pubescent, less than half as long as the petals. Petals lanceolate sub-equal obtuse silky outside. Stamens numerous, appendages large flat. Ovaries few. Carpels oblong, narrowed at the base, 50 in. long. Seeds 2. Hab. Malacca (Griffith and Maingay).

A shrub 6 to 8 ft. tall; branches golden hairy. Leaves thinly coriaceous bullate, narrow oblong-acuminate, base cordate auricled, above glabrous except midrib, beneath midrib and nerves 25 to 40 pairs sparsely golden-hairy, nerves twice inarching, prominent; 12 to 14 in. long, 2:75 to 3:35 in. wide; petioles 25 in. long, pubescent. Flowers solitary, terminal or axillary, 1 in. long; pedicels as long,

The specimen given by King as "Singapore, Ridley," was collected by Cantley and the locality is doubtful.


Tree 20 to 30 ft. tall; branchlets red-hairy. Leaves lanceolate-oblong acute, base rounded, thinly coriaceous, above glabrous, beneath sparingly on the midrib and 12 pairs of nerves red-hairy, 6 in. long, \( 1.5 \) in. wide; petioles \( \cdot1 \) in. long, densely hairy. Flowers solitary, sessile on the branches. Sepals broad, triangular-ovate hairy, \( \cdot12 \) in. long. Petals linear oblong, sub-acute velvety outside, \( 1.25 \) in. long. Ovaries \( 1 \)-ovuled. Carpels \( 12 \) to 15, ovoid sessile brown velvety. Torus hairy. \textit{Hab.} Lankawi on Gunong Raya (Haniff).

Allied to \textit{P. bullata}, but the flowers and leaves smaller and the petals narrower.


Small tree 20 to 30 ft. tall. Leaves thinly coriaceous oblong or oblong-elliptic acute, base rounded or sub-acute, glabrous except midrib and nerves pubescent; nerves 8 to 11 pairs prominent beneath, inarching near the edge; \( 4 \) to 8 in. long, \( 1.15 \) to \( 2.25 \) in. wide; petioles \( \cdot25 \) in. long, pubescent. Flowers solitary or in pairs, axillary; pedicels \( \cdot5 \) to \( \cdot75 \) in. long, tomentose. Bracts in middle of pedicels rather large. Sepals small triangular pubescent. Petals flaccid, sub-equal oblong-lanceolate acute, margins wavy, minutely pubescent on both sides, \( 1.5 \) to 2 in. long, green, becoming at length yellow. Ovaries pubescent; stigma large glabrous. Carpels numerous ovoid pubescent, \( \cdot3 \) in. long; pedicels pubescent, \( \cdot75 \) in. long. \textit{Hab.} In forest. Singapore, Garden Jungle. Johor. Malacca, Ayer Panas (Goodenough). Perak, Bera; Goping and Larut (Kunstler). \textit{Native names:} Jangkang Hutan; Kenanga Hutan.


Tree 20 to 30 ft. tall, \( 12 \) in. through. Leaves membranous, glabrous oblong-lanceolate acuminate, base rounded; nerves 7 pairs, inarching some way from the edge; \( 4 \) to 7 in. long, \( 1.35 \) to 3 in. wide; petioles \( \cdot2 \) to \( \cdot3 \) in. long. Flowers large pale green becoming cream colour, solitary axillary, \( 1.75 \) to 3 in. across;
pedicels .6 in. long. Sepals sub-orbicular, puberulous. Petals rather thin, broad lanceolate or obovate to 3 in. long, 1.25 in. wide, narrowed at the base, puberulous or glabrous. Ovaries pubescent; ovule 1. Carpels oblong, numerous, apiculate, .4 in. long; stalks slender, .4 in. long. Hab. Malacca (Maingay). Perak, Larut (Kunstler). Distrib. Malay Archipelago.

This differs from P. Scortechinii in the smaller flowers (apparently adult) and always glabrous leaves. I am not sure that it is anything but a state of Scortechinii.


A medium-sized or small tree about 30 ft. tall, glabrous except the flowers. Leaves thinly coriaceous, elliptic to oblong-lanceolate acute or acuminate, base acute, minutely muriculate, 4.5 to 6 in. long, 2.5 in. wide; petioles .25 in. long. Flowers large solitary terminal, 2 in. or more across, dirty white with a purple spot at the bases of the petals, very fragrant. Sepals ovate acute glabrous, .6 to .75 in. long. Petals sub-equal ovate-elliptic sub-acute. Stamens numerous; appendages broad sub-orbicular, pubescent. Ovaries oblong, pubescent; style short, cylindric. Carpels numerous, elliptic-ovoid glabrescent purple, stalks 1.5 in. long, crimson. Seed 1, elliptic. Hab. Mountain woods to 5000 ft. altitude or more. Pahang, Gunong Tahan. Selangor, Menkuang Lebah (Robinson). Perak, Welds Rest, Gunong Kerbau (Robinson).

var. angustifolia King, l.c. Leaves narrower, 1.75 in. wide; petals narrow lanceolate, 1.75 in. long. Hab. Perak, Gunong Bubu at 5000 ft. altitude (Wray).

One of the very few mountain Anonaceae.


A small tree 10 to 15 ft. tall; young branches tomentose. Leaves thinly coriaceous sub-sessile oblong to oblong-lanceolate shortly acuminate, base minutely cordate unequal, glabrous above, puberulous beneath; midrib pubescent, nerves 14 to 20 pairs; 9 to 14 in. long, 3.5 to 5 in. wide; petioles .15 in. long, tomentose. Flowers solitary from small tuberces, 1.25 to 1.75 in. across, Sepals semi-orbicular acute connate pubescent. Petals waxy light yellow, oblong tapering to the sub-acute tip, pubescent on both sides. Carpels 10 to 20, ovoid or orbicular pubescent or sub-glabrous, .3 to .35 in. long; .6 to .75 in. wide. Seed 1, ovoid or 2 plano-convex. Hab. Mountain forests. Perak, Larut Hill ranges and Gunong Pondok at 1000 to 2000 ft. altitude (Kunstler); Hermitage Hill (Curtis). Penang Hill (Curtis).

(25) P. chrysotricha Ridl. n.sp.

Branches golden-hairy. Leaves oblong-ovate acute, base

I have only seen a single incomplete flower, peculiar from the large sepals and very numerous ovaries. I am not sure it is a Polyalthia, but, if so, it is near *P. oblonga."


Tree 60 to 70 ft. tall. Leaves coriaceous oblong or elliptic-oblong acute, base cordate, glabrous; nerves 20 to 24 pairs; 12 to 18 in. long, 4'5 to 7'5 in. wide; petioles 4 in. long, thick. Flowers solitary, axillary waxy, cream colour, 2'5 to 4'5 in. across; pedicels 1'5 to 2 in. long. Sepals ovate-orbicular obtuse at base puberulous coriaceous. Petals oblong-elliptic large blunt fleshy puberulous, 1'3 to 2'9 in. long; inner ones smaller. Stamens numerous, appendages truncate. Ovaries few, puberulous. Carpels elliptic-ovoid, blunt, 1 to 1'25 in. long, 7'5 in. through. Hab. Forests. Perak, Larut Hills at 300 ft. altitude (Kunstler).


A tree 20 to 70 ft. tall; young parts pubescent. Leaves membranous obovate-elliptic or oblanceolate shortly acuminate, base cuneate, glabrous except the nerves, 10 to 11 pairs, and midrib pubescent on both surfaces; 5 to 7 in. long, 2'25 to 3'25 in. wide, petioles 1'5 to 2 in. long, tomentose. Flowers yellowish red in pairs from peduncles with abortive flowers at the base, extra-axillary; pedicels 5 to 7'5 in. long, pubescent. Bracts 1 to 2, ovate. Sepals broad ovate concave, free or nearly so to the base, pubescent outside, 2 in. long. Petals yellowish sub-equal ovate or obovate-oblong sub-acute puberulous, nearly 1 in. long. Stamens very short, appendages thick truncate-elliptic. Ovaries oblong, puberulous, 1-ovuled; stigma sessile large lobed. Carpels numerous, ovoid, apiculate, base narrow, red, 6'5 in. long, stalks 1'2 in. long. Hab. Hilly forests, Perak, Larut and Batang Padang district (Kunstler). Pahang, Bukit Goh (Foxworthy).


A small glabrous tree. Leaves stiff coriaceous oblong acute, base cuneate; nerves 10 to 12 pairs, slender, reticulations distinct; 6 to 18 in. long, 1'5 to 2'6 in. wide; petioles 5 in. long. Flowers fascicled on trunk, 2 in. across, green: peduncles 1 to 1'5 in. long, pubescent; bracts small, orbicular. Sepals ovate obtuse, short. Petals, linear oblong obtuse puberulous, 1'6 in. long. Ovaries pilose.
Carpels elliptic-oblong, 1 to 1'5 in. long; stalks 1 to 1'5 in. long. Hab. Malacca (only collected by Maingay).


A tree 50 to 100 ft. tall; branchlets pubescent. Leaves stiffly coriaceous elliptic-oblong sub-acute, base rounded, glabrous except midrib tomentose beneath at the base; nerves 11 or 12 pairs; 4'5 to 7'5 in. long, 1'75 to 3'5 in. wide; petioles 35 to 5 in. long, tomentose. Flowers few in tufts from old wood; pedicels 2 in. long, tomentose. Sepals semi-orbicular short tomentose. Petals pale green nervé, oblanceolate sub-acute or obtuse, pubescent outside, tomentose inside, outers shorter and narrower, 9 to 1'5 in. long, 3 to 5 in. wide. Stamen-appendages truncate. Ovaries numerous glabrous; stigma sessile, puberulous. Carpels numerous obvoid blunt, 1'75 in. long, 1 in. through with a short stalk. Seeds 2. Hab. Perak, Larut Hills below 500 ft. altitude (Kunstler).


A tree; young branches and inflorescence brown, pubescent. Leaves coriaceous oblong or elliptic, base round or acute, glabrous; nerves 9 pairs, 4 to 5'5 in. long, 1'5 to 2 in. wide; petioles 1'25 in. long. Cymes shortly peduncled, axillary 3- to 4-flowered, 1 to 1'5 in. long, golden-hairy. Flowers 1'5 in. across. Bracts oblong, sub-amplexicaul. Sepals ovate-lanceolate acute, 2'5 in. long. Petals, outer linear-oblong hairy outside, sub-acute 1 to 1'5 in. long; inner shorter obtuse spatulate obovate. Pistils strigose above, i-ovuled. Carpels sub-globose, 6'5 in. long; stalk 1'75 to 1'25 in. long. Seed oblong with a deep longitudinal furrow. *Hab. Malacca (Maingay). Penang, Telok Bahang (Curtis).


Tree 40 to 50 ft. tall. Leaves membranous, elliptic or oblong acute, base slightly cuneate, reticulate, glabrous except puberulous midrib; nerves 7 to 8 pairs, not inarching, slender; 4 to 6 in. long, 1'8 to 2'6 in. wide; petioles 2'5 to 3'5 in. long. Flowers 2'5 in. long, 20 to 30 together on a stem tubercle; pedicels 1'5 to 2'5 in. long, slender, puberulous. Bracts ovate-lanceolate. Sepals lanceolate acuminate, bases broad connate. Petals linear-oblong, base slightly concave, minutely tomentose; inners slightly smaller. Stamens, appendages orbicular sub-convex. Ovaries few, oblong, hairy. *Hab. Perak, Thaiping Hills 2800 to 3000 ft. altitude (Kunstler); Sira Rimau (Yapp). Distrib. Sumatra and S. Siam at Trang.

Tree 50 to 70 ft. tall, glabrous except flowers. Leaves coriaceous elliptic-oblong or oblong abruptly acute, base rounded sub-cordate unequal; nerves 12 to 16 pairs, prominent; 8 to 15 in. long, 2'5 to 7 in. wide; petioles stout, 3 in. long. Flowers fascicled on stem and branch tubercles 1'25 in. to 2 in. long, greenish yellow; pedicels pubescent, bi-bracteate, 1'25 to 1'75 in. long. Sepals ovate-orbicular short densely tomentose outside. Petals greenish yellow, dull crimson at base, oblong-lanceolate tapering to a sub-acute tip; outer ones shorter than inner, minutely pubescent. Carpels ovoid-elliptic, blunt, base narrowed, 1'25 in. long, '7 in. through; stalks stout, 1'25 to 2 in. long. Hab. Singapore (Maingay). Perak: Ulu Bubong and Larut Hills (Kunstler). Distrib. Java.


A tree 30 to 60 ft. tall. Leaves rather thin oblong-lanceolate acuminate, base acute, midrib pubescent, otherwise glabrous; nerves 8 to 9 pairs, prominent; 3'5 to 5'5 in. long, 1'4 to 2'1 in. wide; petioles 1'25 in. long. Flowers fascicled on tubercles near the stem-base, pink and white, 1 in. long; pedicels 1 in. long. Sepals ovate acute corrugated. Petals elliptic blunt, coriaceous puberulous. Stamens numerous, appendages transversely elongate. Carpels on a large rounded woody torus, oblong fusiform, tapering at each end, bright orange colour, narrowed into the stalk, 2'5 to 3'5 in. long including the stalk. Seed 1, elongate-ovoid, grooved. Hab. Dense forests, usually in rocky places. Singapore: Bukit Timah; Selitar. Perak, Goping and Ulu Kal (Kunstler); Penang, Richmond Pool.

I cannot separate King's two species, and believe that Beccari's *Polyalthia anomala* from Matang, Sarawak, is the same plant.


A tree 40 to 60 ft. tall. Leaves thinly coriaceous, oblong-elliptic acute narrowed to the rounded base, glabrous except the puberulous midrib; nerves 13 to 19 pairs, prominent beneath; 6 to 16 in. long, 3'75 to 7 in. wide; petioles 3 to 4 in. long, stout. Flowers large, white, in woody cymes from the trunk; pedicels 1'25 to 1'75 in. long. Bract orbicular. Sepals broadly ovate-triangular concave corrugate, puberulous outside, 5 in. long. Petals thick ovate-elliptic sub-acute, puberulous except at base; outers 1'5 to 3 in. long, 6'5 to 1 in. wide, inners narrower. Stamens numerous; appendages truncate oblique. Ovaries 20 to 30, strigose; stigma oblong pubescent. Carpels elliptic beaked pubescent, narrowed into the short stalk. Hab. Wet woods, usually on limestone, Selangor, Batu Caves; Ulu Gombak. Perak, Goping and Ulu Kal (Kunstler).
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Tree 25 to 30 ft.; young parts densely tomentose. Leaves thinly coriaceous oblong or elliptic-oblong or obovate, base narrowed round, glabrous; nerves 18 to 22 pairs, prominent beneath; 10 to 20 in. long, 3 to 7 in. wide; petioles 4 in. long, stout, tomentose. Flowers on pubescent branches 1 to 8 ft. long from the trunk-base, cream colour, '75 to 1 in. long; pedicels '75 to 1.5 in. long. Bracts tomentose, one lanceolate median, one sub-orbicular near the flower. Sepals broad triangular-ovate acute tomentose, '25 in. long. Petals narrow oblong sub-acute pubescent outside, inner smaller. Stamens numerous, appendages broad convex oblique. Ovaries few villous; stigma large, ovoid. Carpels ovoid dark velvety greenish brown. Hab. Hill woods in Perak, 500 to 3400 ft. altitude. Thaiping Hills and Gunong Batu Putih (Kunstler).

Easily distinguished by its long subterranean flower branches.

EXCLUDED SPECIES

P. nitida Hook. fil. F.B.I. i. 64, was based on a fruiting specimen from Tavoy (Wall. Cat. 6439) and a flowering specimen which may not be the same species labelled "Singapore Lobb."

P. simiarum var. angustifolia King, Journ. As. Soc. Beng. l.c. 58. The plants so labelled by King in Herb. Kew bear no resemblance to the Indian P. simiarum either in flowers or leaves; one sheet is undoubtedly P. Hookeriana King. The other consists of leaves of some species unknown to me, and detached carpels identical with those of P. lateriflora.

P. aberrans Maing. Hook. fil. F.B.I. i. 67 is Sphærocoryne aberrans Ridl.

P. sub-cordata Bl. See Milinusa amplexicaulis Ridl.

14. SPHÆROCORYNE, Scheff.

Scandent shrubs or small trees. Leaves coriaceous or membranous. Flowers solitary axillary rather small. Sepals ovate valvate. Petals, outer ones much larger ovate; inner ones ovate much smaller, base flat, not excavate. Stamens numerous oblong, appendages flat truncate. Pistils longer, projecting. Ovaries hairy; styles cylindric, glabrous. Stigma bi-lobed. Ovules 1 or 2. Carpels sub-globose on long stalks. Seed 1, oblong. Species 3, Siam, Cambodia, Sumatra.


A slender climber 30 to 100 ft. tall. Leaves membranous glaucous beneath, lanceolate acuminate glabrous; nerves 14 to 18 pairs
fine; 3'5 to 5 in. long, 1'4 to 1'8 in. wide; petioles 1'2 to 1'25 in. long. Flowers 1'5 to 1'75 in. across, on peduncles 1 in. long. Sepals connate into a three-angled cup. Petals ovate-orbicular acute, outer ones 1'35 in. long, pubescent, inner ones half as large. Carpels on a peduncle 2 in. long and with pedicels over 1 in. long, oblong or ovoid, 1'5 in. long. Seeds 1 or 2, ovoid. Torus globose. Hab. Forests. Malacca (Maingay); Kemandor (Burkill). Selangor, Ulu Selangor (Kunstler). Perak, Goping (Kunstler).

15. ANAXAGOREA, St. Hil.

Shrubs or treelets. Leaves thin, dotted. Flowers small, green, leaf-opposed solitary. Sepals 3, valvate connate at base. Petals 3 or 6, sub-equal (inner row sometimes wanting). Stamens indefinite. Ovaries few; ovules 2, collateral-sub-basal. Carpels follicular curved club-shaped, with a long stalk. Seeds 1 or 2, hard, shining, black, plano-convex. Species about 8, Tropical Asia and America.

Petals 6
Petals 3

(1) A. luzonensis
(2) A. Scortechinii


A bush or shrubby tree 30 to 40 ft. tall, glabrous. Leaves thinly coriaceous elliptic-oblong, abruptly acuminate, slightly narrowed to the base; nerves 7 to 9 pairs; 6 to 8 in. long, 2'5 to 3'5 in. wide; petioles 3 to 4 in. long. Flowers 1'75 in. long, green, pedicels 3 in. long. Sepals ovate acute pubescent. Petals 3, much larger, oblong-lanceolate sub-acute, pubescent outside, fleshy. Ovaries numerous pubescent. Carpels 5 or 6, stalks 1 in. long, sulcate; follicles 1'5 in. long, ovoid curved apiculate. Seeds pear-shaped plano-convex 1'5 in. long, polished black. Hab. Woods, Pahang, Tahan woods. Malacca (Maingay). Selangor, Kanching Camphor forest; Dusun Tua. Perak, Larut Hills; Goping (Kunstler); Batu Kurau (Scortechini); Gapis Pass (Curtis). Lankawi. Native names: Pali
Monyet; Bunga Lerak. *Use*: The natives put the seeds among clothes (Burkill).

This has much larger fruit and flowers than *A. luzonensis* Gray.


Shrubs or treelets. Leaves oblong. Flowers few terminal. Sepals 2, large concave valvate. Petals 4, spatulate narrow, incurved, on the margin of the torus. Stamens numerous, appendage broadly orbicular. Ovaries 10 to 15, ovoid; style short terete; stigma small. Ovule i. Species 4, Malay Peninsula and islands.

![Diagram of Disepalum anomalum](image)

**Fig. 7.—**Disepalum anomalum.


17. **GONIOOTHALAMUS**, Blume.

Small trees or shrubs. Leaves usually coriaceous. Flowers solitary or fascicled often on old wood; peduncles with scaly,
distichous bracts. Sepals 3, valvate, outer thick flat; inner smaller shortly clawed, cohering in a vaulted cap over the stamens and ovaries. Stamens many, linear-oblong; anther-cells dorsal; appendages oblong or truncate. Ovaries many; style cylindric; stigma simple or bifid. Ovules 1 or 2 superposed (rarely 4). Carpels 1-seeded. Species about 50, East Asia.

_Slender shrubs_; flowers axillary, small, green; leaves membranous; ovules 1 or 2.
Leaves oblong narrow, base short narrowed; nerves inconspicuous; style slender.
Leaves long-caudate, base narrow; style very short.
Leaves elliptic, abruptly caudate.
Leaves sub-coriaceous, lanceolate narrowed both ends.
_Tall, erect shrubs_; flowers large; leaves coriaceous.
Flowers very large yellow; petals 2·5 in. long.
Flowers about 1 in. long.
Leaves oblanceolate, 12 in. long, strong-nerved.
Leaves elliptic, very coriaceous, 6 to 8 in. long; nerves very inconspicuous.
Leaves oblong cuspidate, very coriaceous, 6 to 8 in. long; nerves very inconspicuous.
Leaves rather oblong-oblanceolate; conspicuously nerved.
Flowers 5 in. long.
Flowers 1·5 in. long; sepals large.
Flowers 1·5 in. long; sepals small; petals acuminate.

_Tree_. Leaves over 12 in. long, pubescent beneath; flowers large.

_Big tree_. Flowers large, fleshy in masses at base of trunk.

_Shrub_. Ovules and seeds 4.

Shrub or treelet, to 30 ft. tall, branchlets puberulous. Leaves membranous, narrow, oblong, acuminate at each end; nerves 10 to 12 pairs, invisible or very faint; 3·5 to 6·5 in. long, 1·25 to 1·75 in. wide; petioles 2 in. long. Flowers solitary, axillary, 7'5 to 9 in. long, pale green; pedicels 4 to 6 in. long. Bracts 0. Sepals broadly ovate-acuminate pubescent, 3 in. long. Petals thinly coriaceous puberulous, lanceolate acute, inner ones half as large as outer ones, shortly clawed. Stamen-appendages broad orbicular. Ovaries narrow oblong; stigma entire. Carpels ovoid to oblong glabrous, 5 to 7'5 in. long; stalks 3'5 to 4'5 in. long. _Hab._ Thick forest, Perak, Goping (Kunstler). Kedah Peak (Haniff). Kelantan, Chaning Woods.

A bush or treelet 6 to 8 ft. tall glabrous. Leaves membranous
lanceolate acuminate, base acute; nerves 8 to 11 pairs inarching within the margin, faint; 4'5 to 7 in. long, 1 to 1'75 in. wide; petioles 2 in. long. Flowers axillary solitary; pedicels slender 35 to 45 in. long. Bracts 2. Sepals free membranous green nervcd ovate-acute, 7'5 to 11'1 in. long. Petals green, thinly coriaceous broad lanceolate acuminate, narrowed at base, outer ones 1 to 1'2 in. long, inner ones less than half as long ovate-acuminate clawed pubescent. Stamens, appendages broad, pubescent. Ovaries few, 1- or 2-ovuled; style long; stigma funnel-shaped toothed. Carpels ovoid enveloped in calyx, 4 to 5 in. long; stalks 2 in. long. Seeds 1 or 2. Hab. In forests, Selangor, SUNGEI BULUH. Perak, THAIPING Hills 2000 to 3000 ft. altitude; SUNGKAI River (Kunstler). DinDings, LUMUT.


Shrub? Branches slender velvety pubescent. Leaves elliptic acute or caudate, apex obtuse, base shortly cuneate or rounded, membranous glabrous, 4'5 in. long, 1'5 in. wide; nerves 7 to 10 pairs, depressed above, elevate beneath; petioles 1 in. long. Flowers solitary extra-axillary on branches, pedicels thick, 2 in. long, glabrous. Sepals ovate acute, hairy on edges, bases broad 3 in. long, 2 in. wide, veined and reticulate. Petals, outer ones lanceolate, 6 in. long pubescent, inner ones ovate, 3 in. long obtuse pubescent. Stamens numerous, narrow linear, appendages broadly conic, blunt. Ovaries numerous, glabrous. Hab. Perak, Pondok Tanjong (Burn-Murdoch).

Small tree or shrub 3 to 12 ft. tall, glabrous. Leaves membranous lanceolate or oblanceolate acuminate at each end; nerves 14 to 18 pairs, slender, very inconspicuous; 4'5 to 9 in. long, 1'25 to 2 in. wide; petioles 2 to 2'5 in. long. Flowers solitary on branches or pedicels 35 in. long. Sepals membranous reticulate, ovate acuminate, puberulous outside, 2 in. long. Petals subcoriaceous puberulous greenish yellow, outer ones narrow lanceolate acuminate, bases thickened, 65 to 75 in. long, inner ones half as long, ovate acuminate. Anthers shorter than ovaries, appendages long acuminate. Ovaries 20, hairy; 1- or 2-ovuled; style stout; stigma truncate. Carpels ovoid-oblong, apiculate, 6 in. long. Seed 1, rarely 2. Hab. Perak; very common in the hill woods, Gunong Batu Putih (Wray).

A tall, slender tree 30 to 70 ft. high. Leaves coriaceous, glabrous
above, puberulous beneath, oblong acuminate, base cuneate; nerves 10 to 14 pairs, very slender, 6 to 10 in. long, 2·25 to 2·75 in. wide; petioles 2·5 in. long, deeply channelled. Flowers very large 3 to 5 in. long, golden yellow, from the axils of leaves pendulous; pedicels 1 in. long pubescent. Sepals ovate acute pubescent, 1·5 in. long. Petals coriaceous pubescent ovate-oblong, inner ones 6 in. long, ovate acute, golden silky. Stamens very numerous. Ovaries hairy, 2-ovuled; style long, slender; stigma 2-lobed. Carpels about 20, oblong tapering to the stalk, 1·25 to 1·5 in. long, 1·5 in. through; stalk stout 2·5 in. long. Seeds 1 or 2. Hab. In thin woods; common; a very handsome species. Singapore, Johor, Malacca, Pahang, Perak, Penang, Lankawi. Native names: Penawar hitam (lit. black drug); Galang hitam.


Leaves coriaceous large oblong-lanceolate acute or acuminate, base sub-cuneate or rounded; nerves 16 to 20 pairs, slightly prominent beneath; 10 to 18 in. long, 2·5 to 4·5 in. wide; petioles 6 to 1 in. long, stout. Flowers slightly supra-axillary or pendulous from branches below the leaves, 1 or 2, green; pedicels 3·5 in. long. Sepals broadly ovate acute connate at base, 6·5 in. long, puberulous. Petals coriaceous, outer ones oblong-lanceolate acute, 1 to 1·5 in. long, inner ones half as long, ovate acuminate, edges ciliate. Stamens numerous. Ovaries 12 to 18, glabrous, 1-ovuled. Stigma bilobed. Carpels globular obovoid glabrous 4 in. long. Hab. Common in woods all over the peninsula. Malacca, Ayer Panas (Griffith). Selangor, Sempang, Semangkok. Perak, Goping and Larut (Kunstler). Penang: West Hill (Curtis). Pulau Adang. Distrib. Sumatra, Java. Native names: Penawar hitam; Bongsoi. Use: In native medicine; the wood is aromatic.


A small glabrous tree, 15 to 20 ft. tall. Leaves coriaceous oblong-elliptic to oblong abruptly acuminate, base cuneate; nerves faint, 12 to 15 pairs; 5·5 to 9 in. long, 1·5 to 2·75 in. wide; petioles 2·5 in. long, channelled. Flowers solitary pink or green from below the leaves; pedicels 3·5 to 5 in. long, pubescent. Sepals ovate-triangular acuminate, connate at base, pubescent, 2·5 in. long. Petals coriaceous, outer ones broad ovate acuminate, minutely tomentose, keeled outside, 1 to 1·25 in. long; the inner ones one-third as long. Stamens numerous. Ovaries 15, hairy; ovules 3 to 4; style long, slender; stigma sub-capitate, bilobed. Carpels narrow, oblong apiculate narrowed to each end glabrous, 1·5 in. long, 5 in. across; stalks thick 1 in. long. Seeds 2 to 3, flat ovoid black. Hab. Common in woods. Singapore, Bukit Timah; Pulau Damar.
Goniothalamus.]

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A shrub or tree 15 to 40 ft. tall, glabrous. Leaves coriaceous oblong abruptly acuminate, base rounded or cuneate; nerves 10 to 12 pairs, thin very indistinct, 5'5 to 9 in. long, 2'5 to 3'25 in. wide; petioles '3 in. long. Flowers yellow, solitary or fascicled on the branches, pedicels '4 in. long. Sepals free ovate acute pubescent, '4 in. long. Petals coriaceous puberulous; outer ones ovate-lanceolate, thickened and contracted at the base, 1'75 in. long, inner ones '65 in. long. Appendages conic. Ovaries hairy; stigma sub-discoid, 2- to 3-lobed. Carpels ovoid, sub-sessile, '4 to '5 in. long. Hab. Woods, Singapore, Selitar; Jurong. Muar, Biawak (Curtis). Negri Sembilan, Tampin Hill. Perak, Larut (Kunstler). Dindings, Pangkor (Curtis). Penang: West Hill (Curtis). Distrib. Borneo, Sumatra. Native name: Galai.


A shrub 4 to 10 ft. tall; branchlets puberulous. Leaves thinly membranous oblancoate abruptly acuminate, base cuneate, glabrous; midrib puberulous, nerves 11 to 13 pairs, inarching within the margin; 6 to 9 in. long, 2 to 3'25 in. wide; petioles '35 in. long, puberulous. Flowers solitary super-axillary, pedicels '15 in. long. Sepals broadly ovate acute nervet and reticulate thinly membranous green, '3 to '4 in. long. Petals sub-coriaceous yellow or orange, outer ones lanceolate acuminate, puberulous '8 to 1'25 in. long, inner ones one-third as long, ovate acute pubescent. Stamens many, appendages flat broad pubescent. Carpels crowded ovoid, '4 in. long. Hab. Woods, 500 to 2000 ft. altitude. Perak at Goping (Kunstler). Province Wellesley. Penang: Waterfall (Curtis).


Shrub or small tree glabrous except the flowers. Leaves membranous oblancoate blunt or very shortly acuminate, narrowed to the rounded (rarely cuneate) base; nerves 18 to 24 pairs, inarching close to the edge; 10 to 15 in. long, 2'75 to 4 in. wide; petioles '3 in. long. Flowers solitary on the lower part of the stem, pale greenish white, on pedicels '5 in. long. Sepals membranous large orbicular-ovate obtuse or sub-acute connate, '65 to 1 in. long, waxy cream colour. Petals coriaceous puberulous, very little longer than the sepals, inner ones ovate acute, '5 in. long. Anthers numerous, appendages conic. Ovaries puberulous 1-ovuled; stigma 2- or 3-lobed. Carpels oblong, glabrous, narrowed to the short stalks, '45 in. long; stalks '2 to '25 in. long. Hab. Woods below

(11) G. fulvus Hook. fil. F.B.I. i. 75; King, Journ. As. Soc. Beng. l.c. 74.

Shrub. Branchlets rufous-pubescent. Leaves membranous oblong-lanceolate obtuse, above glabrous, beneath puberulous or glabrous; nerves 14 to 16 pairs, 7 to 10 in. long, 2.5 to 3.25 in. wide; petioles thick, 5 in. long. Flowers solitary axillary; pedicels 0.25 in. long, puberulous. Sepals broad ovate obtuse pubescent, connate at base, 1.5 in. long. Petals coriaceous, densely silky, outer ones oblong-lanceolate to lanceolate long-acuminate, 1 to 1.5 in. long, inner ones 3 in. long, ovate acute, golden-silky. Stamens numerous, appendages convex, puberulous. Ovaries pubescent; style cylindric, glabrous. Stigma bifid. Hab. Malacca (Griffith). Pahang, Rumpin (Foxworthy).


A shrub or small, slender tree. Branchlets tomentose. Leaves thickly membranous narrow oblong to obovate-oblong abruptly acuminate, base rounded, glabrous above except the puberulous midrib, beneath puberulous; midrib and nerves (28 to 30 pairs) tomentose, nerves very prominent in arching; 9 to 15 in. long, 3 to 5.5 in. wide; petioles 3.5 in. long, pubescent, channelled. Flowers solitary extra-axillary; pedicels decurved hairy stout, 3 in. long. Sepals stiffly membranous pink nerved reticulate-pubescent, 7.5 to 1 in. long, connate into a cup with 3 ovate acute teeth. Petals coriaceous velvety green to yellow, tinged red, outer ones broad lanceolate acuminate, 1.25 to 1.75 in. long, inner ones more than one-third as long, ovate acuminate. Stamens, appendages acute conical. Ovaries numerous pubescent, 1-ovuled. Carpels ovoid acute hooked, points pubescent, 1.75 in. long, stalks 1 in. long, stout. Hab. Dense forests. Selangor. Batu Caves; Menuang Gasing (Kloss); Kwala Lumpur. Perak, Ulu Kerling, Waterloo, etc. (Kunstler, Curtis).

Very distinct in its large leaves, often widest near the tip, with very numerous parallel nerves.


A tree about 20 ft. tall, 6 in. through. Leaves membranous broad elliptic abruptly acuminate, base sub-acute, glabrous except the midrib, puberulous on both sides; nerves puberulous, 6 pairs; 8 to 12 in. long, 3.5 in. wide; petioles 2.5 in. long, puberulous. Flowers very abundant on tubercles at the base of the stem, forming a pile, on pedicels 2.5 to 3.5 in. long, coriaceous dull red brown to
bright rose pink. Sepals ovate-elliptic obtuse, '6 in. long, puberulous. Petals, outer ones elliptic-oblong or ovate obtuse or subacute with a broad thick claw, 1'65 to 2 in. long, inner ones conuate, '6 in. long, obovate, claw narrow. Stamens yellow, numerous, appendages conic. Ovaries narrow; style cylindric, puberulous; stigma bilobed, white. Carpels globular green, an inch through; stalks 2 to 3 in. long, forming a head of fruit as big as a cricket ball. Hab. Rocky Woods, Singapore, Bukit Timah. Malacca. Dindings. Perak, Chanderiang; Gunong Bubu (Kunstler); Batu Kurau (Curtis). Native name: Banitan.

The mass of flowers at the base of the tree is often very large and is usually covered with earth by the ants, which abound in and on the flowers, and probably pollinate them. I am quite unable to separate G. Prainianus King, which seems to be based on the young flowers only.


A shrub 6 to 15 ft. tall, glabrous except flower and fruit. Leaves thinly coriaceous, oblong slightly obovate, narrowed towards the rounded base; nervés 22 to 25, rather horizontal, inarching near the margin; 10 to 15 in. long, 3 to 6 in. wide; petioles '4 in. long. Flowers near the base of the stem, on stout pedicels '35 in. long. Sepals small coriaceous pubescent semi-orbicular, '2 in. long. Petals very coriaceous, yellow, outer ones lanceolate pubescent, 1'5 in. long, inner ones similar, 1 to 1'2 in. long. Appendages conic. Ovaries hairy. Carpels oblong acute at each end puberulous, 1'5 in. long, '65 in. through; stalks '7 in. long. Seeds 4, compressed, rugose, '5 in. long. Hab. Very little known, based on fruiting specimens from the Ulu Slim and Ulu Bubong in Perak and a Borneo specimen in flower. A fruiting plant I found in Chaning Woods, Kelantan, appears to be this species.

18. OROPEHA, Bl.

Trees of medium size or shrubs. Flowers usually small, axillary fascicled or cymose, white or pink. Sepals 3, valvate. Petals 6, valvate, outer three ovate, inner three clawed and spathulate and cohering at their edges into a conic cap, occasionally oblong approximate in the middle and diverging at the tips. Stamens definite, 6 to 12, ovoid, fleshy; anther-cells dorsal, large, appendages conic. Staminodes 0 or 3 to 6. Ovaries 3 to 15; style short or 0. Ovules 4. Carpels 1- or more-seeded, globular, oblong or elongate, jointed. Species about 25, tropical Asia.

Inner petals vaulted.
Stamens 12; stem hairy; carpels globose  . . (1) O. setosa
Stamens 6.
Stem hairy; carpels globose  . . (2) O. hirsuta
Stem glabrous; carpels elongate, jointed  . . (3) O. enterocarpa
Stem red-velvety; flowers large; carpels elongate, jointed  . . (4) O. maculata
Inner petals slightly vaulted; flowers very small, carpels globose. (5) *Orophea. gracilis*

Inner petals spreading, not vaulted.

Stamens 10 to 12.

Inner petals hastate; fruit globular. (6) *O. hastata*

Inner petals linear-oblung; fruit ovoid. (7) *O. dodecandra*

Stamens 6.

Inner petals cuneiform; fruit cylindric. (8) *O. cuneiformis*


A shrub 4 to 6 ft. tall. Branchlets pubescent and covered with long brown bristles. Leaves membranous oblong to oblong-lanceolate-acuminate, base rounded, sparingly bristly on both sides, especially on the midrib and nerves; lower surface also pubescent; nerves 8 to 10 pairs inarching near the edge; 5'5 to 7'5 in. long, 2 to 2'75 in. wide; petioles '05 in. long, bristly. Flowers solitary extra-axillary 2 in. across; pedicels slender, 7'5 in. long, pubescent. Sepals sub-orbicular blunt. Petals, outer ones broadly ovate sub-acute, pubescent outside; inner ones longer vaulted, claw narrow shorter than the trapezoid-sagittate limb, pubescent on back and edges. Male flower. Stamens numerous, appendages broadly truncate. Carpels 4 or 5, sessile globose or oblong-globose, '3 in. through, pubescent and bristly. Seed 1, rarely 2. *Hab.* Woods from 500 or 1200 ft. altitude, Negri Sembilan, Bukit Danau (Cantley). Perak, Gunong Pondok (Kunstler). *Native name:* Pialu. *Use:* A decoction of the roots used in malaria.


A shrub 3 to 12 ft. tall. Branchlets red-hairy. Leaves elliptic or elliptic-oblung or slightly obovate acuminate, base minutely cordate; above glabrous, beneath hairy, midrib bristly; nerves 8 to 9 pairs, very faint; 3'5 to 4'5 in. long, 1'24 to 1'75 in. wide; petioles '05 in. long, bristly. Peduncles extra-axillary, 5 in. long, 1- to 3-flowered, hairy; pedicels '75 in. long, hairy. Bracts minute, several. Flowers 5 in. across, dark red, base white. Sepals broad ovate acute hairy outside. Petals, outer ones larger broad obovate blunt hairy outside, '15 in. long; inner ones '25 in. long, claw narrow longer than limb, glabrous, limb trapeziform vaulted thick glabrous outside, pubescent within. Stamens 6, in one row. Ovaries 6, ovoid glabrous; ovules 1 to 2. Carpels 4 to 5, globular yellow hairy, '4 in. long; stalks 1 in. long. *Hab.* Perak, Goping (Kunstler). Rare. *Native name:* Supucha Pelandok. *Use:* The plant is chewed with betel-nut in cases of cough.


Tree 10 to 30 ft. tall, glabrous. Leaves membranous elliptic-acuminate base rounded; nerves 6 to 7 pairs, slender, 3'5 to 5 in. long, 1'2 to 1'5 in. wide; petioles '1 in. long. Flowers extra-
axillary; pedicels very slender '75 to 1.25 in. long, pubescent except at base. Bracts several ovate lanceolate. Sepals small ovate acuminate pubescent. Petals, outer ones '5 in. long, ovate acuminate puberulous cream colour; inner ones larger, '6 to '75 in. long; claw narrow, yellowish with a reddish band, or dark claret colour, limb elongate trapezoid. Staminodes 6. Stamens 6. Ovaries 6, ovules 2 to 7. Carpels 4 to 6, elongate-cylindric moniliform red, 3 to 5 in. long, '3 in. through. Seeds 2 to 7, linear-oblong. *Hab.* Malacca (Maingay). Perak, Thaiping (Kunstler).

(4) *O. maculata* *Scort.* in *King, Journ. As. Soc. Beng.* l.c. 84; *Ann. Bot. Gard. Calc.* l.c. 106, pl. 148B.

Shrub 5 to 20 ft. tall. Branchlets red tomentose. Leaves membranous elliptic to oblanceolate, caudate acuminate, base rounded above, glabrous beneath, sub-glabrous, midrib and nerves pubescent; nerves 10 to 12 pairs, faint; 3.25 to 7 in. long, 1.5 to 2.25 in. wide; petioles '1 in. long, tomentose. Peduncles 1- to 3-flowered, very slender, '5 to 1 in. long, pubescent. Bracts numerous, linear-oblong. Sepals narrow lanceolate acuminate. Petals, outer ones larger '5 in. long, ovate acuminate hairy, mottled red and yellow, or white spotted with pink; inner ones '1 in. long, claw long, narrow, pubescent, limb lanceolate acuminate hairy. Staminodes 3, orbicular. Stamens 6, bases hairy. Ovaries 3 to 6, very hairy, 6- to 7-ovuled. Carpels 4 to 6, elongate cylindrical puberulous moniliform, red. Seeds 4 to 7, linear-oblong. *Hab.* In thick woods, usually on limestone rocks. Perak, Goping. Gunong Pondok (Kunstler); Tapah. Pahang, Kota Glanggi and Pulau Chengei, Pahang river.


Tree 20 to 30 ft. tall. Stem 4 to 6 in. through. Leaves membranous to thinly coriaceous, lanceolate acuminate obtuse, base cuneate or rounded narrowed, glabrous; nerves 5 to 6 pairs, slender inarching far from the edge, indistinct; 2.5 to 3.5 in. long, '9 to 1.2 in. wide; petioles '05 in. long. Flowers solitary extra-axillary on slender jointed pedicels '75 to 1 in. long. Bracts several, minute, subulate. Sepals broad ovate sub-acute, base connate. Petals, outer ones larger, ovate acute, '15 in. long, white glabrous except edges pubescent; inner ones '25 in. long; limb thick trapezoid, edges pubescent, claw shorter glabrous. Stamens 6 in one row, appendages long. Ovaries 4 to 10, ovoid glabrous, 2-ovuled. Carpels 6 to 10 globose, '45 in. long, glabrous brown; stalks '25 in. long. *Hab.* Open jungle on limestone hills, Perak, Goping (Kunstler).

(6) *O. hastata* *King, Journ. As. Soc. Beng.* l.c. 83; *Ann. Bot. Gard. Calc.* l.c. 107, pl. 149B.

Tree, 20 to 40 ft. tall, 5 to 7 in. through, glabrous. Leaves coriaceous, elliptic caudate-acuminate, base shortly cuneate; nerves
6 to 8 pairs, inarching within the edges; 3'5 in. to 5'5 in. long, 1'6 to 2'4 in. wide; petioles 1'1 in. to 2 in. long. Peduncles solitary, axillary or extra-axillary, 4 in. long, with several bracts and 3 to 4 flowers on pubescent pedicels. Flowers 4 in. long, dark red, petals tipped yellow. Sepals ovate acute, pubescent outside. Petals, outer ones twice as large, ovate acute, pubescent outside; inner ones 3'5 in. long, limb hastate triquetrose, edges ciliate; claw long, narrowed to base, glabrous. Staminodes 0. Stamens 10 in 2 rows, apiculate. Ovaries 10, oblong, pubescent, 2-ovuled. Carpels 5 to 6, globular, glabrous, 4 in. long, green, mottled dark red; stalks 2'5 in. long. Seeds solitary. Hab. Dense rocky jungle up to 1000 ft. altitude, Singapore, Bukit Timah forest. Perak; Ulu Slim and Larut (Künstler). Dindings, Lumut.


Tree 30 to 50 ft. tall. Stem 15 to 20 in. through. Branchlets pubescent. Leaves sub-coriaceous, elliptic caudate acuminate, base cuneate, glabrous; nerves 5 to 6 pairs elevated beneath, inarching 25 in. from edge; 3'5 to 5'5 in. long; 1'75 to 2'3 in. wide; petioles 2'1 in. long, stout, channelled. Peduncles several together, axillary, 4 in. long with 3 to 7 flowers; pedicels as long or longer. Flowers small, dark red. Sepals ovate connate at base. Petals, outer ones broad ovate acuminate, base rounded, 1'5 in. long; inner ones thick, linear-oblong blunt puberulous, apices recurved. Staminodes 0. Stamens 12, in 2 rows; appendages prolonged. Ovaries 6 to 8, oblique curved glabrous, 2-ovuled. Carpels ovoid blunt glabrous, 8'5 in. long, white spotted red. Seed 1, oblong or rounded. Hab. Sea level to 800 ft. altitude in dense forests. Singapore, Garden Jungle. Selangor, Petaling. Perak at Thaiping and Gunong Bubu (Künstler); Kwala Dipang.

(8) **O. cuneiformis** King, Journ. As. Soc. Beng. l.c. 84; Ann. Bot. Gard. Calc. l.c. 108, pl. 150B.

A tree 15 to 30 ft. tall. Stem 3 to 4 in. through. Leaves dark green thinly coriaceous oblong or elliptic acuminate; base shortly narrowed rounded cordate, at first sparsely hairy, later glabrous above, pubescent beneath; nerves 8 to 12 pairs with the midrib tomentose, 3'5 to 6 in. long, 1'1 to 2'2 in. wide; petioles 0'5 in. long, tomentose. Peduncles supra-axillary, slender rufous-tomentose, 1 in. long. Bracts numerous linear-lanceolate. Flowers 4 or 5; pedicels 3'5 in. long, red-tomentose. Sepals ovate long acuminate. Petals, outer ones ovate acute, white and pink; inner ones cuneiform, sometimes retuse, claw short narrow. Staminodes 3, sub-orbicular. Stamens 6, appendages broad, flat. Ovaries 6, oblong villous, 2- to 3-ovuled. Carpels 2 to 4, sessile cylindric not moniliform, 1'5 to 1'75 in. long, 3'5 in. through. Seeds 2, oblong. Hab. Woods, on limestone hills under 1000 ft. altitude.

19. MITREPHORA, Bl.

Trees or shrubs. Leaves sub-coriaceous or coriaceous. Flowers solitary or in racemes usually axillary or leaf-opposed, small, often unisexual. Sepals 3, orbicular or ovate. Petals 6, in 2 series, valvate; outer ones ovate, thin; inner ones clawed, limb ovate or lanceolate, vaulted and cohering. Stamens oblong; anther-cells dorsal, remote; appendages broad, truncate. Ovaries oblong; style oblong or clavate; ovules 4 or more, 2-seriate. Carpels globose or ovoid, stalked or nearly sessile. Species 10, East Asiatic.

Flower hermaphrodite 1 in. or more across, yellow or red.

Flowers unisexual.

Flowers on branches.
- Carpels ovoid not rugulose; nerves 12 to 14 pairs
- Carpels sub-globular rugulose; nerves 14 to 20 pairs

Flowers on trunk, fleshy.


A tree 20 to 50 ft. tall, 6 to 24 in. through; branchlets tomentose. Leaves coriaceous ovate or oblong-acuminate, base rounded, glabrous; nerves 6 to 10 pairs; 3 to 5½ in. long, 1½ to 2½ in. wide; petioles 3 to 4 in. long. Flowers large and showy, 1 in. across or more, yellow with red spots, several on a leaf-opposed red-velvety peduncle, with many bracts. Sepals connate ovate acute, tomentose. Petals, outer ones orbicular or obovate, edges undulate, pubescent inside, inner ones shorter cordate with a long linear claw. Stamens numerous, appendages flat. Ovaries narrowed into the styles; ovules 4. Carpels ovoid densely tomentose pale green, 1 in. long, 7½ in. through; stalks stout, 7½ in. long. Seeds 4. Hab. Borders of woods in open country. Malacca (Maingay). Selangor. Dindings, Bruas; Telok Sera (Curtis). Perak, Thaiping; Goping (Kunstler); Penang, Telok Bahang (Curtis, Porter). Distrib. Borneo, Cochín-China. Native name: Maribut Daun Besar.


Tree 20 to 30 ft. tall, stem 4 to 6 in. through; branchlets tomentose. Leaves membranous narrow oblong acuminate, base cuneate or rounded, reticulate glabrous; midrib pubescent above, setose beneath; nerves 12 to 14 pairs, prominent; 5 to 14 in. long, 2


Small tree 20 to 30 ft. tall; trunk 6 to 8 in. through; branches puberulous. Leaves thinly coriaceous, elliptic-ovovate or oblong-lanceolate acute or acuminate; base rounded, puberulous when young, minutely reticulate; nerves 14 to 20 pairs, inarching, '15 in. from margin, prominent beneath; 7 to 13 in. long, '175 to 4 in. wide. Flowers '25 to '3 in. wide axillary in pairs or cymes, dull purple to dark pink, '1 to 2 in. long, pubescent, similar to those of M. reticulata. Fruit globose, minutely tomentose, rusty brown, '4 to '5 in. through; stalk '2 in. long. Seeds several. Hab. Johor. Pahang, Tahan River. Dindings. Selangor, Weld’s Hill (native collector); Perak, Thaiping Hills; Sungkai; Goping, common (Kunstler); Penang, West Hill from about 1500 ft. altitude upwards (Curtis). Native name: Prusat.


A tree, glabrous. Leaves oblong or oblong-lanceolate acuminate acute, base rounded; nerves elevate beneath, 9 pairs, inarching, 6 to 8 in. long, 2.5 to 2.75 in. wide; petioles 25 in. long. Flowers in racemes '5 in. long in clusters on trunk; white. Bracts '05 in. long, ovate. Sepals ovate obtuse, edges ciliate, '1 in. long. Petals, outer ones ovate, '3 in. long; tip very thick, coriaceous; inner ones connivent spathulate, limb triangular thick. Male flowers, stamens numerous oblong; appendages triangular-ovate. Pistils abortive. Hab. Forests, Pahang on the Tahan River. Rare (Ridley).

20. POPOWIA, Endl.

Trees or shrubs. Flowers small sub-globular, usually bissexual, occasionally unisexual, hardly opening, extra-axillary or leaf-opposed nearly sessile, tomentose. Sepals 3, ovate valvate.
Petals 6, valvate in 2 series, ovate or orbicular, outer ones little longer than the sepals, spreading; inner ones thick, concave con-nivent acute, tip sometimes inflexed, a little longer than the outer ones. Stamens indefinite or definite, short cuneate; anther-cells dorsal, remote, appendages usually broad and flat. Ovaries about 6, ovoid; style large, oblong, straight or curved. Ovules 1 or 2 on ventral suture, rarely 1, basal. Carpels berry-like, globose or ovoid, stalked. Seeds 1 to 3. Species about 20 in Africa, 12 Australia and 1 African.

Flowers hermaphrodite.
Leaves glabrous except nerves; flowers very small.
Leaves ovate; nerves 6 to 8 pairs . . . . (1) P. ramosissima
Leaves lanceolate; nerves 9 to 10 pairs . . . . (2) P. pauciflora
Leaves yellow, tomentose beneath; fruit very large . . . . (3) P. fœtida
Leaves glabrous above except nerves below, pubescent; fruit small . . . . (4) P. perakensis
Leaves puberulous above, pubescent beneath blunt
Leaves glabrous except midrib, sparse hairy beneath . . . . (5) P. fusca
Leaves soft, tomentose all over . . . . (6) P. velutina
(7) P. tomentosa

Flowers unisexual. Leaves large, glabrous strongly nerved.
Flowers ·5 in. across, dense, hairy.
Petals short, ovate, inner much smaller; fruit ·25 in. . . . . (8) P. nervifolia
Petals subequal, oblong; fruit ·75 in. . . . . (9) P. nervosa
Flowers ·3 in. wide, glabrous; fruit oblong, ·5 in. . . . . (10) P. pumila


A small spreading tree 10 to 12 ft. tall, 3 to 4 in. through; young branches rufous-pubescent. Leaves membranous coriaceous nearly sessile elliptic to nearly ovate shortly acuminate, base round, glabrous except midrib and nerves 6 to 8 pairs ascending pubescent; 2·75 in. to ·4 in. long, 1 to 1·75 in. wide; petioles hairy, ·05 in. long. Flowers leaf-opposed, 1 to 3 together, ·2 in. across, white or yellow. Sepals broad, triangular, ovate acute tomentose outside. Petals sub-equal, coriaceous sub-rotund concave, little larger than the sepals, tomentose outside; inner ones little larger than outer ones, tips incurved. Stamens short, appendages broad concave. Ovaries 5 to 6, villous, ovules 1 to 2. Carpels globose, ·25 to ·35 in. long, pubescent, green; stalks ·05 in. long. Hab. Forests, sea level to 2000 ft. altitude. Common. Singapore, Bukit Timah. Johor. Pahang, Kota Glanggi. Malacca. Selangor, Petaling. Perak, Thaiiping Hills; Ulu Bubong (Kunstler). Dindings, Pangkor. Penang (Wallich); Pulau Betong (Curtis). Distrib. Sumatra, Borneo, South. Siam at Trang. Native name: Kayu San Tuche.

(2) P. pauciflora Maing. in Hook. fil. F.B.I. i. 69; King, Journ. As. Soc. Beng. l.c. 92; Ann. Bot. Gard. Calc. l.c. 117, pl. 159A.
Tree?, branchlets strigose. Leaves membranous elliptic-lanceolate acuminate, base acute or obtuse, glabrous above except midrib and nerves, pilose beneath, 9 to 10 pairs, ascending, 5 to 6 in. long, 1.5 to 2 in. wide; petioles 1.2 in. long, pubescent. Flowers extra-axillary or axillary solitary, 25 in. across; pedicels 1.5 to 2.5 in. long, red, strigose. Sepals minute ovate. Petals, outer ones small ovate, inner ones twice as large, sub-orbicular concave, tips inflexed. Stamens many. Ovaries 6, strigose; ovules solitary. Carpels globose sub-sessile glabrous, 3 in. long. Hab. Malacca (Maingay). Very rare, only known from Maingay's specimens.


A large tree 30 to 40 ft. tall; branches pale, branchlets tomentose. Leaves sub-coriaceous, elliptic-lanceolate caudate-acuminate, above glabrous except the puberulous midrib, beneath densely yellowish-tomentose; nerves 11 to 18 pairs, prominent beneath inarching close to margin, ascending 4.5 to 6.5 in. long, 1.6 to 2 in. across; petioles tomentose, 2 in. long. Flowers solitary 3.5 in. long, yellow, pedicels very short. Sepals 1 in. long lanceolate ovate. Petals, outer ones ovate-elliptic, obtuse; inner ones larger concave, edges thickened, all tomentose. Stamens about 30. Ovaries strigose, about 6, 2-ovuled. Carpels 1 to 3, very large, oblong-ovoid rounded, sessile, densely shortly yellow-tomentose, 2.25 in. long, 1.5 in. through. Seed 1, oblong, 1.6 in. long, 0.75 in. through. Hab. Forests. Malacca, Sungai Hudang (Derry). Penang, Pulau Betong (Curtis). Native name: Pisang Pisang Besar.

(4) P. perakensis King, Journ. As. Soc. Beng. l.c. 94; Ann. Bot. Gard. Calc. l.c. 120, pl. 161B.

A small tree 6 to 15 ft. tall; branchlets tomentose. Leaves large elliptic or oblong shortly acuminate, base narrowed obtuse, above glabrous, except the midrib and nerves 8 to 10 pairs, prominent beneath, tomentose on both sides, beneath pubescent sub-granular; 5 to 6 in. long, 2.5 to 3 in. wide; petioles 1 in. long, tomentose. Flowers extra-axillary, in pairs, 3 in. across, silvery grey; pedicels 1.4 in. long, red-tomentose. Sepals semi-orbicular acute tomentose outside. Petals thick ovoid-orbicular acute sub-concave, white silky; inner ones slightly larger than outer ones. Stamens numerous, appendages truncate corrugate. Ovaries 10, nearly glabrous, 2-ovuled. Carpels 8 or more, oblong-ovoid glabrescent, with horizontal constrictions when dry, 1.5 in. long, 1.25 in. through; stalks 1.25 in. to 1.5 in. long. Seeds 2. Hab. Dense forest. Perak, Thaiping Hills from the waterfall to 2000 ft. altitude (Kunstler).

(5) P. fusca King, Journ. As. Soc. Beng. l.c. 94; Ann. Bot. Gard. Calc. l.c. 120, pl. 162A.

Tree 40 to 50 ft. tall; stem 6 to 10 in. through; branchlets purplish brown, tomentose. Leaves coriaceous, oval-oblong obtuse
VI.
ANONACEAE.

or sub-acute, base rounded, above puberulous, beneath pubescent, midrib and nerves 8 to 11 pairs, prominent brown tomentose both sides; 2·5 in. to 3·5 in. long, 1·4 to 1·8 in. wide; petioles thick, 2 in. long, tomentose. Flowers fasciicled extra-axillary, 25 in. across, on pedicels 15 to 25 in. long, tomentose. Sepals ovate-obtuse tomentose outside. Petals rounded thick and fleshy, both series equal, tomentose outside, puberulous inside. Carpels 3 to 4, globose green with a brown gloss, 25 in. through on stalks 1 to 2 in. long, tomentose. Seed 1. Hab. Dense bamboo forests and lowland mixed forest. Singapore, Garden Jungle. Perak at Ulu Kerling at 500 ft. altitude (Kunstler).

(6) P. velutina King, Journ. As. Soc. Beng. l.c. 94; Ann. Bot. Gard. Calc. l.c. 120, pl. 162B.
Tree 30 to 40 ft. tall, 6 to 8 in. through. Leaves glossy dark green velvety, elliptic-oblong acute or acuminate, slightly narrowed to rounded base, above granular sparsely hairy, beneath softly pubescent, midrib and nerves 6 to 7 pairs, indistinct, tomentose on both surfaces; 3 to 5 in. long, 1·4 to 1·8 in. wide; petioles 1 in. long. Flowers 1 to 2, extra-axillary, 25 in. across; pedicels densely tomentose. Sepals broad, ovate sub-acute, tomentose outside, persistent. Petals sub-equal, thick sub-orbicular, tomentose outside. Carpels few, 1 to 3, ovoid blunt, slightly narrowed at base, velvety-pubescent, 5 in. long, 35 in. through; stalks 2 in. long, tomentose. Seed 1, rugose. Hab. Dense jungle, limestone districts at 500 to 800 ft. altitude. Perak, Goping (Kunstler).

(7) P. tomentosa Maing. in Hook. fil. F.B.I. i. 70; King, Journ. As. Soc. Beng. l.c. 95.
Shrub 6 to 15 ft. tall; stem 2 to 3 in. through or less; branchlets tomentose. Leaves elliptic-oblong obtuse or sub-acute, base rounded, sub-coriaceous, 3·5 to 5 in. long, 1·5 to 1·9 in. across, softly pubescent-tomentose on both sides, much so beneath; nerves 9 to 10 pairs, slender; petioles 1 in. long. Flowers extra-axillary sub-sessile or slightly stalked, 25 in. across, white. Sepals ovate connate. Petals villous outside, outer ones ovate thick, inner ones larger, thick and concave. Stamens 25. Ovaries 7 to 9, oblong pubescent; ovules 2. Carpels globose, pubescent, 5 to 7·5 in. long; stalks 35 in. long on peduncle enlarged to 5 in. long, tomentose. Seeds 2. Hab. Forests lowland. Singapore, Garden Jungle. Malacca (Maingay). Brisu; Ayer Panas. Selangor, Batu caves. Perak, Ulu Kerling, open bamboo forests (Kunstler). Dindings, Gunong Tungul. Penang Moniot’s Road. Native name: Chingau.

Small tree 15 to 20 ft. tall; stem 2 to 3 in. through; branchlets pubescent. Leaves coriaceous oblong-lanceolate to elliptic-oblong shortly acuminate, base cuneate, glabrous above, nearly so beneath,
midrib and nerves pubescent; nerves 10 to 12 pairs, prominent, as are reticulations; 5.5 to 8.5 in. long, 2 to 3.5 in. wide; petioles '35 to '5 in. long, glabrous or pubescent. Flowers 1 to 2, extra-axillary, '5 to '75 in. across; white or pink; pedicels tomentose, '15 to '25 long, bracts 2, nearly as large as sepals. Sepals ovate-orbicular acute thick villous, tomentose outside. Petals, outer ones larger tomentose outside, inner ones longer, tips inflexed, tomentose. Stamens numerous, appendages rhomboid. Ovaries numerous, hairy. Carpels numerous, cylindric-ovoid apiculate, narrowed at base, stigose, '5 in. long, '25 in. through; stalks '2 to '3 in. long on a globular torus. Hab. Forests, to 1000 ft. altitude. Johor, Gunong Janeng (Kelsall). Negri Sembilan, Bukit Sulu (Cantley). Malacca (Maingay). Perak, Thaiping Hills. Selangor, Ginting Bidai. Penang, Pulau Butong at 300 ft. altitude (Curtis). Native names: Pasa Achong; Mumpisang Batu. Use: In house-building.


A tree up to 20 ft. tall; branchlets glabrous. Leaves coriaceous with pellucid dots, elliptic to lanceolate-oblong acute at both ends, tip sometimes acuminate, above glabrous, beneath sparsely stigose with distinct reticulations; nerves 10 to 12 pairs; 8 to 12 in. long, 2 to 3.5 in. wide; petioles '35 to '5 in. long, glabrous. Flowers unisexual, solitary or in pairs, extra-axillary, '75 in. across, globose; pedicels '1 to '2 in. long, pilose, stout. Sepals ovate acute pubescent. Petals white, pubescent, spreading imbricate, much longer, outer ones broad ovate-oblong, blunt; inner ones shorter and narrower, oblong. Stamens in male flowers numerous. Pistils in females many. Carpels numerous, ovoid apiculate, narrowed into stalk, orange (rose red according to Wray), '1 in. long, '5 in. through, pubescent on '75 to '1 in. stalks. Hab. In lowland forest to 3000 ft. altitude. Common. Johor. Malacca. Pahang. Selangor. Perak and Penang. Native names: Poko Girah; Kenchong; Larak. Use: In house-building.

The leaves of this tree very closely resemble those of P. nervifolia.


A shrub 2 to 8 ft. tall; young branches tomentose. Leaves coriaceous oblong to elliptic-lanceolate, apex acuminate, base acute, above glabrous, beneath sparsely pubescent; nerves 9 pairs, faint, 4.5 to 7 in. long, '5 to 2.25 in. wide; petioles '25 to '35 in. long, pubescent. Flowers 1 or 2, extra-axillary sub-sessile, '75 in. across; pedicels '1 in. long, coarsely hairy. Sepals much shorter than the petals, ovate sub-acute, strigose-pubescent outside. Petals imbricate, white, lanceolate hairy-strigose outside, glabrous inside,
outer ones at first much shorter, later sub-equal to the inner ones. Male flowers; stamens numerous, appendages truncate, pistils 0. Female, stamens fewer; pistils 10, pubescent, 1-ovuled. Carpels 4 to 5, sub-cylindric tapering to both ends, '75 in. long, '25 in. through, granular-strigose; stalks '15 in. long, tomentose; torus very small. Seed solitary. Hab. In forests, not common. Selangor, near Klang Gates. Negri Sembilan, Bukit Tampin (Robinson). Perak, Ulu Bubong and Chanderiang (Kunstler).

21. OXYMITRA, Bl.

Climbers woody, usually slender, red-tomentose. Leaves oblong obovate large, glaucous beneath. Flowers, leaf-opposed or extra-axillary, moderately large; buds conic. Sepals 3, valvate, connate at base. Petals 6, valvate in 2 series, outer ones long, flat or triquetrous narrow, connivent, coriaceous, usually yellow, inner ones much smaller, ovate-lanceolate or oblong or narrow, connivent. Stamens many, linear-oblong, truncate; anther-cells dorsal, remote. Ovaries oblong, strigose; style oblong. Ovules 1 or 2, sub-basal. Carpels stalked, 1-seeded. Species 30, Asia and Africa.

Outer petals flat.
Leaves broad, elliptic . . . . . . (1) O. affinis
Leaves narrow, sub-glabrous . . . . (2) O. fornicata
Outer petals concave.
Pedicels long, slender . . . . . . (3) O. filipes
Pedicels very short.
Leaves large, obovate.
Sepals elliptic, nearly half as long as petals . . . (4) O. calycina
Sepals very small, sub-orbicular . . . . (5) O. latifolia
Leaves oblong-elliptic not obovate.
Outer petals broad . . . . . . . . . (6) O. biglandulosa
Outer petals narrow, linear-lanceolate . . (7) O. glauca


Climber; branchlets rusty-tomentose. Leaves sub-coriaceous, oblong-elliptic or slightly obovate acute or shortly acuminate, base round, above glabrous except the midrib pubescent on both sides, beneath glaucous pubescent especially on midrib and prominent nerves 8 to 14 pairs, 3'5 to 10 in. long, 1'25 to 4'5 in. wide; petioles '3 in. long, tomentose. Flowers solitary on pedicels '25 to '45 in. long, yellow. Sepals slightly connate at base, broad ovate, sub-acute, pubescent, '5 in. long. Petals flat, very unequal; outer ones thinly coriaceous, oblong-lanceolate sub-acute, pubescent on both sides, 1'5 to 1'75 in. long, '4 to '6 in. wide; inner ones thickly coriaceous, ovate sub-acute, '5 in. long, pubescent outside. Carpels cylindric blunt pubescent, '5 to '8 in. long, '3 in. through; stalks pubescent, '2 in long. Seeds 1. Hab. Lowland forests. Singapore, Bukit Timah. Malacca, Selandor, etc. (Maingay,

(2) *O. fornicata* Hook. fil. *F.B.I.* i. 71; var. glabra. Branches slender, nearly glabrous. Leaves oblong; base narrow, blunt, tip cuspidate, glabrous; nerves 13 pairs, slender; 6 in. long, 1.75 to 2 in. wide; petioles 1.2 in. long. Flowers very short pedicelled, extra-axillary. Sepals ovate ribbed hairy. Petals, outer ones flat lanceolate golden-silky, inner triangular-ovate. Fruit oblong, *3* in. long. *Hab.* In forests, not common. Penang:

This plant is remarkable in the genus for its narrow leaves. I have only seen two specimens of the Penang plant, one in fruit, the other in young flower. King refers the former to *O. affinis*, which it is not. I believe it to be a form of *O. fornicata*, a native of Assam, Mergui and Cambodia.

(3) *O. filipes* Hook. fil. *F.B.I.* i. 171; King, *Journ. As. Soc.* Beng. l.c. 99. Branchlets velvety-tomentose. Leaves membranous oblong-lanceolate slightly obovate acute (or acuminate), base sub-cordate, above glabrous or pubescent, beneath sub-glauceous pubescent;
midrib and nerves 12 to 14 pairs, above pubescent, beneath tomentose, secondary nerves prominent also; 4'5 to 7'5 in. long, 1'4 to 2'5 in. wide; petioles '2 to '25 in. long, tomentose. Flowers very long and narrow yellow, 1'75 to 2'5 in. long, solitary on extra-axillary peduncles, 3 to 4 in. long, pubescent. Sepals '25 in. long, ovate acute pubescent. Petals, outer ones fleshy narrow triquetrous, base concave; inner ones glabrous, one-fifth length of the outer ones, lanceolate caudate-acuminate. Stamens numerous. Ovaries 1-ovuled. Carpels numerous, brownish green, ovate-cylindric, pubescent, '5 in. long, '25 in. wide; stalks '3 in. long. Hab. Forests. Malacca (Maingay). Perak, Goping and Ulu Bubong (Kunstler).


Climber 20 to 60 ft. long. Leaves thickly membranous oblong ovate, often slightly obovate obtuse, truncate or retuse, base retuse or cordate, above glabrous except tomentose midrib, beneath glaucous (young leaves plum-colour) softly puberulous; midrib and nerves pubescent, nerves 10 to 12 pairs, elevate beneath; 7 to 12 in. long, 3 to 6 in. wide; petioles '25 to '45 in. long, red tomentose. Flowers solitary, on pedicels '25 in. long. Sepals rounded gibbous small, green with short red hairs. Petals outer ones creamy white, fleshy triangular blunt, red-hairy at base, 1 in. long, '5 in. wide at base; inner ones shorter, '9 in. long, cream colour, excavate at base, tip fleshy. Stamens white in 5 rows, anthers oblong, appendages recurved. Ovaries 5 rows, brown hairy; stigma thick, recurved. Carpels cylindric-ovoid, narrowed at base, puberulous or not, yellow orange, '5 to '75 in. long, '3 to '4 in. through; stalk as long. Seed 1. Hab. Borders of forests. Singapore, Garden Jungle; Selitar, etc. Malacca, Selangor, Perak, Goping (Kunstler); Tapah; Relau Tujor (Wray). Penang (Phillips). Redah, Yan. Lankawi (Curtis).


Branchlets red-silky. Leaves coriaceous elliptic to oblong acute or shortly acuminate, base rounded, above glabrous, midrib puberulous, beneath sub-glaucous puberulous; nerves 7 to 9 pairs, prominent beneath; 3'5 to 7'5 in. long, 2 to 3'5 in. wide; petioles 2 to '4 in. long. Flowers solitary extra-axillary, 1 to 1'5 in. long on slender pedicels, '4 in long. Sepals fleshy ovate long acuminate puberulous. Petals yellow, outer ones lanceolate oblong blunt, base concave, midrib prominent; inner ones '3 in. long, bases broad, tips long-acuminate. Carpels oblong-ovoid blunt, yellow, '75 in. long, puberulous or not; stalks '5 in. long. Hab. Forests, lowland. Malacca, Merlimau (Cantley); (Griffith, Maingay). Selangor, Kwalal Lumpur (Curtis). Perak, Ulu Kerling; Waterfall Hill, Thaiping; Goping (Kunstler). Native name: Akar Mupisang hitam. Distrib. Java, Borneo and Sumatra.


Branchlets tomentose. Leaves thinly coriaceous elliptic to lanceolate, blunt or acute, base rounded, above glabrous, except the midrib and nerves pubescent, beneath glaucescent glabrous or nearly so; midrib pubescent; nerves 8 to 12 pairs, prominent beneath pubescent, 4 to 6 in. long, 1'5 to 2 in. wide. Flowers solitary extra-axillary on slender pedicels '5 in. long. Sepals connate at base, broad ovate acuminate pubescent, '25 in. long. Petals, outer ones coriaceous narrow linear-lanceolate sub-acute, base concave, outside pubescent; inner ones, bases sub-orbicular, tips long-acuminate, one-fifth of the length of the flower. Ovaries hairy, 1-ovuled. Carpels many ovoid, '4 in. long and '25 in. through, tomentose; stalks slender, '75 in. long. Hab. Forests. Malacca (Maingay). Perak at Simpang; Ulu Kerling; Goping and Ulu Bubong (Kunstler). Distrib. Sumatra.

22. MELODORUM, Dunal.

Climbing shrubs. Stem rarely stout. Leaves more or less coriaceous, red-pubescent or silky or glabrescent. Flowers terminal, solitary axillary or panicked; buds conic, triquetrous, usually covered with red silky tomentum. Sepals 3, valvate connate, small. Petals 6, in 2 rows, outer ones fleshy or coriaceous, lanceolate or ovate, trigonous; inner ones fleshy, glabrescent, tips triquetrous, base excavate on the inner face. Stamens many; anther-cells contiguous; appendages more or less flattened, triangular to orbicular. Pistils many; style oblong; ovules 2 or more. Carpels berried with several seeds. Species about 35, tropical Asia, Africa and Australia.
i. **Eu-Melodorum.** Petals oblong-ovate, under 1 in. long, seeds smooth.

Flowers 4 in. to nearly 5 in. long; buds broad pyramidal.

Flowers 2.5 in. long, lax, axillary racemes.

Flowers 4 to 5 in. long; solitary, or in short cymes.

Flowers 5 in. long or more; buds pyramidal, broad.

Flowers racemose; leaves glabrous above; fruit globose.

Flowers solitary axillary; fruit cylindric.

Flowers racemose.

Leaves pubescent above (young), base narrowed.

Leaves glabrous, smooth above, base broad round.

Flowers narrow, pyramidal; fruit tubercled.

(1) **M. litseaefolium**

(2) **M. fulgens**

(3) **M. manubriatum**

(4) **M. cylindricum**

(5) **M. latifolium**

(6) **M. Kingii**

(7) **M. hypoglaucum**

ii. **Pyramidanthe.** Outer petals linear-lanceolate, 1.2 to 2 in. long; leaves tomentose beneath.

Outer petals densely woolly outside; fruit globose.

Outer petals minutely red-tomentose; fruit oblong.

Outer petals minutely red-tomentose 2 in. long; fruit ovoid, tubercled; leaves sub-glabrous.

Outer petals minute, red-tomentose 0.75 in. long; oblong.

(8) **M. lanuginosum**

(9) **M. Maingayi**

(10) **M. prismaticum**

(11) **M. rubiginosum**

iii. **Kentia.** Outer petals as broad as long, ovate, edges thick; flowers axillary; seeds pitted.

Leaves oblong-lanceolate; fruit ovoid; ovules 8.

Leaves elliptic or obovate; fruit globose; ovules 2.

(12) **M. elegans**

(13) **M. pisocarpum**


A strong climber; branchlets rusty-tomentose. Leaves coriaceous, oblong-ovate to oblong-acute, base rounded, glabrous above, midrib pubescent; beneath hairy pubescent, midrib and nerves 8 to 10 pairs, red-tomentose, slender, prominent beneath; 2.75 to 4.25 in. long, 1.25 to 1.6 in. wide; petioles 1 to 2 in. long. Flowers in lax few-flowered racemes or panicles, 3 to 4 in. long; pedicels 2.5 to 3.5 in. long. Sepals broad ovate acute concave, connate at base, 1 in. long. Petals broadly ovate acute coriaceous, outer ones 2 to 3 in. long, rufous-tomentose outside; inner ones smaller, puberulous outside. Stamens numerous, appendages broadly and bluntly triangular. Ovaries few, red, pubescent 4-ovuled. *Hab.* Open forest. Rare. Perak, Thaiping Hills at 300 to 500 ft. altitude (Kunstler).

Distinct in its small flowers in panicles, very near the Chinese *M. glancescens.* Kunstler described it on one ticket as a shrubby tree 10 to 15 ft. tall, 3 to 4 in. through.

A moderate climber; branchlets pubescent. Leaves lanceolate-acuminate or elliptic-lanceolate, base rounded or sub-acute, above glabrous, beneath glabrous or sparsely strigose; nerves 13 to 18 pairs, slender curving; 3 to 4 in. long, 1'2 to 1'5 in. wide; petioles '25 in. long, pubescent. Flowers 1 to many in a terminal or leaf-opposed cyme; pedicels '3 to '4 in. long, pubescent. Sepals broad ovate sub-acute, connate at base, '1 in. long, pubescent outside. Petals thick, outer ones flat ovate-oblong sub-acute, red pubescent outside, '5 in. long; inner ones similar but smaller, glabrous and concave at the base, '3 in. long. Stamens numerous, appendages of outer ones lanceolate and as long as the anthers. Ovaries pubescent, 4-ovuled in 2 rows. Carpels ovoid, globose, densely silky tomentose, 1 to 1'5 in. long, '9 in. through; stalks '85 to 1'5 in. long, stout. Seeds oblong. Hab. Open forest-edges. Common. Singapore, Reservoir Woods; Bukit Mandai; Chanchu Kang. Johor. Malacca, Sungei Hudang (Derry). Selangor, Bukit Kutu; Kwala Lumpur; Gunong Semangok at 2500 ft. altitude (Curtis). Perak, Tapah (Wray); Larut (Kunstler). Distrib. Malay Isles. Native names: Akar Kep; Akar Singuloh; Akar Larat, Larit or Lerek.


A large climber; branchlets red-tomentose. Leaves thinly coriaceous, oblong-lanceolate acuminate, base rounded, above glabrous except the rufous-hairy midrib, beneath densely red-tomentose; nerves 12 to 18 pairs, slender curved, rather prominent beneath; 2 to 4'5 in. long, '75 to 1'5 in. wide; petioles '3 in. long, tomentose. Flowers 1 or 2 or more in short racemes, on pedicels '25 to 7'5 in. long, densely red-tomentose, extra-axillary. Sepals ovate broad obtuse, connate at the base, silky outside, '2 in. long. Petals coriaceous, lanceolate to ovate lanceolate obtuse, outer ones densely red-tomentose outside, puberulous in the upper half; inner ones smaller, pubescent at the tip, base concave. Stamens, appendages bluntly triangular. Ovaries numerous oblong, densely silky; ovules 8 in 2 rows. Carpels numerous, ovoid-globose, about 1'25 in. long, densely red-woolly; stalks 2 to 3 in. long. Torus globose, all red-woolly. Seeds 8. Hab. Dense forest. Common. Singapore, Changi; Bedoh. Malacca, Merlimau (Derry); Alor Gajah and Rim Jungle (Griffith). Negri Sembilan. Perak, Tapah (Wray); Gunong Bubu 2000 ft. altitude and Goping (Kunstler). Penang. Distrib. Mergui, Banca. Native names: Akar Jangkang; Akar Larak; Akar Kenchang.

A moderate climber; branchlets rusty-pubescent. Leaves coriaceous elliptic-oblong acute, base rounded, above glabrous, bright green, beneath golden-silky; nerves 8 to 10 pairs, faint; 2.5 to 4 in. long, 1.6 to 1.8 in. wide; petioles 0.5 in. long. Flowers solitary axillary orange yellow, fragrant. Sepals ovate triangular pubescent, connate. Petals, outer ones triangular-lanceolate, 5 in. long, 3 in. wide, flat with thickened edges; inner ones nearly as long, orange lanceolate acuminate. Stamens numerous, dark rose pink; appendages ovate. Pistils honey-coloured, 4 to 6, silky. Carpels cylindric, blunt at both ends, brown-silky, 1 to 1.75 in. long and 0.35 to 0.75 in. wide; stalk 0.5 in. long, thick. Seeds many, horizontal. 


A stout climber; branchlets red-velvety. Leaves coriaceous, oblong blunt, base round, above minutely pubescent or nearly glabrous except the tomentose midrib, beneath densely red-tomentose; nerves 16 to 20 pairs, spreading elevate; 3 to 7.5 in. long, 1.75 to 2.5 in. wide; petioles 0.4 to 0.7 in. long, tomentose thick. Flower-buds conic, in lax axillary racemes or panicles; pedicels 0.35 to 0.5 in. long, red-tomentose. Sepals broad ovate obtuse, connate in a flat cup, 0.25 in. across, tomentose. Petals fleshy ovate blunt, outer ones 0.4 to 0.7 in. long, tomentose outside, inner ones smaller, glabrous. Stamens, appendages triangular acute. Ovaries about 0, short oblong densely hairy; ovules 6 to 8. Carpels globose to ovoid, brown-tomentose, 1 to 2.25 in. long, 1 to 1.2 in. wide; stalks velvety brown, 0.75 to 1.25 in. long. Seeds about 10, flattened, deep brown; var. typica, with rather larger flowers and oblong or globular fruit. Rare. In hill woods. Perak, Thaiping Hills. Distrib. Java.


I think King’s *M. sphærocarpa* is merely a form of this and probably *M. Kingii* is also a variety.


A very large climber 150 ft. long, 4 to 6 in. through. Leaves elliptic sub-acute or obtuse, base rounded, coriaceous, above glabrous, beneath brownish scaly-pubescent; nerves 11 to 15 pairs,
VI. ANONACEÆ.

[Melodorum.]

elevate transverse, nervules conspicuous; 3'5 to 6'5 in. long, 2 to 3 in. across; petioles 5 in. long, thick glabrous. Cymes few-flowered axillary or terminal, dark tomentose; pedicels 5 in. long. Sepals connate with short sub-acute points, small. Petals white tinged with pink; outer ones lanceolate, fleshy, obtuse, 6 in. long, 1 in. wide at base, outside brown tomentose. Carpels globose, 75 in. to 1 in. long, velvety brown; pedicels long. Hab. Forests. Not common; Malacca (Cantley). Perak: Ulu Bulong, 400 to 600 ft. altitude and Thaiping Hills (Kunstler). Native name: Poko Achar. Use: A decoction of the flowers used for dyspepsia.

Possibly only a form of M. latifolium.


A strong climber; branchlets minutely red-pubescent. Leaves thinly coriaceous oblong-lanceolate to elliptic-acute or shortly acuminate, base rounded, above glabrous except the red-pubescent midrib, beneath hoary-puberulous; nerves 10 to 12 pairs, bold ultimately glabrous and dark; 3 to 5'5 in. long, 1'35 to 2'2 in. wide; petioles 25 in. long. Flowers in axillary racemes of 2 to 3 flowers, or in 10- to 12-flowered terminal panicles on pedicels 5 to 8 in. long slender, greenish yellow. Sepals ovate acute concave, connate at base, red-pubescent outside, puberulous inside. Petals coriaceous linear-lanceolate, base dilate concave, outer ones red-tomentose outside, pubescent inside, concave for the whole length, 5 to 8 in. long; inner ones one-third shorter, excavate at base only, above triquetrous. Stamens, appendages broad sub-globular. Ovaries 12, oblong golden-silky; ovules 4 to 6 in. long, 2 rows. Carpels globose tubercled, puberulous or not, 1 in. long. Seeds globose tubercled, puberulous or not, 1 in. long; stalks as long. Seeds 4 or 5, oval. Hab. Hill forests. Perak, Goping and Ulu Bubong and Batang Padang (Kunstler). Native name: Akar Larak Merah.


A strong climber; branchlets red-tomentose. Leaves coriaceous, oblong or sub-ovate oblong acute or shortly acuminate, base rounded; above glabrous except the red-tomentose midrib, beneath densely red-woolly; nerves 12 to 20 pairs inarching close to the edge, prominent beneath; 3'5 to 9 in. long, 1'9 to 3'5 in. across; petioles 4 to 6 in. long, tomentose. Flowers axillary or leaf-opposed solitary, or in racemes of 2 to 4; pedicels stout woolly, 5 in. long. Sepals ovate, red-woolly outside. Petals thick oblong-lanceolate sub-acute, outer ones 1'25 to 2'1 in. long, densely red-woolly; inner ones smaller glabrous, base concave. Stamens
Glauous, above dark shining green; nerves 10 to 12 pairs, very numerous, appendages triangular. Ovaries ovoid, densely red-tomentose, '7 to 1 in. long, '75 in. through. Seeds about 4. *Hab.* Open country and forest edges. Common; a very handsome species easily known by its large flowers. Singapore, Bukit Timah; Jurong; Sembawang. Malacca (Maingay); Perak, Thaiping; Blanda Mabok (Wray). Dindings. Pangkor (Curtis). Penang. Lankawi.


Climber; branchlets pubescent. Leaves rather stiffly coriaceous broadly elliptic or oblong shortly acuminate at tip, base rounded, above glabrous, beneath glaucous; nerves 14 to 16 pairs, slender and slightly prominent; 3 to 6 in. long, 1'5 to 2'35 in. wide; petioles 6 in. long. Flowers solitary axillary, yellow on short '25 in. thick tomentose pedicels. Sepals orbicular subacute, quite connate into a saucer '25 in. across. Petals coriaceous, outer ones oblong-lanceolate, base broad, '75 to 1'25 in. long, flat keeled down the middle inside, red-tomentose outside, inner ones very small triangular-ovate, glabrous. Stamens numerous, appendages rounded. Ovaries 6, silky. Carpels oblong, slightly tapering to each end, red-puberulous, 1'5 to 2 in. long, '75 in. through; stalks 5 in. long. Seeds many. *Hab.* Forests. Rare. Perak, Gunong Batu Putih (Wray at 3600 ft. altitude). Penang (Maingay); Bukit Padi at 1500 ft. altitude (Curtis).


A large climber; branchlets glabrous. Leaves coriaceous oblong abruptly shortly acuminate; base broad rounded, above glabrous except the puberulous midrib, beneath glaucous, finely pubescent or glabrous; nerves 12 to 18 pairs faint, secondary nerves prominent; 4'5 to 8'5 in. long, 2'3 to 3'3 in. wide; petioles 5 to 7 in. long. Flowers 1'5 to 2 in. long, orange outside, white inside, hardly opening, axillary solitary; pedicels 3 to 6 in. long, red-tomentose. Sepals quite connate into a 3-angled disc, 3 in. across, pubescent outside. Petals, outer ones fleshy orange covered with ochreous scurf, inside greenish cream, linear-lanceolate triquetrous, inner ones '3 in. long, triangular ovate acute yellow glabrous. Stamens numerous, white, appendages triangular. Ovaries oblong pubescent; ovules 14 in 2 rows. Carpels ovoid blunt tubercled, 1'4 in. long, '8 in. wide; stalks '8 to 1 in. long, stout. Seeds oval black. *Hab.* Common in forests, Singapore, Garden Jungle; Selitar. Johor. Malacca. Perak, Thaiping; Gop ing (Kunstler). Penang Hill. *Distrib.* Banka, Borneo. *Native name:* Akar Pisang-Pisang Bukit.

Large climber; branches rusty-tomentose. Leaves thinly coriaceous oblong to elliptic blunt or rarely minutely cuspidate, base rounded or sub-cordate often unequal, above puberulous thin, glabrous except the tomentose midrib, beneath pubescent; nerves 13 to 22 pairs, prominent beneath; 3 to 9 in. long, 1'25 to 4 in. wide; petioles 35 to 6 in. long, stout tomentose. Flowers solitary or in terminal cyines of 4 to 5 flowers, on stout pedicels 6 to 8 in. long, red-tomentose. Sepals semi-orbicular, 1 in. long, connate at base. Petals, outer ones thick elongate lanceolate, thinly brown-tomentose outside, slightly concave glabrous inside, inner ones shorter and narrower sub-triquetrous. Stamens very numerous, appendages large, sub-acute. Ovaries several, silky; ovules silky in 2 rows. Carpels oblong, tapering to base, 1 to 1'25 in. long, thinly tomentose; stalks about as long. *Hab.* Rare. Lowland woods, Perak, road to Batu Kurau (Curtis); Goping (Künstler). Penang, Waterfall (Curtis). *Distrib.* Silhet to Tenasserim.

King makes the Malay plant a variety oblonga, but the Goping plant is exactly Hooker's Indian plant. Curtis' Penang plant has smaller stiffer leaves, not oblique at the base.


A large but slender climber. Leaves thinly coriaceous, oblong-lanceolate acuminate, narrowed slightly to rounded base; nerves 12 to 13 pairs, faint; 2'5 to 3'5 in. long, 1 to 1'25 in. wide; petioles 1'25 to 1'35 in. long. Flower-buds obtusely ovate, axillary solitary or 2 to 3 together, 35 to 65 in. long, on slender pedicels, 35 to 6 in. long. Sepals ovate acute connate at base only, outside pubescent, 1 in. long. Petals, outer ones broadly ovate obtuse red-tomentose outside, yellow hoary-puberulous within, inner ones 25 in. long, very thick, triquetrous above. Stamens numerous, appendages thick triangular. Ovaries glabrous; ovules in 2 rows. Carpels ovoid to globose, glabrous, 35 to 5 in. long; stalks slender, 5 in. long. *Hab.* Forests, widely spread in the peninsula, Singapore, Chan Chu Kang (Ridley). Johor, Sedenak. Malacca, Bukit Rejang (Derry). Perak, Thaiping Hills; Chankat Serdang (Wray). Penang at Telok Bahang (Curtis, Wallich).


A glabrous climber. Leaves small, coriaceous elliptic to obovate-elliptic shortly abruptly acuminate, base rounded, underneath indistinct; 2'5 to 4 in. long, 1'25 to 1'8 in. wide; petioles 1'35 in.
long. Flowers axillary solitary or in pairs; pedicels rather stout deflexed puberulous, 25 to 35 in. long. Sepals broadly ovate acute, connate into a triangular cup, puberulous outside. Petals, outer ones thick flat ovate blunt red-tomentose outside, pubescent inside, 3 to 4 in. long, inner ones less than half as long, base concave, apex triquetrous. Stamens numerous. Carpels globular, glabrous, 25 in. through; stalks as long. Seeds 2, plano-convex, dark brown pitted. *Hab.* Common in forests. Singapore, Bukit Timah; Bukit Mandai. Malacca, Merlimau; Selandor (Cantley). Negri Sembilan. Perak, Ulu Bubong; Larut (Kunstler); Penang Hill (Curtis). *Distrib.* Sumatra. *Native names:* Akar Gintek; Akar Tentawan; Akar Tawan hitam.

23. **RAUWENHOFFIA,** Scheff.


Scandent or dwarf shrub. Leaves oblong acute, base round; nerves 10 pairs, obscure beneath, above smooth, shining, 6-6 in. long, 2 in. wide; petioles 2 in. long. Flowers solitary or 2 to 3 together, scurfy, tomentose. Sepals connate, forming a bluntly 3-lobed cup. Petals olive colour, blunt ovate, outer ones little larger than inner, densely appressed, silky hairy 3 in. long. Carpels about 6, oblong to globose, 3-seeded, wrinkled, velvety, 25 in. long. *Hab.* Sandy heaths, half scandent or bushy. Pahang Pasir Aur, Rumpin (Foxworthy). Kelantan, Kota Bharu (Ridley). *Distrib.* Siam, Cochin-China. *Native name:* Pisang-Pisang Ayer.

24. **XYLOPIA,** Linn.

Shrubs or tall trees with coriaceous leaves. Flowers axillary, solitary or cymose, buds triquetrous conic, often slender. Sepals 3, valvate connate, small. Petals 6, valvate elongate, outer ones flat or concave, inner ones nearly as long, triquetrous, base concave. Torus flat or hollow. Stamens numerous, oblong truncate or appendages prolonged; anther-cells often septate. Ovaries 1 or more. Style long, clavate. Ovules 2 to 6, in 1 or 2 rows. Carpels long, cylindric or moniliform or short oblong. Seeds several. Species 70 to 80, tropical Asia and Africa.
Leaves quite glabrous.
Leaves 12 in. long, strongly nerved beneath . . . 
Leaves 6 to 7 in. long . . . 
Leaves 3 to 5 in. long.
Ripe fruit tubercled; leaves lanceolate . . .
Fruit smooth; leaves elliptic cuspidate . . .
Leaves 2 to 3 in. long, shining . . .
Leaves 3 in. long, midrib beneath obscurely hairy; petioles very narrow and long.
Leaves pubescent beneath, coriaceous; nerves inconspicuous.
Leaves oblong-lanceolate 3 in. long acute . . . 
Leaves oblong blunt, 3 in. long . . .
Leaves lanceolate caudate, 2 in. long; silky beneath . . .
Leaves elliptic sub-acute, 6 in. long; petals long.
Leaves oblong acute, 6 in. long, red-hairy beneath, branches hairy; fruit long, cylindric.
Leaves large, thin, obovate or oblanceolate with prominent nerves; petioles narrow.
Leaves glabrous, oblanceolate . . .
Nerves pubescent, strongly elevate, obovate . .
Leaves obovate, hairy all over beneath; very subulate . . . .

Tree 30 to 40 ft. tall glabrous. Leaves large, very coriaceous, oblong shortly bluntly acuminate; base cuneate oblique, margin undulate, glabrous except midrib, puberulous beneath; nerves sunk above, prominent beneath, 12 to 20 pairs, inarching near the edge, transverse nervules horizontal; 5'5 to 10 in. long, 2 to 3 in. wide; petioles 35 in. long, stout. Flowers 1 to 2, on stout woody peduncles, 4 in. long; pedicels red-tomentose, 2 in. long. Sepals thick ovate acuminate blunt woolly, free nearly to base, 2 in. long. Petals linear-lorate obtuse, sub-equal, 7 in. long to 1 in. wide, tomentose, outer ones wider than inner ones, keeled, base dilated concave. Stamens numerous, appendages oblique truncate. Ovary 1, cylindric fluted, glabrous; ovules many. Carpels globose compressed grey woody, 3 in. long, 2.5 in. wide. Seeds flat large, 4 to 6. Hab. Penang, Waterfall (Curtis). Rare.

Very peculiar in the large stiff leaves, with very distinct nervation and the large round woody fruit.

A tree. Leaves very coriaceous, elliptic ovate or oblong shining, shortly abruptly acuminate, glaucous beneath; nerves 12 to 15 pairs, slender; 6 to 7 in. long, 2.5 to 3 in. wide; petioles 3.5 in. long. Peduncles axillary fascicled, 35 to 5 in. long, adpressed-pubescent. Flowers pale green, pubescent. Sepals ovate broad. Petals narrow linear, tapering to the point, 1.25 to 1.5 in. long.

A tree 20 to 25 ft. tall or more, glabrous. Leaves lanceolate acute or acuminate, base acute; nerves 10 pairs very faint, secondaries nearly as distinct; 3 to 4.5 in. long, 1.5 to 1.75 in. wide; petioles 2.5 in. long. Flowers solitary or in pairs pendent, 1.5 in. long; pedicels very short. Bracts orbicular, amplexicaul. Sepals ovate obtuse, connate to middle. Petals linear-oblong expanded at base, slightly hoary-pubescent; inner ones narrower and shorter than outer ones, sub-trigonous. Stamens many, inner rudimentary; anthers linear septate, appendages rounded. Ovaries 2 to 4 pilose; ovules many. Carpels cylindric blunt at both ends, tubercled, 1.5 to 2 in. long, 1.75 in. through. Seeds 7 or 8, compressed. Hab. Forests. Rare. Singapore (Maingay); Bukit Timah. Perak, Gunong Malacca at 1000 to 1500 ft. altitude, top of limestone hills (Kunstler).  

A tall tree; glabrous. Leaves thinly coriaceous, ovate to elliptic, shortly bluntly acuminate, base cuneate; nerves 8 pairs, faint; 3.5 to 5 in. long, 1.5 to 2 in. wide; petioles 2 in. long. Flowers 6 to 9 in. long, 1 to 3 axillary; pedicels red-pubescent, 1 in. long. Sepals broad ovate acute puberulous outside, 1.5 in. long. Petals linear, base concave, tip shortly narrowed, pubescent; inner ones slightly smaller and more concave. Stamens numerous, appendages rhomboid, papillose; anthers septate. Pistils 6, hairy, 2-ovuled; styles longer than stamens, glabrous. Carpels red-hairy 3 to 4, oblong blunt narrowed to the stalk, nearly 1 in. long and 4 in. through; stalk thick, 1 in. long. Seeds about 6. Hab. Common in the south of the peninsula, in thin woods. Singapore, Jurong. Muar (Curtis); Malacca, Bukit Bruang. Negri Sembilan. Perak, Ulu Kal (Kunstler). Distrib. Sumatra and Borneo. Native names: Banit Kijang; Kayu B’linchi. Use: In house-building.  

X. Maingayi, Hook. fil., based on a single specimen of Maingay’s, who considered it the same as X. malayana, seems identical to me.  

A tree with pustulate brown bark, glabrous. Leaves small coriaceous, elliptic bluntly acuminate, narrowed and acute at base; nerves invisible above, beneath fine, secondaries equally distinct as
are reticulations; 2 to 2.75 in. long, '75 to 1.3 in. wide; petioles '1 in. long. Flowers 1 to 2 axillary pendent, '6 in. long; pedicels very short, tomentose. Bracts orbicular. Sepals short ovate sub-acute pubescent, half connate. Petals narrow linear sub-acute pubescent, dilate at base; inner ones shorter, much narrower, concave base larger. Stamens linear, apiculate, cells septate. Ovaries 5 to 8, hairy. Stigma clavate. Habit. Very rare. Malacca (Maingay).


Tree 50 to 60 ft. tall, glabrescent. Leaves thinly coriaceous, elliptic-oblanceolate, shortly bluntly acuminate, base sub-cuneate, above glabrous, beneath glauco-pubescent, finely reticulate; nerves fine, 10 to 12 pairs inarching near the edge; 2.5 to 4.5 in. long, 1.1 to 1.6 in. wide; petioles '1 in. long. Flowers 2 to 5, axillary; pedicels slender decurved, '3 to 5 in. long. Sepals very small ovate rounded, connate towards base. Petals narrow linear acuminate pubescent yellowish; inner ones sub-equal but narrower, '1.2 in. long, '5 in. broad. Stamens numerous, appendage conic. Ovaries numerous elongate, 6-ovule; style filiform. Carpels cylindric blunt, narrowed to a thick, short stalk, 2.6 in. long, '4 in. through. Seeds 1 to 4. Habit. Hill woods at 600 ft. altitude. Rare; very fragrant. Penang, Government Hill (Curtis).


A tree 25 to 30 ft. tall. Leaves thinly coriaceous, small elliptic or ovate or lanceolate, base cuneate, apex acute or sub-acute, above glabrous, beneath grey pubescent; nerves 6 to 7 pairs, very faint; '1.5 in. to 3 in. long, 1.0 to 1.25 in. wide; petioles '2 in. long. Flowers 1 to 3 together axillary, yellowish green, '6 in. to 0.75 in. long; pedicels '1 in. long, pubescent. Sepals ovate sub-acute, united to the middle. Petals tomentose, outer ones linear subulate, base broader, concave, inner ones trigonous, shorter and narrower. Stamens numerous; anthers linear. Ovaries 1 to 3 densely hairy, 4- to 6-ovule. Habit. Malacca (Maingay). Upper Perak (Wray). Penang, Sungei Pinang (Curtis). Native name: Lilan.


A tree 60 to 80 ft. tall with dark coloured branches and silky buds. Leaves stiffly coriaceous glossy green, brown beneath, copper pubescent when young, oblong obtuse, base cuneate, glabrous; nerves 8 to 9 pairs, very faint, inarching within the margin; 2 to 3 in. long, '75 to 1 in. wide; petioles '2 in. long, stout. Flowers '75 in. long, extra-axillary solitary or racemose; peduncle 25 to 75 in. long with several bracts. Pedicels '25 in. long,
puberulous. Sepals ovate acute, connate about half their length; teeth acute, puberulous outside, 1 in. long. Petals linear-oblong, tapering at the tip, white silky, base little dilate; inner ones smaller. Stamens linear not sepalate, appendages short erect. Ovaries 4 or 5, silky. Carpels oblong-cylindric blunt, reddish brown, 1.25 in. long, 7 in. wide. Seed 3 to 4 globular. Hab. Forests. Malacca (Griffith and Maingay); Perak, Larut (Kunstler).


Shrub or small tree, with very slender pubescent branchlets. Leaves small, lanceolate acuminate obtuse, base cuneate, above glabrous, beneath adpressed silky or glabrous, coriaceous; nerves 10 pairs, faint; 1.25 to 2.25 in. long, 6 to 8 in. wide; petioles 1 in. long, slender. Peduncles axillary, very short. Flowers small white, 2 to 3 in. long. Sepals ovate sub-acute, connate at base, pubescent outside. Petals linear-oblong blunt, silky pubescent, dilate at base; inner ones slightly narrower. Stamens numerous. Ovaries 2, silky; ovules 2. Carpels 1 to 3, sub-globose or oblong pubescent, 3 in. long. Hab. Singapore (Wallich 6452). Malacca (Maingay and Griffith). Pahang, Temerloh (Foxworthy). Native name: Memponai.

(10) **X. magna** Maing. in. Hook. fil. F.B.I. i. 84; King, Journ. As. Soc. Beng. l.c. 120; Ann. Bot. Gard. Calc. l.c. 151, pl. 197B.

A tree 40 to 60 ft. tall; stem 6 to 10 in. through; branchlets tomentose. Leaves coriaceous, ovate-lanceolate to elliptic sub-acute, base rounded, above shining light green, glabrous except the pubescent midrib, beneath hairy; nerves 10 pairs inarching near the edge, very faint, reticulations as conspicuous; 3 to 4.5 in. long, 1.25 to 2 in. wide; petioles 25 in. long, pubescent. Flowers 2 to 2.5 in. long, solitary or in pairs on red-pubescent pedicels 3 in. long. Sepals ovate acute, connate into a cup, pubescent outside. Petals sub-equal, oblong-linear acuminate, 1 in. across, dilate and concave at base, coppery-pubescent. Stamens numerous; anthers linear separtate, appendages oblong. Ovaries 15, densely hairy outside, 4-ovuled. Carpels obovoid-oblong blunt, tomentose, green, marked with red and white, 1.4 in. long, 0.65 in. wide; stalks thick, 1.5 in. long. Hab. Thick lowland forest. Malacca (Maingay); Perak, Larut 500 to 800 ft. altitude and Ulu Kal (Kunstler). Native name: Kudaga hutan.


A tree 50 to 80 ft. tall, 10 to 24 in. through; branchlets pubescent. Leaves coriaceous, narrow oblong acute, base slightly narrowed rounded sub-cordate, above glabrous dark green, beneath glaucous, pubescent; nerves 10 to 12 pairs inarching near the edge, prominent
beneath; 3'5 to 5'5 in. long, 1'1 to 2 in. wide; petioles 2 in. long, channelled. Flowers solitary or in pairs axillary or extra-axillary, yellow; pedicels red-velvety, 5 to 75 in. long. Bracts small, lanceolate. Sepals ovoid acuminate, connate at base, pubescent outside, 2 in. long. Petals linear fleshy, acute at tip elongate yellow, outer ones red-pubescent outside, puberulous inside, concave at base, 1'25 to 2 in. long; inner ones narrower and thinner, little shorter, puberulous. Stamens 24; anthers linear, appendages broadly oblong. Ovaries numerous, hairy. Carpels red, elongate cylindric, 4 to 5 in. long. Seeds oblong. Hab. Common in forests at low altitudes. Singapore, Bukit Timah; Selitar; Changi. Malacca (Maingay, Griffith). Pahang. Selangor, Rawang (Kloss). Perak, Ulu Bubong and Batang Padang (Kunstler). Distrib. Borneo. Native names: Jangkang Merah or Jangkang Paya; Pisang-Pisang Jari. Use: The bark is used for walls and partitions in houses, and the timber for rafters.


A tree 15 to 70 ft. tall; stem 4 to 15 in. through. Leaves coriaceous, elliptic-oblong, more or less obovate sometimes abruptly short acuminate, base cuneate dark green, glabrous; nerves 6 to 8 pairs, curved, interarching '2 in. from edge, prominent beneath; 3'5 to 8 in. long, 1'75 to 2'5 in. wide; petioles '25 in. long, thick wrinkled. Flowers solitary or in pairs extra-axillary, cream colour to light yellow, green when young; pedicels stout, '5 in. long, tomentose. Sepals thick ovoid, connate at base, acute puberulous, 1 in. long. Petals sub-equal linear, 1'5 in. long, 1 in. wide, base much expanded, hemispheric, densely tomentose, inner a little shorter. Stamens cuneate, appendages broad. Ovaries few oblong, densely silky, 6- to 8-ovuled. Carpels few globose, minutely tomentose, '6 in. through. Seeds 4 or 5, discoid. Hab. Perak, Thaiping Hills up to 500 ft. altitude. Common (Kunstler); Sungkai (Burn-Murdoch). Negri Sembilan, Selaru (Foxworthy).

The tree has a spicy smell (Kunstler).


Tree 50 to 60 ft. tall, 10 to 15 in. through; branchlets tomentose. Leaves coriaceous large, obovate-elliptic to elliptic-oblong shortly abruptly acuminate, base sub-cuneate rounded, above glabrous, beneath sparsely pubescent, especially on midrib; nerves 10 to 14 pairs, straight elevate; 4 to 7 in. long, 1'75 to 4 in. wide; petioles 3'5 in. long, pubescent. Flowers 1 to 5, fascicled on axillary tubercles pale yellow; pedicels '2 to '25 in. long, thick tomentose. Sepals free, broad ovate obtuse, brown, pubescent outside. Petals thick, linear obtuse, base concave dilated, pubescent. Stamens numerous, appendages truncate angled. Ovaries few, short,
pubescent, ovules 4 to 5. Carpels broad ovoid blunt, pubescent eventually glabrous. Seeds 4, discoid, brown. Hab. Dense jungle near limestone, 200 to 300 ft. altitude, Perak at Kwala Dipang (Scortechini and Kunstler).


A tree 20 ft. tall; branches tomentose. Leaves thinly coriaceous large, obovate-elliptic, abruptly shortly acuminate, base slightly cuneate, above glabrous, beneath softly tomentose; nerves 12 to 14 pairs, inarching, '1 to '2 in. from edge, prominent beneath; 6.5 to 8.5 in. long, 2.75 to 3.5 in. wide; petioles '5 to 1 in. long, thick, tomentose. Flowers extra-axillary on stout branches, 2 to 5 together, green fragrant; pedicels tomentose 2 in. long. Sepals ovate, long acuminate, '35 in. long, tomentose. Petals filiform, 1/2 in. long, very narrow, bases widely concave, tomentose. Stamens numerous, appendages 4- to 5-angled. Ovaries ovoid, silky, 4- to 6-ovuled. Hab. Dense forests at low altitudes. Rather rare. Singapore, Bukit Timah and Changi (Ridley). Distrib. Borneo.

The flowers are scented like Cananga flowers.

25. PHÆANTHUS, Hook. fil.

Bushes or small trees, with thin membranous leaves. Flowers small, solitary or 2 or 3 together, extra-axillary, pendulous. Sepals 3, small, valvate. Petals 6, valvate, outer ones small like the sepals; inner ones large flat, coriaceous. Stamens numerous, oblong-quadrate truncate; anther-cells dorsal, distant. Ovaries numerous, 1- to 2-ovuled, ascending, basal. Style cylindric or clavate, grooved ventrally. Carpels stalked, 1-seeded. Species 6, one in Burma, one in the Andamans, the rest Malayan.

Leaves softly pubescent; flowers over an inch long. . . . (1) P. nutans
Leaves glabrous; flowers 1 in. or less long . . . . (2) P. lucidus


A bush or small tree; branchlets tomentose. Leaves membranous, obovate-lanceolate to obovate-elliptic, caudate-acuminate, base narrowed sometimes acute, above glabrous except midrib and nerves tomentose, beneath softly pubescent, midrib tomentose; nerves 10 to 14 pairs, prominent beneath, inarching near the edge; 5 to 9 in. long, 1.3 to 4.5 in. across; petioles 3 in. long, tomentose. Flowers on pedicels, '5 to 1.5 in. long, pubescent. Sepals linear lanceolate, '2 in. long. Petals, outer ones sepaloid, green; inner ones ovate-oblong acute pubescent, cream colour, '75 to 1 in. long. Stamens pale green outside; anther-cells white. Carpels ovoid, pubescent, '6 in. long, orange or dark red. Hab. Common in


Usually a bush with straight, black stems and tough bark; branchlets brown-furry. Leaves papery-membranous, dark green above, shiny beneath, oblong-elliptic or lanceolate acuminate, base cuneate, glabrous except midrib pubescent beneath; nerves 8 pairs, rather prominent beneath; 4.5 to 6.5 in. long, 1.25 to 2.25 in. wide; petioles 1.2 in. long. Flowers 16 to 1 in. across on pedicels 1 to 1.25 in. long. puberulous. Sepals ovate acute almost triangular, edged with red fur. Petals, outer ones more lanceolate, otherwise similar to sepals; inner ones thick, oblong-ovate acute green 5 in. long, pubescent both sides. Stamens, appendages square truncate. Ovaries numerous, green, i-ovuled. Carpels oblong fleshy, 6 in. long, 3 in. through, red, smooth and shining dotted all over with shining hairs; stalks 5 to 6 in. long. Hab. Thick forests. Common; flowers September. Singapore, Garden Jungle; Tanglin. Johor; Serom. Pahang at Pulau Tawar. Malacca, Bukit Besar; Mt. Ophir. Selangor, Batu caves. Perak, Thaiping Hills; Ulu Bubong (Kunstler). Penang Hill at 500 ft. altitude (Curtis).

26. MILIUSA, Lesch.

Trees or shrubs. Flowers often unisexual, green or purple, axillary or extra-axillary solitary (fascicled or cymose). Sepals 3, small, valvate. Petals 6, valvate in two series, outer small like the sepals; inner larger, when young cohering by the margins, at length free. Torus elongate, cylindric. Stamens definite or indefinite; anther-cells contiguous, ovoid, extrorse; appendages broad. Ovaries indefinite, linear-oblong; ovules 1 to 2, rarely 3 to 4. Species about 12.

Leaves narrowed to base.

| Flowers nearly 1 in. across | . . . . | (1) M. longipes
| Flowers 2.5 in. wide | . . . . | (2) M. parviflora
| Leaves sub-sessile, unequally bilobed at base | . | (3) M. amplexicaulis


A small bushy tree or shrub 15 to 30 ft. tall, glabrous. Leaves membranous shining, oblong-oblanceolate acuminate, base cuneate; nerves 12 pairs, faint, 5.5 to 7 in. long, 1.75 to 2.75 in. wide; petioles 1 to 1.5 in. long. Flowers axillary solitary on slender pedicels,
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5 to 7.5 in. long with 3 to 4 lanceolate bracts at base. Sepals and outer petals similar small ovate acute, edges ciliate, green; inner petals much larger, 5 to 6 in. long, ovate oblong sub-acute, greenish yellow, inside purple. Stamens 18; appendages broad. Ovaries numerous, glabrous. Stigma capitate sessile. Carpels numerous, globular-ovoid, blunt, glabrous, 25 to 3 in. long; stalks 7.5 to 1 in. long. Hab. Dense forest. Singapore on Bukit Timah. Malacca. Woods at the base of Mt. Ophir. Perak, Chanderiang and Kinta (Kunstler). Kedah at Yan.


A small tree with grey bark. Leaves membranous lanceolate-acuminate, glabrous when adult except the midrib, 2 to 2.5 in. long, 7.5 to 1.5 in. wide; nerves fine, inconspicuous, 12 pairs. Flowers solitary extra-axillary, green; pedicels pubescent 5 in. long. Sepals very small ovate acute, pubescent. Petals, outer ones similar to sepals; inner ones ovate-triangular blunt, pubescent outside, 12 in. long. Stamens few; anther-cells separate; appendages triangular short erect. Ovaries 8, silky. Carpels 5 in. long, oblong blunt, 25 in. through. Seeds 1 to 3, elliptic. Hab. Limestone rocks. Perlis, at Bukit Lagi and Tebing Tinggi (Ridley).


Tree; branches brown-tomentose. Leaves nearly sessile, elliptic-ovate acuminate, base broad, unequally bilobed ampelicaulis, 7 in. long, 3.5 in. wide; nerves 12 pairs, elevated beneath, above glabrous, beneath sparsely hairy, midrib and nerves hairy; petioles 1 in. long. Flowers axillary in twos or threes; peduncles 25 in. long; pedicels as long, hairy. Bracts small ovate. Sepals ovate acute, edges hairy. Petals, outer ones similar, little longer; inner ones ovate-triangular fleshy glabrous, edges hairy, 1 in. long. Stamens in 3 whorls, bases hairy; appendages broad ovate. Pistils several. Hab. Limestone rocks. Perak at Lenggong; Larut (Kunstler). Lankawi at Kwah (Curtis).

27. ALPHONSEA, Hook. fil.

Shrubs, medium-sized trees or climbers. Leaves more or less coriaceous, glabrous. Flowers middle-sized or small in leaf-opposed fascicles on the branches, solitary or two or three together silky white or yellowish, buds conic. Sepals 3 valvate, very small. Petals 6 in 2 series, much larger, saccate at the base, sub-triangular valvate sub-equal or the inner ones a little smaller. Torus cylindrical or hemispheric. Stamens few, or many whorls; anther-cells dorsal, contiguous; appendages very small or 0. Ovaries 1 or more; ovules 4 to 8 in 2 rows; style cylindrical; stigma rather large. Carpels usually cylindrical, several seeded, stalked or sessile. Species 9 to 10, Indo-Malayan.
Leaves pubescent beneath; tree . . . . (1) A. Maingayi
Leaves glabrous.
Trees or shrubs.
Buds conic; fruit globose or ovoid . . . . (2) A. lucida
Buds globose; fruit cylindric; leaves 6 in. long
Buds conic; fruit cylindric; leaves 3 in. long . (3) A. sub-dehiscens
Climber; buds conic; leaves stiff, 6 in. long, lanceolate . . . . (5) A. Curtisi


A medium-sized tree; branches spreading, bark black. Leaves coriaceous glabrous, dark shining green, elliptic-oblong to lanceolate, obtusely acuminate, base rounded; nerves 8 to 9 pairs, inarching far from the margin, reticulations conspicuous beneath, edges and midrib hairy; 5 to 7 in. long, 1'5 to 2'7 in. wide; petioles 2'5 in. long. Flowers extra-axillary solitary or shortly racemose, peduncles tomentose. Sepals very small sub-ovibcular, brown-hairy. Petals silky, pale flesh-colour, outer ones base gibbous, above lanceolate sub-acute, tips recurved, inner ones erect tips shortly recurved, a little smaller, fleshy with a central groove, 7'5 in. long. Stamens in 3 rows, filaments connate in three bundles; anthers elliptic; appendages 0. Ovaries 7; styles brown-hairy cylindric; stigma orbicular white. Ovules 20. Carpels ovoid, short-stalked, 2 in. long, 1 in. through, tomentose. Seeds many. Hab. Lowland forest in the South. Singapore, Garden Jungle. Malacca, Selandor (Cantley, Maingay). Pahang, Kwantan, and Negri Sembilan, Senawang (Foxworthy). Native names: Papisang Bukit; Terbak.

var. elliptica Ridl. M. elliptica Hook. fil. F.B.I. i. 90; King, Journ. As. Soc. Beng. l.c. 123; leaves quite glabrous; nerves not so conspicuous and reticulations finer. Flowers less silky. Fruit 2'5 in. long. Hab. Malacca (Maingay).


A shrub 6 to 8 ft. tall, glabrous. Leaves thinly coriaceous, broadly elliptic abruptly acuminate, base cuneate; nerves 6 to 8 pairs, inarching some way from edge, depressed above, prominent beneath, transverse nervules conspicuous beneath; 4'5 to 5'5 in. long, 1'75 to 2'5 in. wide; petioles 3 in. long. Flowers solitary or in racemes of 3; peduncles very short, puberulous 3 to 4 in. long. Sepals triangular-ovate, connate at base, puberulous outside. Petals yellowish, inner ones slightly smaller than outer ones. Stamens in three rows, shortly apiculate. Ovaries 4 to 5, oblong, pubescent; ovules many in 2 rows; stigma sessile, sub-capitate. Hab. Dense jungle 300 to 500 ft. altitude. Larut (Kunstler).


Tree 30 to 40 ft. tall; stem 4 to 5 in. through; branchlets
puberulous. Leaves thinly coriaceous oblong-lanceolate or elliptic abruptly acuminate, base rounded or cuneate, glabrous on both sides; midrib channelled above; nerves about 10 pairs, very faint; 4 to 6 in. long, 175 to 23 in. wide; petioles grooved, 25 in. long. Flowers globular, scarcely opening, 25 in. across, solitary or in pairs axillary on short thick pedicels with several orbicular bracts. Sepals thick joined into a flat cup, 3 in. through; lobes obtuse, broad. Petals larger thick fleshy, silvery grey, orbicular acute concave, pubescent outside; outer ones 2 in. across, inner ones smaller. Stamens numerous; appendages large fleshy conical. Torus conic. Pistil 1, puberulous, many-seeded; stigma minute. Carpels elongate clubbed pubescent, 1 to 1.25 in. long, narrowed to stalk, 25 to 3 in. long. Seeds 10. Hab. Rare in dense jungle at 400 to 600 ft. altitude. Perak, Ulu Bera (Kunstler). Dindings, Lumut (Ridley).


A small tree 20 to 30 ft. tall; stem 3 to 4 in. through; branchlets with soft brown pubescence. Leaves thinly coriaceous ovate-lanceolate to oblong, shortly and rather abruptly acuminate, base rounded, slightly oblique, above glabrous, midrib brown-hairy, beneath sparingly hairy on nerves; nerves 7 to 9 pairs, faint; 2.5 to 3.5 in. long, 1 to 1.5 in. wide; petioles hairy, 1.5 in. long. Flowers 1 to 3 from extra-axillary pubescent peduncles 1.5 to 4 in. long. Bracts sub-orbicular, deciduous. Sepals semi-orbicular blunt, connate at base, tomentose outside, cream colour. Petals sub-equal oblong-ovate or sub-triangular obtuse, waxy white, tomentose, 3.5 in. long. Stamens in 3 rows; anthers ovate apiculate. Ovaries 3 oblong silky; many ovules in 2 rows. Carpels 1 to 2, elongate terete acuminate, pubescent, 1 in. long, 2 in. across; dark brown. Hab. Perak, Ulu Bubong in bamboo forest at 400 to 600 ft. altitude. Rare (Kunstler).


A shrub; scandent branchlets yellow pubescent. Leaves stiffly coriaceous, oblong-lanceolate, acute at both ends, glabrous except the scurfly midrib, finely reticulate, shining; nerves 12 to 15 pairs, faint, inarching some way from the edge; 4 to 5.5 in. long, 2.2 to 1.75 in. wide; petioles 2 in. long. Peduncles extra-axillary 1- to 2-flowered. Flowers 1 in. long, buds conic; pedicels 3 in. long, silky. Bracts 1 or 2, orbicular. Sepals connate in a cup, 2.5 in. across, tomentose outside, teeth ovate sub-acute. Petals much larger, oblong-ovate sub-acute, outer ones tomentose on both sides, inner ones narrower, glabrous inside. Stamens numerous; appendages small. Pistils 3, tomentose, many-ovuled. Stigma broad. Hab. Penang at Muka Head. Rare (Curtis).

Excluded is A. ventricosa Hook., given as Penang, Wall. Cat. 6458, but the specimens so numbered were from the Calcutta Gardens. It is Assamese.
28. KINGSTONIA, Hook. fil.


Leaves oblong to elliptic, acuminate, base rounded, glabrous; nerves 12 to 14 pairs, prominent beneath, 4 to 8 in. long, 1.5 to 3.25 in. wide; petioles 1.4 in. long, puberulous. Flowers 2.25 in. long in fascicles of 8 to 10; pedicels slender, 3.5 to 5 in., pubescent. Bracts several orbicular, imbricate at base. Sepals pubescent outside. Petals, outer ones oblong-elliptic concave, tomentose outside, inner ones smaller thick concave, tomentose above. Stamens 15. Ovary oblong pubescent. Carpels ovoid blunt tomentose, 1.5 in. long, 1.1 in. through. Seeds 4 oblong. Hab. Malacca (Maingay); Ayer Panas (Goodenough). Perak, at 300 ft. altitude (Wray).

The imbrication of the inner petals suggests an affinity with Stelechocarpus, but there is only one pistil.

29. MEZZETTIA, Beccari.

Vast trees with small coriaceous leaves. Flowers small axillary or from axils of fallen leaves, fascicled or umbelled, green. Sepals 3, ovate valvate. Petals 6, valvate, flat linear, inner series smaller than the outer. Stamens 9 to 12 in 2 rows; anther-cells lateral introrse; appendages truncate. Torus small, concave, pubescent. Ovary 1, ovoid glabrous, contracted to a very short style; ovules 2. Carpels globose or elliptic, pulpy. Seeds 2, extremely hard, large, plano-convex. Species 5 or 6, Malay Peninsula and islands and Africa.

Leaves coriaceous; sepals broadly ovate.

- Outer petals linear
- Outer petals ovate lanceolate
- Leaves thinly coriaceous; sepals semi-orbicular

(1) M. leptopoda Oliver, Hook. fil. Ic. Pl. t. 1560; King, Journ. As. Soc. Beng. l.c. 129; Lonchomera leptopoda Hook. fil. F.B.I. i. 94.

An immense tree over 100 ft. tall with smooth, grey bark. Leaves glabrous, coriaceous, oblong narrowly elliptic acute or obtusely acuminate, base rounded; nerves 8 to 9 pairs, inarching far from the margin faint; 2.5 to 4 in. long, 1 to 1.75 in. wide; petioles
35 in. long. Flowers in fascicles of 2 to 6 on slender pubescent pedicels, 5 to 75 in. long. Sepals broad ovate, connate at base, tomentose. Petals green, tomentose on both sides, outer ones linear obtuse, 2 in. long, inner shorter and broader. Ovary ovoid. Fruit globose, 2.5 in. long, light green, pulp firm. Seeds 2, 1.5 in. long, 5 in. thick, brown, testa stony, back rounded, inner surface flat, ovoid oblong. Hab. In forests. Common all over the south of the peninsula from Singapore northwards. Native name: Poko Prah.


A tree; glabrous. Leaves coriaceous elliptic-oblong acuminate, base cuneate; nerves 10 pairs faint, inarching within margin; 2.5 to 3 in. long, 1 to 1.25 in. wide; petioles 2.5 to 3.5 in. long. Flowers crowded in sessile fascicles axillary or extra-axillary, 3 to 8; pedicels 3 in. long, puberulous. Sepals broadly ovate obtuse, connate at base pubescent. Petals, outer ones ovate obtuse flat pubescent, inner ones smaller broad elliptic obtuse, tips incurved. Anthers 12, sessile, obovate-quadrat. Ovary oblong tapering to style. Ovules 2. Hab. Malacca (Hervey). Native name: Mengkudang.


Tree 30 to 40 ft. tall. Leaves thinly coriaceous oblong-lanceolate to oblong shortly acuminate, base cuneate, drying black, glabrous; nerves 10 pairs, faint; 2.5 to 5 in. long, 5 to 1.5 in. wide; petioles 2.5 in. long. Flowers umbel bed fascicled, axillary or extra-axillary on branches below the leaves, 5 to 10 in a fascicle; pedicels slender, scurfy, pubescent, 35 to 6 in. long. Sepals semi-orbicular, connate into a spreading cup, densely tomentose. Petals, outer ones ligulate acute tomentose with a glabrous patch at the base, inner ones less acute and one-third shorter. Anthers sessile 12; appendages very broad truncate. Ovary 1, ovoid, 2-ovuled. Carpels sub-globose, 1.5 to 2 in. across, smooth, glaucous. Hab. Penang, Government Hill at 1200 ft. altitude (Curtis).

**Order VII. MENISPERMACEÆ.**

Climbing herbs or shrubs. Leaves alternate, entire or rarely lobed, usually palm inerved. Stipules 0. Flowers small or minute white or green, in cymes or racemes, solitary or fascicled, unisexual. Sepals 6, or 3 to 4, or 8 to 12, usually free, imbricate in 2 to 4 series. Petals 6 or 0, or 1 to 5, free or connate. Male flowers, stamens hypogynous, filaments free or connate. Anthers free or connate, 2-celled. Pistillodes minute or 0. Female flowers, staminodes 6 or 0. Ovaries 3 (rarely 1 or 6 to 12). Style terminal, simple or
divided. Ovules 1 (except Fibraurea, 2) usually amphitropous. Fruit a drupe. Seed hooked or reniform or straight, often curved round an intrusion of the endocarp. Albumen even or ruminate or absent. Cotyledons flat or semiterete. About 32 genera.


(a) Ovaries 3.
Drupes with a terminal style-scar; stamens free.
Sepals 3 or 6; petals 6; slender climbers; leaves thin, usually herbaceous
Sepals 6, connate; petals 0; slender climber
Sepals 9; petals 6
Sepals 6; petals 0; woody liane
Drupes with sub-basal scar.

Woody climbers.
Sepals 6; stamens free; flowers in heads
Sepals 6; petals 6; stamens free; flowers cymosed
Sepals 9; stamens 9, connate; flowers panicked
Sepals 8; petals 2; stamens 4 to 8
Slender climbing shrubs; leaves not coriaceous.
Sepals 9; petals 3 to 6
Sepals 6; petals 4 to 6; stamens 3
Sepals 6; petals 6; ovaries 3 to 6; stamens 6 to 9
Sepals 8 to 12; petals 4 to 6
Sepals 6; petals 6; ovaries 3; styles forked.
(b) Ovaries usually 1. Endocarp muricate; leaves peltate.
Sepals 6 to 10; petals 3 to 5, free
Sepals 4; petals of male 4, female 1
Sepals 4 to 8, connate; anthers on a central column

1. TINOSPORA, Miers.

Weak climbers with loose pale bark often warted. Leaves membranous, rarely sub-coriaceous, cordate or truncate at the base, 3- to 5-nerved. Racemes solitary slender rarely branched. Males several together. females solitary. Flowers small, green. Sepals 3 to 6, outer series usually smaller than the inner one. Petals 5 or 6, widely cuneate-ovate, very small and involute round the stamens or larger and free. Stamens 6, free. Females, petals minute spathulate-oblong. Staminodes 6, shorter and with the petals adnate to the pistils. Carpels 3, ellipsoid. Style short thick. Stigma ligulate peltate. Drupes 3 or fewer, stalked ellipsoid. Seed flattened moon-shaped, hollowed on ventral side. Albumen ruminate. Species 24, tropical Asia, Australia.

Leaves herbaceous; fruit 2.5 in. long, red.
Leaves slightly cordate, base truncate
Leaves truncate at base; fruit 1.25 in. long, yellow.
Leaves sub-coriaceous, base round

1 T. crispa
2 T. macrocarpa
3 T. Curtissii
(1) **T. crispa** Miers, *Contrib. Bot.* iii. 34; *Hook. fil. F.B.I.* i. 96.
Climber with fawn colour papery warded bark. Leaves ovate to oblong-ovate acuminate, base truncate or very slightly cordate, thin light green, 3 to 3.5 in. long, 3 to 15 in. wide; petioles 3.5 in. long. Raceme slender lax. Flowers small green. Males, sepals 3 outer smaller, 3 inner elliptic much larger. Petals very small, involute oblong ovate. Stamens short 6. Females, pistils 3, sub-cylindric. Fruit oblong 3 in. long, yellow or red. Seed smooth. *Hab.* Cultivated ground, Singapore. Malacca, Pulau Jawa (Griffith); Penang, near Waterfall (Curtis); Perlis, Tebing Tinggi. *Distrib.* India. Introduced here and more or less cultivated; very rarely flowering.

(2) **T. macrocarpa** Diels, *Pflanzenreich, Menispermaceae* 141.
Stem as in *T. crispa*. Leaves ovate-oblong, base truncate or cordate, acuminate, 3-5 in. long, 3-75 in. wide. Flowers unknown. Drupes oblong cylindric, 1.5 in. long, 7 in. wide; endocarp bony sub-ellipsoid, somewhat warty. *Hab.* Malacca (Maingay).

Possibly *T. uliginosa* Miers, of the Malay Islands, as King suggests, of which I have seen no plants.

Climber; bark pale, warty. Leaves elliptic ovate, base round minutely cordate, sub-coriaceous; nerves 3 pairs with reticulations elevate beneath; 4 in. long, 3 in. wide; petioles 1 in. long. Inflorescence laxly panicked over 12 in. long; branches 3 to 5 in. long, minutely puberulous. Flowers 12 in. wide, solitary and a few in short racemes. Pedicels very short. Bracts minute acuminate. Male flowers, sepals 3, round and wide. Petals longer lanceolate acuminate. Stamens 6, filaments short broad linear. Female flowers and fruit unknown. *Hab.* Penang, Batu Feringhi, near the beach (Curtis).

2. **PERIPETASMA**, Ridl.


Glabrous. Leaves trinerved with 6 pairs from the midrib, reticulations wide elevate beneath, 6 in. long, 2 in. wide; petioles 1 in. long. Panicles 12 in. long with many slender racemes, 8 or 9 in. long. Flowers scattered. Pedicels slender *1* in. long. Bracts
half as long. Sepals outer narrow lanceolate-acuminate, inner wider, with 2 ribs on each, finely dotted, connate at base. Stamens shorter, incurved. *Hab.* Lowland woods. Selangor, Kwala Lumpur and Batu Tiga (Ridley).


Big liane. Leaves coriaceous or membranous, 3- to 5-nerved.

Racemes solitary or fascicled from the old wood. Flowers white. Males, sepals 9 to 12, 3 outer bract-like, 6 inner narrow oblong. Petals 6 shorter oblong or orbiculate. Stamens 6, opposite petals and as long, free; filaments thick; anther-cells immersed; abortive carpels occasionally present. Females, petals and sepals similar; staminodes 6, lanceolate beaked. Carpels 3, glabrous sub-ovoid. Stigma peltate cerebriform. Drupes 3 or fewer, oblong to ovoid, compressed. Seed obovate with large flat cotyledons. Species 6 to 8, Malayan.

Liane 60 to 100 ft. long much branched; stem ribbed, 2 to 4 in. through, exuding white latex when cut. Leaves coriaceous ovate-oblong, narrowed at base, tip blunt or shortly acuminate, glabrous dark green; nerves from base 3, 1 or 2 pairs above from midrib; 4 1/2 to 5 1/2 in. long, 2 to 3 in. wide; petioles slender, geniculate 2 1/2 in. long. Male racemes fascicled from the old wood, 6 to 10 in. long. Flowers white 1 1/2 in. across; pedicels 1 in. long. Sepals 3 or 4, green covered like the pedicels with short red hairs. Outer petals 6, linear oblong obtuse, edges white hairy, inner ones 6, short connivent, oblong, edges incurved, white glabrous. Stamens fleshy thickened at base, connective thickened incurved beak-like; anther-cells wide apart, immersed. No pistillodes. Female inflorescence panicked 1 1/8 in. long, racemes pubescent 8 in. long. Outer sepals 2; staminodes 6. Fruit oblong elliptic flat, 1 in. long, 1 1/2 in. wide (channelled when dry) smooth, dark green with white spots. **Hab.** Very common in forests and secondary jungle, roadsides, etc. Singapore to Kedah, Alor Sta. **Distrib.** Tonkin, Sumatra, Borneo. **Native names:** Akar Langkap; Akar Lumpang; Akar Nasi; A. Lempeoyang; A. Mumbulu. **Use:** As a drug in rheumatism.

### 4. **FIBRAUREA,** Lour.


Big liane. Leaves ovate oblong, base rounded, apex acuminate; nerves from base 3, prominent beneath, deep green coriaceous glabrous; 7 in. long, 4 in. wide; petioles 2 1/2 in. long. Flowers, male, white in lax panicles from old wood, 2 to 6 in. long. Bracts narrow linear acute. Sepals 6, rounded-ovate. Inner petals narrower than outer ones, elliptic. Stamens 6, bluish green. Female flowers green. Carpels 3 obovoid bluish green. Drupe orange colour, elliptic smooth, pulp bitter, 1 1/2 in. long. Seed oblong, 1 in. long, grooved deeply on the lower surface, ends rounded. **Hab.** Very common in hedges and woods. Singapore to Penang. **Distrib.** Tavoy, Malay Islands to Celebes. **Native names:** Akar Kinching Kerbau (buffalo urine); Akar Kuning.
Use: The wood of the stem and roots formerly used as a yellow dye, and also used in medicine. The whole plant very bitter.

5. COSCINUM, Colebr.

Climbing shrubs, not very stout. Leaves ovate more or less peltate. Flowers in dense globose heads, in racemes or panicles. Sepals 6, orbicular. Petals 3, large spreading elliptic; anthers adnate, outer 1-celled, inner 2-celled. Female flower, staminodes 6. Ovaries 3 to 6; styles subulate. Drupes globose; endocarp bony. Seed globose, embracing a globose intrusion of the endocarp. Albumen fleshy ruminate. Embryo straight, cotyledons orbicular. Species 6, Indo-Malayan.

Leaves very slightly peltate ovate yellowish tomentose beneath; flower-heads small . . . . (1) C. Wallichianum
Leaves oblong distinctly peltate, tomentum white; flower-heads large . . . . . . . (2) C. Blumeanum


A moderate liane. Stem yellow when cut, tomentose above. Leaves coriaceous ovate-peltate, above glabrous shining, beneath yellowish tomentose; nerves 5, radiating from base, prominent beneath as are the reticulations, with 2 pairs of nerves from the midrib above; 6 to 7 in. long, 4½ to 6 in. across; petioles woolly, 3 in. long, thick. Male heads of flowers from the branches, in tomentose panicles, 4 in. long; peduncles 1 in. long; heads 2 in. across. Outer sepals short, inner ones longer oblong pilose. Drupes globose 1 in. through, fawn colour, on much thickened branches. Hab. Common in woods, but seldom to be found in flower. Singapore, Changi. Malacca (Maingay). Perak. Distrib. South India, Ceylon. Native names: Akar Kunyit; Kunyit Babi; Tol (Sakai).

Use: In dart poison by the Sakais.

(2) **C. Blumeanum** Miers, Contrib. Bot. iii. 23; Hook. fil. F.B.I. i. 99; King, Journ. As. Soc. Beng. l.c. 38i.

A woody climber, whitish woolly. Leaves coriaceous, oblong-ovate or oblong shortly acuminate, base rounded quite peltate, above glabrous, beneath white tomentose; nerves 7 radiating from apex of petiole, reticulations prominent, secondary nerves inarching near the edge; 8 to 15 in. long, 4 to 6 in. wide; petioles 6 to 8 in. long, thickened at both ends. Male inflorescence from the old wood 4 to 5 in. long, woolly-tomentose; branchlets 5 in. long thick. Heads globose 5 in. across. Sepals and petals light yellow, silky-tomentose outside, lanceolate sub-spathulate, inner ones narrower. Stamens 6. Hab. Forests. Dingdings, Lumut (Curtis). Penang Hill, 200 to 2000 ft. altitude (Wallich, Maingay). Kedah, Alor Sta. Native name: Akar Mengkunyit.

Lianes. Leaves deltoid-ovate edge subcrenate, quite glabrous; petioles very long. Inflorescence of pedicellate cymes on a long raceme from the old wood below the leaves. Sepals 6, cuneate elliptic, concave, inner ones broadest. Petals 6 cuneate, embracing the stamens. Stamens 6, filaments thickened upwards; anthers 4-lobed. Carpels 3; style short; stigmas lobed. Drupe large; endocarp with a depression on each side and the back transversely ribbed. Seed horseshoe-shaped. Species 3, Indo-Malaya, China.


A strong liane, wood yellow, glabrous. Leaves membranous, rounded ovate obtuse peltate; nerves radiating 7; 2'5 to 4 in. long, 3 in. wide; petioles slender, 3 to 3'5 in. long. Inflorescence of several long branches fascicled from the trunk 20 in. long with scattered compound cymes on pedicels 5 in. long. Outer sepals 3, concave oblong elliptic pale, inner 3, wider, yellow shining. Fruit panicles longer. Drupes very fleshy yellow; endocarp woody flat curved pyriform deeply channelled on one face and strongly ribbed on the keel, 1 in. long. Rare. *Hab.* High forest, Perak, Larut (Kunstler). Kelantan on Gunong near Kota Bharu. *Distrib.* Cochin-China and Borneo.

7. **ARCANGELISIA**, Becc.


A big powerful liane, 40 to 60 ft. long. Stem 2 to 5 in. through. Leaves stiffly coriaceous glabrous, ovate to elliptic, cordate or truncate at base, acuminate at top; nerves from the base 3 to 5, with one or two pairs rising from the midrib; 3'25 in. long, 2'75 in. wide; petioles slender, geniculate at base and thickened above, 2'5 in. long. Panicles usually from the trunk slender, 4 to 6 in. long, many-flowered. Bracts triangular. Flowers small white. Sepals 3 triangular ciliate; inner sepals and petals ovate boat-shaped obtuse. Stamens 6 to 9 connate in a globose head. Female

8. PYCNARRHENA, Miers.

Scandent shrubs. Leaves lanceolate to oblong. Cymes axillary or reduced to 1-flowered pedicels, in fascicles. Flowers minute. Sepals 6 to 9, outer ones ciliate, inner ones larger, innermost suborbicular very concave glabrous. Petals 2 to 6 obovate, smaller than the outer sepals. Stamens 2 to 10; filaments very short or hardly any, thickened above; anthers half-immersed globose. Female flower resembling male, but with 2 to 4 ovoid carpels. Stigmas tongue-shaped. Drupes 3 or fewer. Seeds exalbuminous. Species 17, India, China, Malay Islands to Australia.


A tall slender climber woody, 40 to 60 ft. long. Stem 15 in. through. Leaves coriaceous oblong or lanceolate acuminate acute, base blunt narrowed; nerves 6 pairs inarching far from edge; 3 to 4 in. long, 1.25 to 1.5 in. wide; petioles 15 in. long. Flowers fascicled, as many as 18 together in male, very small on slender filiform pedicels, 4 in. long, on pubescent axillary tubercles. Male flowers, 93 in. long. Sepals, outer ciliate, inner 3 larger concave orbicular. Petals smaller widely obovate. Stamens 2 to 4. Female, pedicels fewer, 2 to 4, robust in fruit, 6 in. long. Drupe pear-shaped 4 to 5 in. long, pulpy glabrous, reddish green. Hab. In forests. Malacca (Griffith). Perak, Gunong Bubong (Kunstler) at 400 to 600 ft. altitude in bamboo forests. Distrib. Cambodia, Siam.

9. LIMACIA, Lour.

Woody climbers, medium size. Leaves ovate or oblong, not peltate. Inflorescence of compound cymes, false panicked or racemose. Male flowers, sepals 9 pubescent, outer bract-like, inner concave larger. Petals 6, smaller. Stamens 6 or 3; filaments free obconic. Female flowers, staminodes 6 or 3. Carpels 3 pilose. Stigma sub-trilobed recurved. Drupes 3 to 1, gibbous sub-globose fleshy; endocarp smooth except the transversely wrinkled dorsal band. Species 5, Cochin-China and Malay Islands.

Stems and under side of leaves and cymes yellow tomentose (1) L. velutina
Stems and leaves nearly glabrous . . . . . . (2) L. oblonga

A moderate woody climber; branches and leaves covered with golden fur. Leaves variable in size, elliptic to oblong-lanceolate acuminate or cuspidate, base blunt or shortly narrowed, sub-coriaceous; nerves 5 to 6 pairs; 2.5 in. to 5 in. long by 1.6 to 2 in. wide; nerves and midrib and edges at least hairy; petioles .5 to 1.5 in. long. Cymes axillary, several together or solitary, about .5 in. long, golden-tomentose. Flowers small crowded at the top. Sepals ovate eventually spreading tomentose outside. Petals clawed embracing the stamens. All yellow. Stamens 6 pilose; anther-cells brown. Carpels in female flower black-hairy. Stigma pale grey. Drupe ovoid flattened, orange yellow, 1 in. long, pulp orange brown. Seed dark brown. *Hab.* Common in open country, secondary jungle and thickets. Singapore very common. Malacca, Selangor, Perak, Penang.

var. **parvifolia** Ridl. A form with all the leaves small 2 to 2.5 in. long and .8 to 1.3 in. wide. Cymes numerous 5 or 6 together. Penang, Government Hill at 2500 ft. altitude. *Distrib.* Cochin-China, Siam, Tenasserim and Malay Islands.


Rather slender woody climber; stems yellowish-tomentose eventually glabrous. Leaves coriaceous, very variable, the terminal ones lanceolate acuminate, 3 in. long by 1 in. wide, the lower ones broadly oblong to elliptic sub-acute, base rounded glabrous, .5 to 8 in. long, 4.5 to 5 in. wide; nerves 3 or 4 pairs prominent beneath as are the secondaries and the very fine reticulations; petioles .75 to 1.25 in. long. Panicles slender 4 to 5 in. long, extra-axillary in lines of fascicles of 2 to 4, pubescent. Flowers small numerous, greenish yellow. Outer sepals lanceolate, inner sub-orbicular. Petals boat-shaped. Stamens glabrous. Drupe very excentric, over .5 in. long, obovoid flattened. *Hab.* Thickets in open country. Malacca, Bukit Bruang and Pringit (Griffith). Selangor, Kwala Lumpur; Rawang (Kloss). Perak, Goping (Kunstler). Penang up to 1200 ft. altitude, Government Hill, common. *Native name:* Akar China.


Climbing shrubs. Leaves penninerved; petioles short. Panicles usually short. Male flowers 6 to 12. Sepals, outer ones bract-like, inner larger obovate elliptic. Petals 4 to 6 minute obcordate. Stamens 9 to 3, free or more or less connate. Females, staminodes 0. Carpels 30 to 6. Drupe gibbous ovoid, compressed grooved on both sides. Albumen ruminate or scanty or 0. Species 15, mostly African, 3 Indian to Penang.


*T. acuminata* Hook. *fil.* “Singapore, Griffith, in Herb. Hooker,” is doubtless an error. Griffith was probably never in Singapore at all, and a plant so labelled in *Herb. Wallich.* from Singapore is not a Menispermaceous plant at all.

11. **COCCULUS**, DC.


Glabrous leaves lanceolate, blunt . . . . . (1) **C. ovalifolius**

Hair leaves deltoid to lanceolate . . . . . (2) **C. elegans**


A slender twiner. Leaves papery lanceolate blunt at both ends, tips micronulate; main nerves 1 pair from the base and 2 or 3 pairs from the midrib above, very fine, reticulations conspicuous; 2½ to 3 in. long, 1 in. wide, glabrous; petioles 2 in. long pilose. Compound cymes axillary 1 in. long; rachis and branches pilose. Cymes (branches) 2 in. long, often racemiform. Bracts 2. Sepals 3, outer bract-like, 3 inner ovate elliptic. Petals 6, tips bifid with spreading lobes. Female cymes smaller; carpels 6. Drupes compressed horseshoe-shaped, blue black; endocarp with 2 dorsal keels of ribs and tubercles. *Hab.* Climbing on bushes on the sea-shore in sandy spots. A pretty plant, with its white and yellow flowers. Singapore, Changi. Pahang, Kwala Pahang. *Distrib.* China, Cochin-China, Java, Philippines and Mascarene Islands.

A slender twining laticiferous hairy herb. Leaves deltoid or lanceolate acute, base rounded, 3-nerved with distinct reticulations, sparsely hairy; 2 in. long, '25 to '50 in. wide; petioles '2 in. long, hairy. Racemes axillary, hairy. Sepals, outer ovate obtuse 5, inner ones 3 rounded ovate acute. Petals 6 ligulate oblong with 2 long points. Stamens 6 as long. *Hab.* Open places, twining on grasses. Dindings at Lumut. Tringanu at Cherating River (Ridley).

12. **Hypserpa**, Miers.

A slender woody climber. Leaves small coriaceous; nerves palmate. Cymes usually short, rarely panicked. Sepals 8 to 12, outer ones bract-like, inner ones gradually larger, patent, ciliate. Petals 4 to 6 (or 6) obovate fleshy. Stamens 6 to indefinite, free or more or less joined; anthers immersed. Female flowers, stamina- nodes various in number; carpels 6 to 3. Stigma oblong-linear. Drupes transversely ovoid; endocarp grooved and ribbed on back. Albumen copious. Species 16, Indo-Malaya, China, Australia and Polynesia.


Slender woody climber with dark green shining coriaceous leaves, oblong to oblong-lanceolate; nerves fine and indistinct; 2-5 to 4-5 in. long, '80 to 1-5 in. wide or smaller; petioles '3 in. long, appressed hairy as are the branch tips. Cymes '3 in. long, axillary, appressed hairy, few-flowered. Flowers small '1 in. across, white or yellow. Sepals, outer minute ovate triangular, inner ones larger, obovate. Petals spatulate. Drupes globular '2 in. through, red. *Hab.* In hedges and thickets, not rare. Singapore, Tanglin. Malacca (Maingay). Penang, Batu Feringhi; Pulau Betong (Curtis); Pulau Jerajah (Kunstler). *Distrib.* India and Malay Islands. *Native name:* Akar Minyak.


Slender woody climber. Leaves sub-cordate, edge sub-crenate, more or less pubescent; nerves palmate. Cymes, males 3- to 6-fascicled, females solitary or in pairs. Sepals imbricate, 3 outer minute, bract-like, 6 inner obovate. Petals 6 sub-obovate, margins inflexed round the stamens. Stamens free or connate. Female flowers, staminodes 6; terete longer than the petals. Carpels 3. Stigma bifid or doubly bifid. Drupes 3, sub-orbicular flattened; endocarp with transverse ridges with tubercles. Species 6, Indo-Malaya.
Stem and leaves grey tomentose. (1) P. incanus
Stem sparsely pilose, leaves sparingly puberulous. (2) P. membranaceus


A very slender climber, young parts sparingly pilose. Leaves thin membranous ovate, base truncate rounded slightly peltate; nerves 5 pairs, sparingly puberulous, 1.5 in. long by 1.6 in. when full grown. Leaves at the ends of branches 0.4 in. long and wide. Hab. Penang, (in montibus Wallich 4967), also collected here by Gaudichaud and in Java by Hallier and Koorders. Flowers and fruit unknown.

14. STEPHANIA, Lour.

Slender woody or herbaceous climbers with ovate or triangular peltate leaves. Inflorescence of false-umbellled simple or compound cymes, branches usually crowded at the tip. Male flowers, sepals 6 to 8 usually sub-equal concave. Petals 3 to 4 obovate or orbicular. Stamens connate in a peltate head. Female flowers, sepals 3 to 6. Petals 2 to 4, like those of the males. Carpel 1, no style. Stigma lobed. Drupe fleshy; endocarp compressed obovate with 2 rows of spines or tubercles down the back. Seed horseshoe-shaped. Species 32, African and Indo-Malayan and Chinese.

Inflorescence from bare stems peduncled compound. (1) S. corymbosa
Inflorescence from leaf axils.

Leaves ovate acuminate; flowers in small dense heads, discoid. (2) S. capitata
Leaves pubescent beneath; flowers crowded in heads (3) *S. hernandifolia*
Leaves thin glaucous beneath; umbel lax, spreading . . . .

Glabrous. Leaves membranous to subcoriaceous rounded ovate, base rounded, apex sub-acute 4 to 4'2 in. long, 3 in. wide; petioles 4'5 to 6 in. long; nerves about 11 radiating from petiole apex, beneath glaucescent. Male inflorescence sub-paniculate 2 to 3 in. long. Peduncle 1 in. long. Flowers crowded at ends of branches. Sepals 4, outer linear, puberulous recurved, 4 inner obovate glabrous. Petals 4, conchiform tomentose. Female inflorescence larger compound corymbose. Branches about 3 in. long. Drupes flattened obovate with transverse tubercled ridges. *Hab.* In forests. Rare. Perak, Maxwell's Hill, at 3000 ft. altitude (Wray). *Distrib.* Sumatra, Java, Borneo.

Rather a stout species, glabrous. Leaves membranous or papery, ovate to nearly lanceolate, base rounded or sub-cordate, apex acuminate 3 to 5 in. long, 2 to 2'2 in. wide; petioles 2 to 2'2 in. long. Inflorescence very short 4 in. long, simple or few-branched; peduncles filiform 5 in. long; in females cymules contracted to a discoid head, 2 in. across. Sepals sub-connate yellow. Drupes very crowded, much compressed, obovate red 2 in. long, whole head 1'5 in. through. Endocarp with four rows of processes on the back. *Hab.* In lowland woods. Johor, Genuang. Perak, Thaiping Hills, about 500 to 800 ft. altitude (Kunstler).

Slender climber more or less pubescent. Leaves membranous ovate, apex acute or acuminate, base rounded, glabrous or partly pubescent, glaucous beneath; nerves about 5, 3 to 4'5 in. long, 2'5 to 3 in. wide; petioles 1 to 4 in. long. Inflorescence more or less puberulous; peduncle slender, 2 to 3 in. long, rays of umbel about 6. Sepals 5 to 8 elongate obovate, yellow. Petals 3 or 4 widely obovate. Female heads discoid 1 in. across. Drupes flattened when dry; endocarp with transverse ribs with tubercles at each end. *Hab.* Penang, Penara Bukit (Curtis). *Distrib.* India, Cochin-China, Malaya, Australia.

Slender glabrous climber. Leaves ovate obtuse membranous, base rounded; nerves 10, beneath glaucescent, 3 in. long, 2'75 in. wide; petioles 2 to 5 in. long, slender. Inflorescence umbellate; peduncle slender 3'75 in. long. Branches 6, 1'5 in. long, rays of umbellule 3 in. long. Flowers racemose on short slender stalks, 1 in. across.

15. CISSAMPELOS, Linn.

Slender climbers. Leaves more or less peltate ovate, hairy or glabrous. Male inflorescence paniculate corymbose, axillary or in compound cymes on axillary branches with reduced leaves. Females few-flowered simple. Male flowers, sepals 4, obovate. Petals forming a cup, rarely free. Stamens connate into a column. Female flowers, sepals 1 obovate. Petal 1, shorter. Carpel 1. Drupes often pilose; endocarp with transverse warty ribs on the back. Species over 20, South American and African with one Cosmopolitan.

(1) C. Pareira Linn. Sp. Pl. ed. i. 1031; King, Journ. As. Soc. Beng. l.c. 386.


16. CYCLEA, Arnott.

Slender climbing shrubs usually hairy. Leaves cordate to deltoid, oblong more or less peltate. Inflorescence paniculate to sub-racemose, axillary or from the stem. Branches corymbose. Flowers in small heads. Male flowers, sepals connate into a lobed cup. Petals sometimes free, usually connate into a cup. Stamens connate into a column; anther-cells 4 or 5. Female flowers, sepals 1 or 2 scale-like. Petals 1 or 2, smaller. Carpels globose-ovoid, often hairy. Drupe usually hairy; endocarp sub-compressed, tubercled. Species 19, Indo-Malaya and China.

Leaves ovate acuminate peltate hairy . . . . (1) C. laxiflora
Leaves oblong acuminate glabrous . . . . (2) C. elegans


Slender climber, very pilose. Leaves thin ovate peltate acuminate more or less pilose above, stiffly pilose beneath, 3.5 to 6 in. long, 3 to 5.5 in. wide; petioles pilose 2 in. long. Panicle pendulous from the stem, over a foot long, very lax with long branches and many
flowers. Calyx turbinate glabrous, white or creamy, 4-partite to the middle. Petals 4 linear. Drupes white pilose obliquely horseshoe-shaped obovoid compressed; endocarp with 3 tubercled ridges, 2 in. long. Hab. Hedges in lowlands up to 4000 ft. altitude in forests. Singapore, Changi; Tanglin; Pulau Ubin. Malacca (Griffith, Maingay). Dindings at Lumut. Perak, Thaiping Hills (Derry, Kunstler); Gunong Kerbau at 4000 ft. altitude (Robinson). Penang Hill (Maingay). Native name: Akar Gasing Bukit.


Climbing shrub nearly quite glabrous. Leaves lanceolate-ovate acuminate, base cordate or peltate membranous, glabrous; nerves 5 radiating from base, 3 in. long, 1-75 in. wide; petioles 1 in. long. Panicles slender, solitary, axillary. Male flowers crowded minute. Anthers about 4 broad. Drupe pisiform, slightly compressed; endocarp boldly tubercled. Hab. Perak, Thaiping Hills, 1500 to 2000 ft. altitude, not common (Kunstler).

**Order VIII. Nymphaeaceae.**

Aquatic perennial herbs. Leaves usually floating round rarely oblong, often peltate. Scapes 1-flowered, naked. Sepals and petals free hypogynous or adnate to a fleshy disc surrounding or enveloping the carpels. Sepals 3 to 5. Petals 3 to 5 or many. Stamens numerous. Carpels 3 or more in 1 whorl, free or connate or sunk in pits in the disc. Stigmas as many as carpels, peltate or decurrent. Ovules few or many. Fruit of connate carpels, or separate indehiscent carpels, or often an enlarged turbinate disc with the carpels sunk in the crown. Temperate and tropical regions. Genera 8. Species 30 to 40.

| Carpels confluent with one another; flowers showy white, blue, red or yellow, patent | 1. Nymphaea |
| Carpels confluent with the disc into a berry; flowers hardly opening, dull brown and pink | 2. Barclaya |
| Carpels irregularly scattered in a turbinate disc; flowers large, showy | 3. Nelumbium |

1. **Nymphaea**, Linn.

Large herbs with creeping rhizome. Flowers expanded floating on long radical scapes, white, red or blue. Sepals 4. Petals in many series, inner passing into stamens, all adnate to disc. Stamens many; filaments petaloid; anthers small linear. Ovaries many in 1 series sunk in the fleshy disc forming a many-celled syncarp crowned by connate radiating stigmas. Fruit a berry. Seeds small. Species 20, whole world.

| Leaves entire or slightly sinuate; flowers white to blue | (1) N. stellata |
| Leaves toothed; flowers white to pink | (2) N. Lotus |
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NYMPH^ACE^.

VIII.

[Nymphcea.

(i) N. steUata Willd. Sp. PL ii. 1153; Hook. fil. F.B.I, i. 114;
Leaves elliptic deeply cordate, entire or shortly toothed, purple
beneath, 6 to 8 in. long. Flowers 1*5 to 6 in. across, white or

Petals linear lanceolate, 10 to 30.
Stamens
tinted pale blue.
10 to 50, with long appendages. Common in ditches and backwaters of rivers. Flowers very variable in size from little more
than an inch across to about 4 or 6 in., according to depth of water.
Pahang, Lake Chenei (Fox) large form. Province Wellesley.

Indo-Malaya, Australia. Native names : Ati-Ati Payah Kelipoh
;

TpTfil'd TCgciiiI


fiL F.5.7. i. 114; Bot.
4665, var. pubescens.
Leaves peltate deeply cordate, edge distinctly sinuate, toothed,
purple and pubescent beneath, 9 in. across. Flowers 2 to 5 in.
Petals white to dark pink. Anthers without
wide. Sepals blunt.
Durian Tungul (Burkill), flowers
Ponds. Malacca (Griffith)
white.
Patalung
(Gwynne Vaughan), flowers reddish pink.
Distrih. India, Malaya.
(2)

Mag.

t.

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Often cultivated by Chinese and others for ornament easily known when
Our form is the variety
white-flowered by its strongly toothed leaves.
pubescens with leaves pubescent beneath.
;

2.

BARCLAYA,

WalHch.

Small aquatic herbs with long villous rootstocks, and floating
Flowers hardly expanding, pinkish. Sepals 5,
or erect leaves.
narrow apiculate, inserted at the base of the ovary. Petals
numerous biseriate connate below in a tube confluent with the
Stamens many in many series inserted in the corolla
carpels.
tube filaments short anthers pendulous. Ovaries 6 to 8, confluent
pink, apex conical styles triangular connate into a lo-rayed cone.
Berry globose pulpy. Seeds elliptic spiny, albumen floury.
Species 4, Burma to Borneo.
;

;

;

Leaves rounded cordate, tomentose beneath; sepals
tomentose narrow with long glabrous tails
Leaves thin, oblong ovate broad glabrous, base round;
sepals narrow
Leaves oblong obtuse, base cordate glabrous sepals broad,
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(i)

B. Motleyi

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(2)

B. Kunstleri

(3)

B. longifolia

;

glabrous
(i)

tails short

B. Motleyi Hook.

fiL

Trans. Linn. Soc.

xxiii.

147,

t.

21

Leaves rather thick, round cordate, blunt or apiculate, glabrous,
except the nerves above, tomentose beneath, 3 in. long, 3 to 5 in.


wide; petioles fleshy tomentose reddish 3 to 7 in. long. Peduncle up to 8 or 9 in. long tomentose. Sepals narrow keeled greenish with red tomentum, 1·25 in. long, 1·15 in. wide. Petals linear, outer series green, inner pink tailed, innermost dark pink incurved blunt, the 2 inmost much shorter triangular incurved violet pink, tip yellow. Stamens yellow. Pistils pink. Fruit 1 in. long ovoid, pink. Seed small elliptic spiny. Hab. In slow streamlets in swampy ground in dense forests. Singapore, Bukit Timah. Malacca, Ayer Panas (Maingay); Sungei Hudang (Derry). Pahang. In a mud-


(2) **B. Kunstleri** Ridl. B. Motleyana var. Kunstleri, King.

This, in its thin glabrous leaves and globose seeds, is much nearer **B. longifolia**
than B. Motleyi, but the sepals are those of B. Motleyi, as indeed is the whole flower. In the Setul plant some of the leaves are lanceolate cordate.

(3) **B. longifolia** Wall. Trans. Linn. Soc. xv. 442, t. 18; Hook. fil. F.B.I. i. 115; Ic. Pl. 809, 810.

Glabrous. Leaves narrow oblong, all deeply cordate at base, lobes rounded, 6 to 8 in. long, 1 to 1.5 in. wide; petioles 4 to 9 in. long. Peduncle 6 to 12 in. long, slender. Sepals 7.5 to 1 in. long, 0.25 in. wide, lanceolate apiculate keeled. Petals oblong-linear blunt. Fruit sub-globose. Seeds globose, apiculate. Hab. Running streams. Lankawi (Curtis). Distrib. Burma, Andamans.

### 3. NELUMBIUM, Juss.

A large aquatic with a stout rhizome. Leaves round peltate glaucous green, on a tall petiole, high above the water. Flowers large rose pink, white or yellow, fragrant. Sepals 4 or 5 caducous. Petals and stamens many hypogynous, many-seriate caducous; anthers with a clubbed appendage. Ovaries many one-celled sunk in the flat top of a turbinate disc, ovules 1 or 2. Carpels ovoid, loose in the fibrous spongy torus. Seed ovoid, testa leathery. Species 2, 1 Asiatic, the other West Indian.

(1) **N. speciosum** Willd. Sp. Pl. ii. 1258; Roxb. Fl. Ind. ii. 647; Wight, Ill. i. t. 9; King, l.c. 391.

Leaves 1 to 2 ft. across concave glaucous. Peduncles and petioles 3 to 5 ft. long, smooth or prickly. Flowers 4 to 6 in. across. Petals elliptic, rose pink (rarely white or deep rose). Fruiting torus 2 to 4 in. across. Hab. Abundant in ditches in Province Wellesley, and in Pahang near the Pahang River by Pekan in swamps. Frequently cultivated by Chinese, who eat the rhizome and carpels. Possibly not native here. Native names: Seroja; Teratai.

### Order IX. CRUCIFERÆ.

Herbs, often annual, or biennial. Leaves herbaceous, mostly radical, entire or lobed. Flowers bisexual, racemned terminal. Sepals 4, in 2 series. Petals 4, hypogynous, arranged crosswise, equal, white, yellow, or pink. Glands usually 4 (or 2 or 6) at base, or forming a lobed ring. Stamens hypogynous 6; filaments subulate; anthers basifixted, sagittate. Ovary of 2 connate carpels; ovules many (rarely few) parietal; style simple. Stigmas 2. Fruit a siligua or silicula, 2-celled. Seeds sub-globose, usually exalbuminous. Whole world, rare in the tropics.

### NASTURTIUM, Br.

Small herbs, leaves usually lobed. Flowers small, white or yellow. Sepals short. Petals hardly clawed. Pod short or
elongate terete. Seeds in 2 rows. Species 20 or more, whole world, chiefly temperate regions.

(1) **N. indicum** DC. *Syst. Veg.* ii. 199; *Hook. fil.* *F.B.I.* i. 134.

A weed 4 to 8 in. tall glabrous. Leaves runcinate or oblong crenulate simple, decurrent on the petiole, 3 in. long, 1 in. wide; petioles 1 in. long winged. Racemes axillary and terminal, 3 to 4 in. long. Flowers yellow, 2 in. long. Pods linear spreading 1 in. long, •! in. through. Seeds very numerous. *Hab.* Occasional weed in waste ground. Singapore, Gardens; Bukit Timah road; Chan Chu Kang. Penang, Convalescent Bungalow. *Distrib.* Tropical Asia.

**Order X. CAPPARIDACEÆ.**

Herbs, shrubs or trees, sometimes climbing. Leaves simple or palmately 3- to 9-foliolate. Stipules 2 or 0, sometimes spiny. Flowers solitary, racemed or unbelled, regular or irregular. Sepals 4, free or connate, valvate or imbricate. Petals 4 (rarely 2 or 0), hypogynous or seated on the disc. Stamens 4 to indefinite, hypogynous or perigynous or at the base of or on a long or short gynophore. Ovary sessile or stalked (on a gynophore) i-celled; style short or 0; ovules indefinite on 2 to 4 parietal placentas. Fruit a capsule or berry. Seeds angled or reniform exalbuminous. Tropical or sub-tropical countries.

1. **Cleome**, L.

Herbs with 3- to 9-foliolate leaves. Flowers racemed (or solitary) yellow, white (or pink). Sepals 4, spreading. Petals 4. Stamens 6 to 20. Ovary sessile or with a gynophore; ovules many on 2 parietal placentas. Capsules oblong or linear, valves 2, separating from the seed-bearing placentas. Seed reniform. Species about 80, Cosmopolitan.

Erect, unarmed herb; flowers yellow, viscid

Slender branched prickly herb; flowers small white

(1) **C. viscosa**

(2) **C. aculeata**


An erect viscid herb. Leaves 3- to 9-foliolate, leaflets obovate or ovate, lower ones long petioled, upper ones sometimes sub-

*Hab.* Common weed carried about by cattle, the plants often springing up from their dung. Whole peninsula from Singapore to Lankawi and Kelantan. *Distrib.* Whole world. *Native name:* Kutepeng.


Herb slightly shrubby about 1 ft. tall, branched prickly puberulous. Leaves below trifoliolate petiolate, leaflets obovate, upper ones simple sessile, ovate pubescent, '5 to '75 in. long. Flowers small solitary axillary, '5 in. across, on slender pedicels, greenish white. Stamens 6. Capsule terete green 1-5 in. long. Seeds large muricate. 


2. **GYNANDROPSIS**, DC.


(i) *G. pentaphylla* DC. *Prodr.* i. 238; *Hook. fil. F.B.I.* i. 171; *King, l.c.* 392.

About 1 ft. tall. Leaves quinate long-petioled, leaflets sessile obovate or cuneate, '5 to 1'5 in. long. Flowers white with purple stamens, '35 to '8 in. long. Capsules cylindric pointed 2 to 4 in. long. *Hab.* Waste ground common from Singapore to Kedah. *Distrib.* Tropics generally. *Native names:* Maman putih; Maman antu. *Use:* As a pot-herb, planted among padi in Tringganu as a vegetable.

3. **ROYDSIA**, Roxb.


Leaves obovate, cuspidate : : : : : : : (i) *R. parviflora* 
Leaves oblong, elliptic : : : : : : : (2) *R. Scortechinii*


Woody climber 4 to 8 ft. long. Leaves membranous, oblanceolate
to obovate elliptic acuminate, narrowed at the base; nerves 5 or 6 pairs, prominent beneath 3.5 to 4 in. long, 1.5 to 2.25 in. wide; petioles 6 in. long. All glabrous. Flowers in racemes, axillary or forming a terminal panicle. Racemes 8 in. long dense-flowered. Sepals 6, velvety on both sides reflexed, 1 in. long, linear oblong. Stamens 20; filaments equal not compressed. Stigmas 3, globular. Fruit unknown. Hab. Forests, Selangor, Sempang, Semangkuk Pass. Province Wellesley on a rock (Kunstler) rare. Distrib. Burma.

(2) **R. Scortechinii** King, l.c. 397; Ann. Bot. Gard. Calc. v. 120, pl. 139.

A climber, glabrous with pale bark. Leaf oblanceolate shortly acuminate to broadly elliptic or elliptic-ovate, narrowed to the base, membranous; nerves 6 or 8 pairs, rather fine, elevate beneath, 5 to 6 in. long, 1.5 to 2.5 in. wide; petioles 75 in. long. Flowers in terminal or axillary racemes or panicles about 6 in. long. Sepals 6, linear-oblong, reflexed or tomentose on both surfaces, 1 in. long. Stamens 30; filaments unequal compressed. Gynophore very short. Stigmas 3 ovate. Fruit ovoid smooth yellow, 1.5 in. long, 1 in. through. Hab. Forests. Selangor, Ginting Bidai. Perak, Larut, rocky jungle at 300 to 800 ft. altitude (Kunstler).

4. **CAPPARIS**, Linn.

Trees or shrubs erect tomentose or climbing often with stipular thorns. Leaves simple. Flowers white or pink often showy. Sepals 4, free, imbricate in 2 series. Petals 4, sessile imbricate. Stamens indefinite inserted on the torus at the base of the long gynophore. Ovary 1- to 4-celled; stigma sessile; ovules many or 2 to 6, on parietal placentas. Fruit fleshy. Seeds many imbedded in pulp. Species 125, all warm climates except N. America.

Flowers in simple umbels or racemes axillary.

Fruit globose.

- Flowers axillary solitary; leaves 1 in. long
- Flowers umbellate terminal; leaves 2 in. long
- Flowers umbellate axillary; leaves 2 in. long
- Flowers racemose large; leaves 5 in. long
- Fruit globose 1.75 in. through; leaves 4 to 5 in. long

Flowers supra-axillary in rows of 2 or 3.

- Leaves large 5 by 3 in.
- Leaves 6 by 3 in. strongly nerved
- Fruit elongate 4 to 7 in. long
- Fruit elongate 3 in. long
- Flowers in a terminal panicle of umbels, small

(1) **C. Larutensis**
(2) **C. diffusa**
(3) **C. sepiaria**
(4) **C. Scortechinii**
(5) **C. Kunstleri**
(6) **C. micracantha**
(7) **C. perakensis**
(8) **C. Finlaysoniana**
(9) **C. cucurbitina**
(10) **C. paniculata**

Sarmentose or scendent prickly shrub, 30 to 40 ft. long. Branchlets and petioles minutely tomentose, prickles in pairs short hooked. Leaves glabrous coriaceous oblong-lanceolate obtuse or retuse; nerves faint 5 to 6 pairs, 1 to 125 in. long, 74 in. broad; petioles 2 in. long. Flowers white turning pink, 75 in. across, solitary on pedicels 5 in. long. Sepals fleshy ovate, inner ones round concave. Petals oblong glabrous. Stamens 12. Gynophore nearly 2 in. long. Fruit globose. *Hab.* Thickets. Perak, Larut, climbing on trees (Kunstler); Kampar mines, sarmentose bushes (Ridley).


(5) **C. Kunstleri** King, l.c. 396.

Scendent, 40 to 60 ft. tall, glabrous. Thorns in pairs stipular short, hardly 1 in. long. Leaves thinly coriaceous oblong-lanceolate to oblanceolate acute, narrowed and cuneate at the base; midrib and
nerves 7 pairs, curving and inarching within the margin, prominent beneath, 4.5 to 5.5 in. long, 1.5 to 2.25 in. wide; petioles 5 in. long. Fruit solitary axillary globose, 1.5 to 2 in. through deep yellow. Gynophore stout 2.5 in. long; pedicel 1.5 in. long. Hab. Perak, Gunong Bubu, at 400 to 800 ft. altitude (Kunstler). Flowers unknown.

(6) C. micracantha DC. Prodr. i. 247; Hook. fil. F.B.I. i. 179; King, l.c. 394.

Fig. 11.—Capparis micracantha.

A thorny bush, glabrous, spines in pairs, stipular, straight. Leaves thinly coriaceous dark green, broadly lanceolate to ovate acutely acuminate, base cuneate or rounded; nerves 7 or 8 pairs, 3 to 6 in. long, 1.5 to 2.5 in. wide; petioles 3 in. long. Flowers 2 or 3 together, supra-axillary 1 to 1.5 in. across. Sepals oblong, puberulous. Petals oblong white, the two lower ones with an orange blotch, soon turning deep purple, at the base. Stamens 15 to 20, shorter than the gynophore. Fruit, 2 to 3 in. through

(7) C. perakensis Ridl. C. pubiflora var. perakensis King, l.c. 394.

A straggling shrub 5 ft. tall, glabrous, with minute thorns in pairs. Leaves membranous, elliptic-oblong acuminate, base narrowed or rounded; nerves 9 or 10 pairs and reticulations prominent, 5 to 7 in. long, 2 to 2'5 in. wide; petioles '25 in. thick sulcate. Flowers 1 in. across, supra-axillary. Bracts narrow acute; pedicels long, slender. Sepals oblong concave, 2 outer ones pubescent outside. Petals white oblong, the 2 posterior united at the base by a gland, pubescent above and round the gland, with a purple blotch. Stamens numerous. Gynophore 1 in. long with ovary pubescent. Hab. In damp shady forests. Perak (Scortechini). Kelantan, Chaning Woods, Kelantan River.

(8) C. Finlaysoniana Wall. Cat. 6992; Hook. fil. F.B.I. i. 179; King, l.c. 395.

Sarmentose-scanent, glabrous. Thorns stipular nearly straight, in pairs, very short, bases broad, tips blunt black. Leaves coriaceous, broadly lanceolate to elliptic, shortly acuminate; midrib and 7 pairs nerves prominent beneath, 6 to 7'5 in. long, 2'25 to 3 in. wide; petioles '4 in. long. Flowers solitary or in pairs, large white with a golden spot at the base of the lower petals. Sepals lanceolate acute. Fruit cylindric, tapering to tip, 4 to 7 in. long, 1 to 1'5 in. wide, red on a gynophore, 1'5 in. long, with a pedicel as long. Seeds, '4 in. long, ovoid. Hab. Singapore, sandy open country, Changi, now very rare. Pahang. Plawan, Rumpin (Foxworthy). Native name: Jambol Merah.


A climber, with stout branches nearly glabrous. Leaves coriaceous, elliptic lanceolate to lanceolate acuminate, base shortly narrowed or not; nerves 8 or 9 pairs, prominent beneath inarching '1 in. or less from edge, secondary nerves conspicuous, 5'5 in. to 7'5 in. long, 1'75 to 2'25 in. wide; petioles '2 in. long slender. Flowers in fascicles of 2 or 3, on pedicels over 1 in. long. Sepals ovate lanceolate acuminate puberulous. Petals broadly elliptic obtuse. Stamens 20. Gynophore short. Fruit cylindric, narrowed to base, shortly apiculate, when ripe 3 in. long, 1'25 in. through, orange coloured; gynophore '75 in. long; pedicel 1'25 in. long. Seed ovoid smooth, '4 in. long. Hab. Dense mixed jungle at 500 to 700 ft. altitude. Perak, Ulu Bubong (Kunstler). Dindings (Ridley).

(10) C. paniculata Ridl. Journ. F.M.S. Mus. x. 129.

Long slender thorny climber, much branched. Thorns short

5. **CRATAEVA**, Linn.


Tree; leaflets elliptic, acute, rather stiff; fruit 2 in.

long, oblong

Shrub; leaflets lanceolate, acuminate, thin; fruit 1 in.

long, globose

(1) *C. macrocarpa*

(2) *C. religiosa*

(1) *C. macrocarpa* Kurz, *Journ. Bot.* 1874, 195, t. 148, figs. 8 to 10; *King, l.c. 398.*

A fairly large tree, about 60 ft. tall. Leaves membranous, leaflets nearly sessile elongate-oblong lanceolate acuminate acute, glabrous; nerves about 8 pairs, prominent beneath inarching within margin, 4 to 6 in. long, 1·75 to 3·2 in. across. Flowers in terminal racemes, 2 to 3 in. long. Sepals green 2 in. long. Petals white, 1·5 in. long, 80 in. wide, ovate clawed, rounded. Stamens pink, 3 in. long. Gynophore as long. Fruit large wooly oblong globose, fawn colour with paler spots, 2 or 3 in. long. Seeds 4 in. long, ovoid reniform compressed shortly tubercled on the edges. *Hab.* River banks, not rare. Pahang, Tahan River and Chenei. Malacca, Tampoi; Selandor, etc. Selangor, Batang Berjuntai. Perak, Kwala Kangsa; Kertai River (Kunstler). Penang, Balik Pulau. *Distrib.* Indo-China. *Native names:* Kulumbai; Dala.


Tree or shrub, not very tall. Leaves deciduous at flowering time, leaflets lanceolate acuminate, narrowed at the base, thinly coriaceous glaucous beneath; nerves about 10 pairs, secondary nerves as conspicuous, 4 to 5 in. long, 2 to 2·25 in. wide; petiolules 1 in. long; petioles 2·25 in. long. Flowers in a short raceme, about 4 in. long. Sepals narrow lanceolate acute 2 in. long. Petals obovate round clawed, cream colour, 1 in. long, 5 in wide,
narrowed somewhat at the tip. Stamens violet, slender. Gyno-
ophore slender, as long. Fruit globose to ovoid, about 1 in. long. 
_Hab._ Malacca, sandhills, Tanjong Kling. Selangor at Pudok. A
dwarf form on the sandhills, not more than 4 ft. tall, but flowering. 
Possibly not native in either place, but it seemed to have estab-
lished itself at Tanjong Kling, far away from the village. Plants
occasionally are to be seen in gardens. _Distrib._ India. _Native
name:_ Cadat.

**ORDER XI. VIOLACEÆ.**

Herbs or shrubs or small trees. Leaves alternate, entire or 
serrulate, stipulate. Flowers regular or irregular bibracteate. 
Sepals 5, imbricate in bud equal or unequal. Petals 5 hypogynous,
equal or unequal, imbricate or contact in bud. Stamens 5; fila-
ments short thick; anthers free or connate, cells often with apical 
processes, connective broad produced beyond the cells. Ovary 
sessile superior, i-celled; style simple. Stigma capitale or 
truncate entire or lobed. Ovules many on 3 parietal placentas, 
anatropous. Fruit a 3-valved capsule. Seeds small or very small.
Albumen fleshy. Genera 21. Species 240, temperate and tropical 
regions of both hemispheres.

Herbs; corolla irregular; lower petal dissimilar . . 1. VIOLA
Shrubs or trees; corolla regular, no staminodes . . 2. Alsodeia
Herbs, erect; corolla regular; staminodes numerous . 3. Neckia

**1. VIOLA, L.**

Herbs usually stoloniferous. Flowers on 1- rarely 2-flowered 
peduncles, axillary. Sepals produced at base. Petals erect or 
spreading, lowest the largest spurred or saccate at the base. Anthers 
connate, connectives of the 2 lower ones often spurred at the base. 
Style clavate or truncate. Stigma blunt lobed or cupular. Capsule
3-valved. Seeds ovoid or globose. Species 100, all cool regions.

(1) _V. serpens_ Wall. Roxb. _Fl. Ind._ ii. 449; _Hook._ fil. _F.B.I._ i. 
184; _King, l.c._ 399.

Stoloniferous glabrous (or hirsute). Stems long, leafy. Leaves 
ove-cordate blunt or acute, crenate-serrate, 1·5 to 2·3 in. long, 
7 to 1·3 in. wide, hairy beneath. Stipules toothed. Sepals acute 
1·2 in. long. Corolla pale lavender, lower petals streaked darker 
violet purple, rarely all white, 5 in. long, spur short rounded. 
Petals blunt. Capsule 4 in. long; valves blunt. _Hab._ Banks and 
shady spots, at 3000 to 4000 ft. altitude. Perak, Telom, Ulu 
Batang Padang on stream banks and in clearings at 4000 ft. alti-

tude. Penang, Government Hill at 3000 ft. altitude (now extinct 
here). _Distrib._ India, Java, Sumatra, China.
2. ALSODEIA, Thouars.

Treelets or shrubs. Leaves alternate or opposite entire or serrate. Flowers small white or yellow, solitary, racemel or paniculate, axillary or terminal. Sepals 5, sub-equal. Petals 5 sub-equal sessile. Stamens 5, filaments free or connate, inserted on or inside an annullar disc, with long or short dorsal membranous appendages; anther-cells sometimes with linear processes. Ovary ovoid; style straight. Stigma terminal. Ovules few or many. Capsule 3-valved. Seeds few. Species about 50, tropics generally.

i. Prosthesia. Anthers with a subulate appendage from the tip of each cell and broad dorsal appendages from the connective.

Capsule globose bluntly angled, pale, warty; leaves large, glabrous
Capsule ovate acute; leaves broad, glabrous
Capsule unknown.
Leaves broad lanceolate, acuminate; with flowers hairy
Capsule globose warty.
Cymes very short; flowers small; leaves about 3 in. long glabrous
Capsule ovoid glabrous.
Cymes very short; flowers small; leaves thin and hairy
Capsule valves 1 in. long, boat-shaped.
Cymes racemose • 5 in. long
Capsule valves • 75 in. long
Cymes panicked, 1 in. long; leaves large 7 in. long
Capsule ovoid • 5 in. long.
Cymes corymbose peduncled; flowers rather large
Capsule ovoid • 75 in. long.
Raceome of cymes terminal 4 in. long

(1) A. Wallichiana
(2) A. Kunstleriana
(3) A. hirtella
(4) A. lankawiensis
(5) A. dasycaula
(6) A. Wrayi
(7) A. Hookeriana
(8) A. Maingayi
(9) A. cinerea

ii. Pentaloba. Anthers with broad appendages from connectives only.

Fruit not spiny hairy.
Cymes very small; leaves 3 in. long ovate
Cymes small not peduncled.
Leaves lanceolate; capsule silky small
Leaves oblong; capsule glabrous • 25 in. long
Leaves lanceolate, long, acuminate large; capsule • 5 in.
Cymes corymbose peduncled many-flowered.
Flowers • 08 in. long; numerous crowded
Flowers • 15 in. long; leaves 4 in. long
Flowers • 3 in. long; leaves 10 in. long
Capsules covered with soft bristles. Cymes small.
Leaves oblong lanceolate; capsule sparsely bristly
Leaves lanceolate acuminate toothed; capsule densely bristly; anthers with a subulate process from each cell, no appendage to connective
Leaves, oblong, obovate, toothed; capsule 2 in. across, densely felted

(10) A. minutiflora
(11) A. lanceolata
(12) A. pachycarpa
(13) A. Scortechinii
(14) A. condensa
(15) A. floribunda
(16) A. grandiflora
(17) A. capillata
(18) A. comosa
(19) A. echinocarpa
(1) **A. Wallichiana** Hook. fil. F.B.I. i. 187; King, l.c. 400.


Small tree. Branches, petioles, nerves of leaves and inflorescence covered with stiff hairs. Leaves lanceolate, long-acuminate obtuse, base narrowed, unequal, edges serrulate or nearly entire; nerves 16 pairs, 6 to 10 in. long, 2 to 2.5 in. wide, glabrous above, stiffly hairy beneath on midrib and nerves; petioles 6 to 1 in. long, hairy. Racemes short axillary 6-flowered. Flowers white. Sepals 3, outer ones orbicular imbricate, hairy outside, strongly ribbed, inner 2 glabrous. Petals little longer oblong obtuse or truncate with a few processes at the tip, glabrous. Stamens glabrous; filaments flat, as long as the anther; anther-cells with elongate processes; dorsal appendage wider ovate acute. Ovary hairy. Capsule 6 in. long, valves ovate sub-acute, hairy pale green.


Shrub. Stems pale. Leaves coriaceous, 4 to 8 in. long, 1.5 to 2.5 in. wide, elliptic-lanceolate or ovate-lanceolate acuminate, base narrowed, edge slightly serrulate; nerves 9 pairs; petioles 5 in. long, glabrous or hairy. Racemes small axillary; pedicels 12 in. long. Flowers as long, unisexual. Males, sepals ovate, edges ciliate. Petals oblong, twice as long. Filaments terete; anthers oblong, with 2 short horns at the tip; appendages (dorsal) reniform, thin. Females, similar but staminodes with narrow lanceolate appendages. Ovary globose; style cylindric, stout. Disc annular. Fruit globose, brown warty. *Hab.* Lankawi at Kwah and Terutau (Curtis).


Tree 20 to 30 ft. high, 4 to 8 in. through. Branchlets pubescent. Leaves thin, oblique obovate elliptic, abruptly acuminate, serrate, base narrowed, glabrous except the nerves, 6 to 8 pairs and midrib beneath, 5 to 7 in. long, 2.5 to 3 in. wide; petioles pubescent, 5 in. long. Stipules subulate, pubescent, 2 in. long. Racemes axillary very short, 2 in. long, few-flowered. Sepals 5, unequal ovate, pubescent outside. Petals obovate-oblong obtuse, ciliate. Filaments very short; anthers cordate or reniform, with 2 small subulate processes on the cell tips and a cordate-acuminate appendage on the back. Ovary villous; style glabrous. Capsule ovoid glabrous, valves blunt. Seeds globular, caruncle beaked. *Hab.* Perak, Goping (Kunstler). Perlis, Kanga. Pulau Adang. *Distrib.* Sumatra. *Native name:* Melor Angin.

Miquel's specimens in Herb. Kew and his description of *A. dasycaula*, l.c. are both poor, but indistinguishable from King's plant. My *A. hispida* seems to be a more hairy form only.


Tree 15 to 20 ft. tall. Stem 2 to 3 in. through. Leaves membranous, bright green, oblanceolate acuminate, serrulate or not, narrowed to the base, 5.5 to 8 in. long, 9 to 2.5 in. wide; petioles 1 to 2 in. long. Stipules linear, 1 in. long. Racemes very short, 5 in. long, crowded axillary. Bracts ovate pubescent. Sepals lanceolate, tomentose. Petals oblong obtuse, tomentose on midrib. Anthers ovate-cordate with 2 terminal processes and an ovate acute dorsal process as broad as itself. Ovary and base of style villous. Capsule velvety when young, glabrous when old, valves 1 in. long, boat-shaped. Seed mottled. *Hab.* Hill woods, Perak, Kenering (Wray); Goping and Thaiping, altitudes up to 1000 ft. (Kunstler).

Tree 20 to 30 ft. tall with hanging branches. Leaves membranous, glabrous, lanceolate or oblonglanceolate, abruptly acuminate, entire or serrulate, narrowed to base; nerves 7 to 9 pairs, curved, 5 to 8 in. long, 1.5 to 2 in. wide; petioles 2.5 in. long. Stipules ovate, 1 in. long, glabrous. Panicles axillary and below the fallen leaves, numerous, short compact when young, increasing to 1 in. and lax when old. Pedicels 1. in. long. Sepals ovate equal, pubescent. Petals white, ovate obtuse or lanceolate. Filaments glabrous as long as the long disc; anthers ovate-cordate, cells with 2 apical points and a dorsal appendage ovate acute, wider than the anther. Ovary pubescent. Capsule ovoid, valves smooth blunt boat-shaped, 9 in. long, 3 in. wide. Seeds subglobose, caruncle papillose pitted. *Hab.* Hill woods 1800 to 2000 ft. altitude. Perak, Larut (Kunstler); Hermitage Hill. Pahang, Bentong (Foxworthy). *Native name:* Kayu Champaka Ayer.

(8) **A. Maingayi** Hook. *fil.* F.B.I. i. 188; *King,* l.c. 402.

A small tree, glabrous. Leaves membranous sub-sessile, elliptic acuminate, base cuneate, crenulate, serrate or nearly entire; nerves 10 to 12 pairs, prominent as are the secondary parallel nerves, 5 to 10 in. long, 3 in. wide; petioles 1 in. or less long. Cymes 5 in. long on peduncles, 5 to 7 in. long, 8- to 16-flowered. Sepals 2 in. long, imbricate, oblong, edges ciliate, outer 3 larger than the inner 2. Petals imbricate ovate, longer, villous in centre. Stamens, filaments short, thick, villous, connective tomentose on back; anthers with two setose anterior and one ovate villose sub-terminal dorsal appendage. Ovary and style villous, disc glabrous. Capsule ovoid, nearly glabrous, valves sub-acute 5 in. long. Seeds smooth with a white caruncle. *Hab.* South of the peninsula; Johor, Ulu Batu Pahat (Kelsall). Malacca (Griffith and Maingay).


Shrub 6 to 8 ft. tall, glabrous. Leaves membranous, elliptic-ovate or lanceolate acuminate, narrowed to the base, serrulate, drying pale; nerves 8 to 10 pairs, 4 to 6 in. long, 1.5 to 2.5 in. wide; petioles 2 to 4 in. long. Stipules scarious ovate acute, puberulous, 2.5 in. long. Panicles terminal, 4 to 6 in. long, narrow with rather distant cymes, 2 to 4 in. long. Bracts ovate scarious. Sepals ovate ciliate. Petals oblong obtuse, tips undulate or toothed, edges ciliate. Anthers ovate, terminal appendages subulate, dorsal one ovate, from the middle of the back. Ovary glabrous. Capsule ovoid, glabrous, 75 in. long, valves blunt. Seeds globose with an ovoid beaked hilum. *Hab.* Forests. Perak, Larut Hills at base (Kunstler). *var. hirsutiflora* King, l.c. 404; sepals tomentose, filaments villous. Perak, Changkat Jerin (Wray).
XI. VIOLACEÆ.


A. lanceolata Wall. Cat. 4023; Hook. fil. F.B.I. i. 188; King, l.c. 404.


A. pachycarpa King, l.c. 408.


Shrub or tree 20 to 25 ft. tall. Leaves membranous large, elliptic acuminate to lanceolate serrulate; nerves 12 to 13 pairs, secondaries transverse, 7 to 9 in. long, 2 to 3 in. wide; petioles '2 in. long. Racemes short sessile condensed, several together, axillary. Bracts ovate. Flowers pedicelled, white, '2 in. long. Sepals broadly ovate. Petals oblanceolate acuminate, longer.
XI. VIOLACEÆ.

[Alsodeia.


Glabrous tree 30 to 40 ft. tall, 6 to 10 in. through. Leaves membranous, elliptic sub-acre, serrulate, base cuneate unequal; nerves 13 to 15 pairs, elevate beneath, secondaries transverse, 8 to 14 in. long, 3 to 4.5 in. wide; petioles 25 to 35 in. long. Stipules subulate, 35 to 5 in. long. Panicles axillary compact, much branched, 1.75 to 2.5 in. long. Bracts numerous, ovate acute. Flowers pale green, 1 in. long. Sepals unequal, outer 2 or 3 larger, round, inner ovate pubescent. Petals little longer, ovate villous. Anthers cordate with one ovate appendage. Ovary glabrous. Capsules ovoid pointed, glabrous. Hab. Chanderiang under 800 ft. altitude (Wray); Kedah at Yan (Ridley).


A shrub 8 to 10 ft. tall, or tree to 60 ft. high; young branches tomentose. Leaves membranous, oblong-lanceolate to elliptic acute, more or less serrulate, base rounded, above glabrous except nerves, beneath minutely tomentose; nerves 14 to 16 pairs, secondaries transverse, 4.5 to 7 in. long, 1.5 to 2.5 in. wide; petioles 1 to 2 in. long. Stipules lanceolate, pubescent, 25 in. long. Cymes axillary 1.5 in. across, on peduncles, 1 to 1.5 in. long, many-flowered. Flowers yellowish white. Bracts oblong obtuse, pubescent. Sepals unequal pubescent, 3 ovate round and 2 ovate. Petals ovate-oblong blunt, tips reflexed. Disc 1-lobed, pilose. Filaments dilate and pilose towards the tip; anthers elongate ovate; appendage terminal ovate. Ovary villous; style puberulous. Capsule ovoid pubescent, valves blunt. Hab. Woods, Singapore, Ang-mo-kio. Perak, Larut Hills; Goping and Tapa; Gunong Bubu (Kunstler). Distrib. Sumatra.


A shrub about 8 ft. tall, glabrous. Leaves large elliptic-lanceolate acuminate, base rounded; nerves 10 pairs with transverse secondaries elevate beneath, 8 to 10 in. long, 2 to 4 in. across; petioles hardly any. Panicles axillary or extra-axillary, 1.5 to 3 in. long. Peduncle over 1 in. long. Flowers numerous, white. Sepals lanceolate subacute, edges ciliate, 1 in. long. Petals 3 in. long, linear-lanceolate obtuse; midrib silky. Stamens, filaments as long as anthers, hairy; anthers narrow lanceolate acute, with a lanceolate prolongation at the tip. Ovary villous; style cylindrical, villous. Disc rather deep, glabrous, 5-lobed. Hab. Woods, Singapore at Ang-mo-kio. Johor, Ulu Batu Pahat (Kelsall).
Alsodeia.]

XI. VIOLACEÆ.


Shrub or small tree. Branchlets tomentose. Leaves membranous oblong-lanceolate caudate-acuminate, serrulate, base

**Fig. 12.—Alsodeia echinocarpa.**
rounded, above glabrous, beneath pubescent; nerves 11 to 14 pairs, 5·5 in. to 7·5 in. long, 1·5 to 2·5 in. wide; petioles '2 in. long. Stipules subulate, '3 in. long. Flowers white or yellow. Sepals ovate blunt tomentose. Petals lanceolate acuminate, pubescent outside. Both with terminal tufts of hairs. Filaments shorter than anthers; anthers narrow ovate, each cell with a terminal seta, no appendage. Ovary sparsely villous; style pubescent. Capsule '5 in. long densely covered with soft pubescent spines about '5 in. long. Hab. Forests, Selangor, Dusun Tua; Rawang (Kloss). Perak, Tapa (Wray); Goping (Kunstler). Distrib. Cochin-China.


A bush or small tree as much as 30 ft. tall. Young branches tomentose. Leaves membranous, obovate or ovate-elliptic abruptly acuminate, boldly serrate, base rounded or cuneate, above glabrous except nerves, beneath pubescent; nerves 11 to 15 pairs, prominent, 6·5 to 9 in. long, 2·25 to 3·25 in. wide; petioles '1 to 2 in. long. Stipules ovate acute '25 in. long, acute pubescent. Cymes axillary, pubescent, condensed sessile, 3- to 6-flowered. Bracts lanceolate. Sepals ovate obtuse tomentose. Petals little longer, oblong pubescent outside, white. Stamens and disc glabrous; anthers ovate-cordate, with a small terminal appendage. Ovary villous. Capsule large, '1 to 2 in. across covered with tomentose felled fibres, valves compressed, blunt, '75 in. long. Seed sub-globose. Hab. Common in woods from Singapore to Tringganu. Distrib. Southern Siam, Borneo, Sumatra and Cochin-China, Laos. Native names: Aho Lumut; Ardani (Penang); Jenta-Jenta; Lalada or Lelada; Sebilik; Segumpa betina; Kayu Rembut; Medang Gombo; Jangut Baong. Use: Seeds as a purgative.

3. NECKIA, Korth.

Small herbs with slightly woody erect stems usually simple and more or less covered with bristly hairs (stipules). Leaves lanceolate, serrate. Flowers small, pink or white on long peduncles axillary. Sepals sub-equal. Petals equal. Stamens dimorphic, outer setaceous or gland-like, inner 10 connate with the stamens into a tube. Stamens, filaments very short; anthers oblong. Ovary many-ovuled. Capsule septicidally 3-valved. Seeds numerous. Species about 7, Malay Islands.


Whole plant 3 to 12 in. tall. Stipules of red brown bristles '25 in. long. Leaves lanceolate acuminate at both ends, edges bi-serrate, shortly pale beneath, 1·5 to 7 in. long. Flowers on peduncles '1 in. long. Sepals lanceolate acute, toothed. Petals ovate obtuse, rose pink. Stamens monadelphous, 10. Capsule ovoid acute, longer than sepals. Seed obovoid, punctate. Hab.
Neckia.]

XI. VIOLACEÆ.

Stream banks in forest. Johor, Gunong Janeng, and Telepak; Gunong Pantai (forma minor, leaves 2·5 in. long, 1·5 in. wide), Pahang, Tahan River (forma major, leaves 6 in. long, 7·5 in. wide) (Ridley). *Distrib.* Lingga island.

Fig. 13.—Neckia malayana.

**Order XII. Pittosporaceae.**

1. **PITTOSPORUM**, Banks.

Trees or shrubs. Petals erect, claws connivent or connate. Ovary incompletely 2- to 3-celled; ovules 2 or more on placenta. Capsule 1-celled, woody, coriaceous; valves placentiferous in middle. Seeds imbedded in red pulp. Species about 50, Asia, Australia and Polynesia.

- Leaves membranous; nerves very inconspicuous
- Leaves coriaceous; nerves prominent, reticulate both sides

(1) **P. ferrugineum**

(2) **P. reticosum**

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**Fig. 14.—**Pittosporum ferrugineum.

(1) **P. ferrugineum** Ait. DC. Prodr. i. 346; Hook. fil. F.B.I. i. 199; King, l.c. 129; Bot. Mag. t. 2075.

A small tree about 20 ft. tall. Young parts tomentose. Leaves membranous lanceolate or ovate-lanceolate acute or acuminate at both ends, edges undulate, dull green backs paler, glabrous; nerves 7 to 8 pairs, yellowish, 2 to 3 in. long, 1 to 1.5 in. wide. Flowers in short terminal corymbs, yellowish white, .25 in. long.

(2) *P. reticosum* Ridl.

A small tree 10 to 15 ft. tall, bark pale. Leaves opposite, rigid sub-coriaceous glabrous lanceolate, pale beneath; nerves impressed above, strongly reticulate above and beneath, 2 in. long, 1.25 in. wide; petioles pubescent 1 in. long, ultimately glabrous. Fruit oval 1.25 in. long on a slender peduncle 1.5 in. long. Stigma bilobed, lobes globose. *Hab.* Pahang in thickets on the Padang at 5000 to 6000 ft. altitude (Robinson, Ridley).

No flowers of this plant have been seen, but in its stiff reticulate leaves it is quite distinct from any species known.

**Order XIII. POLYGALACEÆ.**

Herbs, erect or scandent shrubs or trees. Leaves alternate rarely whorled, reduced to scales or 0, simple entire. Stipules 0. Flowers irregular bisexual 3 bracteate. Sepals 5 unequial, 2 inner often petaloid. Petals 5 or 3 unequal, inferior usually keel-shaped (keel). Stamens 8 (rarely 4 or 5) hypogynous, filaments united, rarely free; anthers opening by terminal pores (rarely by slits). Ovary free 1- to 3-celled; style curved. Stigma capitate. Ovules 1 or more in each cell, anatropous. Fruit 2-celled, 2-seeded, loculicidally dehiscent or indehiscent, 1-seeded or of 3 indehiscent carpels. Seed strophiolate albuminous. Species 500, the whole world except New Zealand.

Herbs or rarely erect shrubs. Capsule dehiscent.

| Stamens 8, 2 interior sepals petaloid | 1. POLYGALA |
| Stamens 4 to 5, leafy annuals | 2. SALOMONIA |
| Stamens 4 to 5, leafless parasites | 3. EPIRHIZANTHES |
| Climbing shrub; fruit 1-celled, indehiscent samara | 4. SECURIDACA |

Erect trees or shrubs.

| Stamens 5 united; fruit of 3 samaras | 5. TRIGONIASTRUM |
| Stamens 8 distinct; fruit a drupe or berry | 6. XANTHOPHYLLUM |

**1. POLYGALA, L.**

Herbs or rarely shrubs. Sepals persistent, inner 2 larger, petaloid. Petals 3, united at base with the staminal sheath, the lower one keel-shaped and often crested (the keel). Stamens 8; filaments united for the lower half into a split sheath. Ovary
2-celled, 2-ovuled; capsule 2-celled, loculicidal. Seeds usually strophiolate and albuminous. Whole world except Tasmania, about 250 species.

Shrubs; flowers axillary.

Fleshy plant; fruit winged . . . . (1) **P. venenosa**
Woody plant; fruit not winged . . . . (2) **P. pulchra**

Shrublet; raceme terminal, erect; flowers white . . . . (3) **P. monticola**

Small herb with small yellow flowers, prostrate with narrow lanceolate leaves . . . . (4) **P. brachystachya**

Erect herb; leaves ovate; flowers many very small yellow . . . . . . . . (5) **P. cardiocarpa**

(1) **P. venenosa** Juss. in Poir. Dict. v. 493; **King, l.c. 130.**

A glabrous shrubby plant 4 to 6 ft. tall. Leaves thin rather fleshy, lanceolate and oblong-lanceolate acuminate and narrowed at the base; nerves 7 to 10 pairs, 5 to 8 in. long, 1-5 to 4 in. wide; petioles 2 in. long. Racemes axillary pendulous 1 to 3 in. long. Sepals translucent, tipped with pink. Petals white, keel not crested chrome yellow withering to violet pink with a crimson keel. Capsule reniform 3 in. long 4-winged all round purple. Seed with scarlet aril. **Hab.** In mountain forests from 1500 to 5500 ft. altitude. Rarely below this. The form here is the var. **robusta**, Miq. Fl. Ind. Bat. i. (2), 126. Pahang, Pulau Tawar. Selangor, Ginting Bidai (Kloss); Menuang Gasing (Kloss); Semangkok. Perak, Thaiping Hills (all collectors). Gunong Kerbau (Robinson); Gapis Pass (Curtis); Gunong Batu Putih (Wray); Penang, West Hill (Curtis). **Distrib.** Malay Islands. **Native name:** Katumbit Hitam.

(2) **P. pulchra** Hassk. Flor. xxv. (2); Beibl. 32.

Slender woody shrub 4 ft. tall. Leaves membranous thin, oblong-lanceolate; nerves 9 pairs, 8 in. long, 3 in. wide; petioles 25 in. long. Racemes 1 in. long, pendulous. Sepals 2 outer ones, one saccate ovate acute, the other small ovate; petaloid sepals obovate round, 25 in. long. Petals 2 short oblong blunt; keel 4-lobed, fleshy not crested. All white tinted yellow. Capsule obovoid orbicular deeply retuse, not winged except at tip, green tipped with purple or nearly all purple, 2 in. long, 3 in. wide. Seed sub-globose, aril scarlet. **Hab.** Hill woods, Negri Sembilan, Bukit Tangga. Selangor, Ginting Bidai (Ridley); Ulu Langat (Kloss). Perak, Goping (Kunstler). **Distrib.** Java and Sumatra.

This is easily recognised by the slender woody stem, narrower leaves and smaller flowers.


A simple erect shrublet 2 ft. tall. Leaves 3 to 4 in. long, 1-5 in. wide, lanceolate acuminate at both ends, glabrous or with a few hairs; nerves 8 pairs; petioles 5 in. long. Raceme dense erect. Flowers white, keel pink 25 in. long; pedicels very short. Sepals outer ovate rounded pubescent. Petals oblong, keel crested pink
yellow-edged. Capsule reniform bilobed nearly \( \frac{1}{2} \) in. across. \( \textit{Hab} \). Rocky places on mountains 4000 to 6000 ft. altitude. Pahang, Gunong Tahan; Gunong Benom (Barnes). Selangor, Semangkok; Mengkuang Lebah (Robinson). Perak, Gunong Bubu (Kunstler).

var. \textit{major} Ridley. Leaves 6 in. long, 2 in. wide; petioles \( \frac{1}{2} \) in. long; raceme 9 in. long. Pahang, Gunong Tahan (Ridley).

(4) \textit{P. brachystachya} Bl. Bijdr. 59; King, \textit{l.c.} 131.

A slender erect or prostrate herb. Branches puberulous angled above, 4 to 6 in. long. Leaves linear-lanceolate bristle-pointed glabrous, \( \frac{1}{4} \) in. long, \( \frac{1}{5} \) in. wide. Racemes slender 2 in. long axillary, few-flowered; pedicels nearly as long as flowers. Flowers \( \frac{1}{10} \) in. long yellow. Petaloid sepals obovate oblong. Petals small, keel narrow at base, apex suddenly dilated trilobed. Capsule sub-orbicular emarginate, edges ciliate. \( \textit{Hab} \). In turf, roadsides, and grass plots. Singapore, grass plots in the Gardens; Macpherson Road. Pahang, Pulau Tawar. Malacca. Sungei Bharu Ulu; Chabau. Tringganu (Yapp). \textit{Distrib.} Java and Sumatra. \textit{Use:} An antidote for snake-bite.


A slender herb branched erect, glabrous 6 in. or more tall. Leaves ovate obtuse \( \frac{1}{2} \) to 2 in. long, \( \frac{1}{2} \) in. wide narrowed to the petioles \( \frac{1}{5} \) in. long. Spikes slender 2 in. long. Flowers very numerous \( \frac{1}{5} \) in. long, yellow. Sepals 4 ovate rounded, outers larger. Petals oblong-ovate, keel not crestet broad, ovate, tip prolonged. Capsule heart-shaped retuse, wings ribbed. Seed elliptic black pustulate; caruncle small black. \( \textit{Hab} \). On limestone rocks. Selangor, top of Batu caves rocks. Lankawi Islands (Curtis). Perak, Goping (Kunstler). \textit{Distrib.} Siam and Tenasserim.

King’s plant identified as \( \textit{P. triphylla} \) var. \textit{glaucescens} is this species. Its capsule is not entire, but emarginate, and the flowers are yellow.

2. \textbf{SALOMONIA,} Lour.

Small leafy annuals. Flowers minute in dense terminal spikes, pink. Sepals nearly equal, 2 inner somewhat larger. Petals 3, united at the base with the staminal tube, lower keel-shaped galeate not crested. Stamens 4 or 5; filaments united into a sheath for half their length. Ovary 2-celled with one ovule in each cell. Capsule compressed laterally, 2-celled loculicidal, edges toothed. Seed not or hardly strophiolate. Species about 8, east tropical Asia and Australia.

Leaves ovate, cordate, petioled . . . . (1) \textit{S. cantoniensis}
Leaves sessile, elliptic . . . . . . . (2) \textit{S. oblongifolia}
Leaves sessile, amplexicaul, edges ciliate . . . . (3) \textit{S. ciliata}.

(1) \textit{S. cantoniensis} Lour. \textit{Fl. Cochinchine} 14; King, \textit{l.c.} 132.

A branched annual about 6 in. or less tall. Branches winged.
Leaves ovate cordate petiolar 3-nerved, 0.25 to 0.4 in. long, 0.25 to 0.5 in. wide. Spikes numerous terminal, dense above, lax below, 1 to 3 in. long. Flowers 0.05 in. long pink. Sepals linear. Capsule flat reniform, edges with short recurved triangular teeth, adhesive. Seeds black. *Hab.* Common on paths and sandy spots. Singapore. Malacca, Negri Sembilan, Selangor, Penang. *Distrib.* India, Malay Islands. Native name: Rumput Bua.

(2) *S. oblongifolia* DC. *Prod.* i. 354; *Hook. fil.* F.B.I. i. 207; *Deless. Jc. Sel.* iii. t. 19; *King, l.c.* 132. *S. obovata* Wight. *Ill.* i. t. 22B.

An erect simple or little branched annual 3 to 6 in. tall. Branches very slightly winged. Leaves elliptic or elliptic-lanceolate, sessile 0.15 to 0.14 in. long. Bracts linear. Spikes terminal 1 to 3 in. long. Flowers crowded above pink 0.05 in. long. Sepals nearly equal lanceolate. Capsule reniform, teeth spreading filiform. *Hab.* Rather rare in dry sandy heaths. Singapore, at Changi. Province Wellesley, Tasek Gelugur, and Butterworth. Setul Heath (Ridley). *Distrib.* India and Malay Islands, Siam, Cambodia, Australia.


A small branched herb, annual 4 to 9 in. tall. Leaves sessile amplexicaul oblong-ovate sub-acute, base broad, margins ciliate; nerves 3 from the base, 0.25 in. long, 0.6 in. wide. Spikes dense 2 in. long. Flowers very small pink, 0.1 in. long. Sepals sub-equal lanceolate denticulate. Capsule oblong-reniform, teeth spreading filiform. *Hab.* Sandy country. Rare, on Setul Heath. *Distrib.* Ceylon.

3. **EPIRHIZANTHES**, Bl.


4. **SECURIDACA, L.**

Climbers. Flowers in terminal panicles or compound racemes (or in simple racemes or axillary), small. Sepals 2, outer boat-shaped, 2 inner large petaloid. Petals 3, lateral ones separate from the crested keel except at the base, upper ones absent. Stamens 8; filaments united; anthers opening by pores. Ovary 1-celled 1-ovuled. Fruit a broad-winged samara, wing chopper-shaped. Species about 25, chiefly in America, a few Asia and Africa.

Leaves ovate oblong to elliptic; flowers panicled; bracts caducous.

Leaves elliptic; flowers in short panicled racemes; bracts persistent.

(1) **S. Tavoyana** Wall. Cat. 4196; Benn. in Hook. fil. F.B.I. i. 208.

(2) **S. bracteata** Benn. l.c. i. 208; King, l.c. 133.

The leaves are more fleshy and thinner than in *S. Tavoyana* and panicles shorter and fruit smaller.

5. **TRIGONIASTRUM, Miq.**

Tree. Leaves white beneath. Flowers in terminal axillary panicles. Sepals 5, the 2 outer a little larger than inner. Petals 5 unequal, 2 lower partly united forming a keel, odd petal largest, base saccate with a hairy gland. Stamens 5 or 6; filaments united. Ovary hairy 3-locular; ovules pendulous solitary. Fruit of 3 samaroid carpels, each with 1 seed. Species 2, Malay Peninsula and Islands.


6. XANTHOPHYLLUM, Roxb.

Trees of medium or large size, or bushes. Leaves coriaceous, often light green when dry. Racemes axillary and terminal. Flowers white, pink or yellowish. Sepals 5 sub-equal. Petals 5 or 4, lower keel not crested. Stamens 8, free, 2 attached to base of petals. Ovary often surrounded by a disc, stipitate r-celled; ovules various. Fruit r-celled, r-to many-seeded, indehiscent. Seed exalbuminous estrophiolute. Species about 30, mostly Malayan, a few Indian, r Australian.

Ovary and style glabrous.

Ovules more than 4.

Leaves, small 3 to 8 in. long.
Flowers large 6 in. long.
Flowers small 25 in. long.
Flower small pulpy orange to black; tree.
Flowers dry globose green; bush or small tree.
Fruit large as a cricket ball, many seeded.
Leaves large bullate; nerves puberulous beneath.
Ovules 4 only.

Leaves large, 9 to 18 in. long base narrowed; a bush.
Leaves large, 9 to 18 in. long, base cordate; tree.

Ovary and style pilose.

Ovules more than 4.

Leaves rufous hairy beneath.
Leaves yellow hairy.
Leaves glabrous small; fruit large, rind thick glabrous.
Leaves glabrous 48 in. long; fruit 75 in., rind thin tomentose.
Ovules 4 only.

Leaves pubescent beneath.
Leaves large elliptic 7 by 3 in.

X. Scortechinii
X. Kingii
X. affline
X. obscurum
X. bullatum
X. Hookerianum
X. venosum
X. rufum
X. sulphureum
X. stipitatum
X. pulchrum
X. puberulum
X. Kunstleri
Leaves elliptic lanceolate 4 by 1.25
Fruit glabrous small, smooth; flowers pink; big tree
Fruit glabrás 1 in. through; flowers few white, small tree
Leaves glabrous; fruit warty when dry.
Leaves 4 in. long, 2 wide elliptic acuminate
Leaves 2 in. by 4 in. elliptic
Leaves 2 in. by 1 in. elliptic cuspidate
Leaves glabrous; fruit hairy; leaves elliptic stiff coriaceous large.
Leaves glabrous; fruit tomentose; leaves elliptic lanceolate small

A glabrous tree 25 to 30 ft. tall. Leaves thinly coriaceous ovate blunt acuminate, base cuneate, pale shining; nerves 3 pairs, not prominent, 2 to 2.25 in. long, 1 in. wide; petioles 3.5 in. long. Racemes axillary 2 in. long. Flowers few, 5 in. long pink; pedicels 3.5 in. long. Sepals glabrous, edges ciliolate, outer 3 ovate blunt, inner rounded. Petals broad obovate clawed, keel pubescent; filaments as long, flat pubescent. Ovary shortly stalked, ovoid glabrous; ovules 6. Fruit globose 2 in. through; pericarp 3 in. thick. Hab. Rare, forests. Perak, Relau TuJor (Wray). Penang Hill (Curtis).

A tree 30 to nearly 60 ft. tall. Leaves shining deep green subcoriaceous elliptic-lanceolate to elliptic, shortly blunt acuminate; nerves 5 to 6 pairs, 2.5 to 4 in. long, 1.2 to 1.75 in. wide; petioles 2.5 in. long. Flowers in racemes 2 in. long, white turning yellow 2.5 in. long on longer pedicels. Sepals ovate, glabrous unequal dark red. Petals much longer, 2.5 in. long. Ovary glabrous, stipitate, stipes surrounded by a shallow undulate ring-shaped disc; ovules 10. Drupe sub-globular 5 to 75 in. through, orange turning deep red, pulpy sweet. Seed, i. Hab. Not rare in open country and woods. Flowers in January. Singapore, Tanglin, Johor, Sungei Tebrau. Malacca (Griffith). Pahang, Pekan. Selangor, Perak, Ulu Kerling and Ulu Kal (Kunstler). Distrib. Borneo.

Usually a large bush, but growing to a tree 30 to 60 ft. tall glabrous except the inflorescence. Leaves thinly coriaceous, drying yellowish green, elliptic to oblong-lanceolate, shortly blunt-acuminate, base cuneate; nerves 5 to 8 pairs, 4 to 7 in. long, 1.8 to 2.5 in. wide; petioles 3 to 4 in. long. Panicles axillary and terminal, minutely tomentose 3 to 10 in. long. Flowers numerous, white withering yellow 3.5 in. long; pedicels nearly as

(4) X. obscurum Benn. l.c. i. 211; King, l.c. 141. X. insigne Benn. l.c. 211; King, l.c. 144.

A large tree with deep green shining coriaceous leaves, elliptic blunt, narrowed at base; nerves 5 to 9 pairs, 4-25 to 4.75 in. long, 2 to 2.25 in. wide; petioles .4 in. long. Racemes axillary 1 to 1.5 in. long, few-flowered. Flowers .5 in. long. Sepals oblong blunt, edges ciliate, light green, gibbous at base, 3 outer ones small. Petals oblong sub-spathulate, white often tinted rose pink, .5 in. long. Ovary ovoid glabrous. Fruit globose as big as a cricket-ball or larger, pericarp thick brownish green. Seeds several large embedded in sweet white pulp. Hab. Forests, Singapore, Tanglin, etc., Malacca, Bukit Sabukor. Native name: Buah Kapas.

(5) X. bullatum King, l.c. 142.


(6) X. Hookerianum King, l.c. 139.

A glabrous shrub. Leaves coriaceous elliptic-oblong, point abrupt 1 in. long blunt, base slightly narrowed to petiole, nerves 6 to 10 pairs, prominent beneath, 9 to 11 in. long, 3 to 4 in. wide; petioles .75 in. long. Flowers .4 in. long; pedicels very short. Sepals sub-equal broadly ovate, tomentose, edges ciliate. Petals oblong obtuse, glabrous deep yellow, keel pubescent. Filaments flat, puberulous. Ovary sessile ovoid, tomentose; ovules 4. Hab. Rare. Perak at Goping (Kunstler). Pahang, Sungei Lenget, Rumpin (Foxworthy). Native name: Medang Mangas.

(7) X. venosum King, l.c. 139.

A glabrous tree 25 to 30 ft. tall. Leaves coriaceous, oblong
sub-acute, narrowed to a rounded or cordate base; nerves 14 to 16 pairs prominent beneath and inarching 2 in. from edge, secondary nerves and reticulations fine and distinct, 9 to 14 in. long, 2·5 to 3·25 in. wide; petioles 0·75 in. to 1 in. long. Flowers 4 in. long in few-branched axillary panicles 3 to 6 in. long. Sepals sub-equal broad ovate puberulous. petals oblong obtuse, keel pubescent, waxy light yellow or pink. Filaments flat puberulous. Ovary ovoid tomentose 4-ovuled. Fruit globose with conical top, rugose verrucose dark blue black. Hab. Rare in dense jungle, Selangor, Dusun Tua; Rawang (Kloss). Perak, Ulu Bera and Ulu Bubong (Kunstler).

(8) X. rufum Benn. in Hook. fil. F.B.I. i. 210; King, l.c. 143.
Tree 40 to 50 ft. tall. Leaves coriaceous elliptic to ovate, or obovate-elliptic suddenly acuminate, glabrous above, paler pubescent beneath; nerves 7 or 8 pairs, 4·5 to 6·5 in. long (point 5 in. long), 2·25 to 2·75 in. wide; petioles 5 in. long. Panicles terminal or axillary, from upper axils, 3 to 7 in. long, tomentose, ends of branches rufous. Flowers 6 in. long. Bracts ovate. Sepals unequal ovate or sub-reniform rufous-tomentose. Petals more than twice as long, oblong blunt glabrous, keel tomentose, reddish brown. Ovary sessile tomentose. Ovules 12 to 16. Fruit 0·75 in. through, globose, with 4 vertical rufous ridges. Hab. Not rare in Malacca, Selandor; Bukit Bruang. Negri Sembilan, Bukit Sulu (Cantley). Selangor, Bukit Chiraka, Klang (Foxworthy). Distrib. Sumatra. Native name: Tuloh Buaya.

(g) X. sulphureum King, l.c. 143.
A tree 100 to 150 ft. tall. Leaves coriaceous elliptic oblong, or sub-oboVate acuminate, base cuneate above glabrous shining, beneath minutely sulphureous pubescent, especially on midrib and nerves 6 or 7 pairs, 5·5 to 7·5 in. long, 2 to 2·5 in. wide; petioles 5 to 6·5 in. long. Panicles tomentose many-branched axillary or terminal 3 in. long. Sepals unequal ovate-round, minutely tomentose, edges ciliate. Petals oblong blunt glabrous, tips pubescent, keel obovate, tomentose yellow. Filaments glabrous. Ovary stipitate 8-ovuled. Fruit globose yellow glabrous. Hab. Old jungle on low hills. Perak, Batang Padang district (Kunstler).

(10) X. stipitatum Benn. l.c. i. 210; King, l.c. 140.
A tree 60 to 70 ft. tall. Leaves small sub-coriaceous ovate obtuse, base rounded, 2·5 in. long, 0·75 in. wide (drying dark); nerves indistinct 3 or 4 pairs; petioles 1 in. long. Flowers dull red, few on terminal and axillary glabrous racemes 1 to 1·5 in. long; pedicels slender longer than the flowers. Sepals sub-equal, oblong blunt. Petals twice as long, spathulate. Ovary on a long stalk as long as itself, pilose; ovules 8 to 12. Fruit 2 or 3 in. long, about 2 in. through, oval dark purple. Hab. Open jungle, not common. Malacca (Maingay, Hervey). Perak, Larut (Kunstler); Bikam, Sungkai (Foxworthy).

Shrub or small tree. Leaves coriaceous elliptic acute, or shortly blunt-acuminate, base rounded, above shining, beneath glaucous; nerves 5 or 6 pairs with reticulations prominent, 4 to 8 in. long, 2·25 to 4 in. wide; petioles thick ·2 in. long. Racemes axillary rufous-tomentose dense 3 in. long. Bracts broad, ovate concave, coloured. Sepals sub-equal ovate rounded, midrib tomentose, edges ciliate. Petals oblong, ·5 in. long, blunt, glabrous, yellowish tinged with pink, keel pubescent. Filaments short, flat, puberulous. Ovary ovoid, pointed tomentose; ovules 12. Disc thin deep, glabrous. Fruit globose, ·75 in. through, minutely tomentose green, pericarp crustaceous. Hab. Open jungle, hilly localities. Distrib. Perak, Blanda Mabok (Wray); Larut (Kunstler). Penang, Telok Bahang (Curtis) and Penara Bukit.


Large shrub. Branches pubescent. Leaves oblong-elliptic or lanceolate cuspidate, shortly narrowed at base, thinly coriaceous 5·5 to 8 in. long, 2·25 to 2·75 in. across; nerves 5 or 6 pairs, elevate beneath, reticulations large, all pubescent; petioles ·25 in. long. Flowers white, in short terminal panicles 2 to 3 in. long, pubescent, few-branched. Sepals unequal, ovate obtuse, minutely puberulous. Petalsspathulate, glabrous ·5 in. long, keel slightly pubescent. Stamens glabrous except at base. Ovary villous, stipitate; ovules 4. Hab. Not common, Selangor, by the stream at Klang gates. Bindings at Lumut (Ridley).


A glabrous tree 50 to 80 ft. tall. Leaves large coriaceous elliptic to elliptic-oblong, shortly suddenly acuminate, base rounded or narrowed shining; nerves 8 to 10 pairs, prominent beneath as are secondaries and reticulations when dry, 4·5 to 9 in. long, 2·25 to 4·25 in. wide; petioles 6 to 7·5 in. long. Panicle terminal few-branched or racemes stout, 6 in. long. Flowers ·6 in. long, Sepals ovate rounded fleshy, midrib thickened minutely tomentose brown. Petals oblong obtuse, glabrous except pubescent keel, yellow. Filaments with an ovoid swelling pubescent above the base. Ovary sub-sessile, ovoid, grooved, 4-ovuled tomentose. Fruit globose ·65 in. wide, smooth. Hab. Forests in low country. Perak, Thaiping Hills (Kunstler). Penang, Government Hill (Curtis).

Resembles X. Curtisii, but much more robust, leaves much larger and drying greenish yellow.

(14) X. Curtisii King, l.c. 138.

A glabrous tree 30 to 60 ft. tall with a dense head of foliage. Leaves coriaceous, deep shining green, ovate-lanceolate acuminate,
base rounded or cuneate; nerves 5 to 6 pairs not very prominent, 3 to 5 in. long, 1 to 1.3 in. wide; petioles .4 in. long. Panicles axillary or terminal .3 in. long, buds yellow. Sepals sub-equal, rotund, tomentose. Petals oblong obtuse, glabrous except the keel broadly obovate pubescent. Filaments with an ovoid pubescent swelling near base. Ovary sessile, ridged, pubescent; ovules 2 to 4. Disc glabrous fleshy angled. Hab. Forests. Singapore Gardens, in jungle. Malacca, Bukit Bruang (Curtis). Penang, Moniots Road (Curtis).

(15) X. glaucum Wall. Cat. 4109; Benn. l.c. i. 209; King, l.c. 137. X. microcarpum Chodat, l.c. 263.

A big tree with a stout trunk, 30 to 60 ft. tall. Leaves sub-coriaceous, shining above, glaucous beneath, lanceolate to elliptic-lanceolate sub-acute, base narrowed; nerves 8 to 10 pairs, 3 to 4 in. long, 1 to 1.4 in. wide; petioles hardly 25 in. long. Flowers .25 in. long, rose pink in terminal racemes or panicles 3 to 4 in. long, lax pubescent or hairy. Sepals unequal, oblong pubescent. Petals glabrous except the keel. Ovary tomentose. Fruit globose .25 in. through, smooth glabrous. Hab. North of the peninsula in open country. Setul and Perlis at Kanga. Distrib. Siam (Trang), Chittagong and Burma.

Chodat separates King’s plant as X. microcarpum, saying it has “Fructus parvus nec verrucosus nec costatus,” a good description of Wallich’s type of X. glaucum.


A small tree, bark grey. Leaves lanceolate oblong acuminate 4 to 5 in. long, 2 in. wide, above smooth, green, beneath glaucous; nerves fine 6 to 7 pairs inarching within margin, base shortly cuneate; petioles .1 in. long. Racemes few axillary and terminal, puberulous .75 in. long few-flowered. Sepals unequal ovate obtuse. Petals .5 in. long, white, glabrous, connate with the very short staminal tube at the base only. Ovary shortly stipitate, pilose. Fruit globose, smooth, green hairy, .75 in. through. Hab. In woods, rare. Singapore in the Garden Jungle and at Selitar. Pahang, Rumpin (Foxworthy). Native name: Sisyor.

(17) X. verrucosum Chodat, l.c. 263. X. eurhynchum King, l.c. 137 (not of Miquel).

Tree 30 to 50 ft. tall. Leaves sub-coriaceous elliptic-lanceolate acuminate sub-acute or rounded at base; nerves 4 or 5 pairs, 4 to 5.5 in. long, 1.75 to 2.5 in. wide; petioles .3 in. long. Flowers .25 in. long in pubescent axillary and terminal racemes 3 in. long, or in few-branched panicles. Sepals unequal, ovate-oblong blunt, tomentose. Petals spatulate glabrous except keel. Style and ovary villous; ovules 4. Fruit globose .75 in. across, verrucose green. Hab. Perak, Thaiping; Goping (Kunstler). Dindings, Pangkor (Curtis). Penang, Batu Feringghi (Curtis). Distrib. Sumatra.

Chiefly distinguished from X. Palembanicum by its much larger leaves.

A shrub 3 to 8 ft. or more tall. Branchlets puberulous. Leaves sub-coriaceous, drying yellow green, shining above, elliptic to oblong acuminate, base rounded or narrowed; nerves 10 to 13 pairs, prominent, inarching within the edge, 6 to 10 in. long, 2.25 to 4.5 in. wide; petioles 3 to 6 in. long. Flowers 3.5 in. long in terminal or axillary racemes or panicles 3 in. long. Sepals ovate blunt, puberulous. Petals oblong, obtuse, puberulous, base pubescent, cream colour. Ovary densely villous on a glabrous stalk, 4-ovuled, disc glabrous. Fruit globose .75 in. through, silky when young, ripe glabrous and warty. *Hab.* In dense forests in the low country not rare. Perak, Gunong Pondok (Kunstler); Gunong Bubu. Penang Hill (Burkill).

Distinguished from *X. affine* Korth. by the distinctly inarching fewer nerves, villous silky ovary and 4 ovules only. The panicles are also much denser and the fruit wrinkled.

A tree 15 to 40 ft. tall, with lanceolate or elliptic caudate-acuminate leaves, base acute; nerves 4 to 5 pairs inarching within the margin, 3 to 4 in. long (tail often 1 in. long), 1 to 1·3 in. wide, bright dark green; petioles 25 in. long. Racemes axillary few-flowered, 1 to 1·5 in. long, minutely tomentose. Sepals unequal, oblong obtuse. Petals spathulate glabrous white, keel silky. Ovary and style villous; ovules 4. Fruit green globose glabrous 7·5 in. through, verrucose and grooved when dry. Hab. Common in woods in the low country. Singapore, Garden Jungle. Malacca (Griffith, Hervey). Pahang. Bentong (Foxworthy). Perak, Larut Hills (Kunstler). Penang (Curtis). **Distrib.** Sumatra.

The wrinkles in the fruit by which King distinguishes **Palembanicum** from **Maingayi** only appear when the fruit is dried, and are of no value as a character.

(20) **X. hebecarpum** Chodat, Bull. Herb. Boiss. iv. 263.

Leaves elliptic acuminate blunt, thickly coriaceous glabrous, 8 in. long, 4 to 5 in. wide; nerves 5 pairs, prominent beneath, midrib prominent; petioles about 2 in. long. Fruit 1 in. through, cerebriform, velvety; pericarp 1 in. thick. **Hab.** Rare and very incompletely known. Dindings on Pangkor Island (Curtis, 1639).

I have great doubt that this is a **Xanthophyllum** at all.

(21) **X. Griffithii** Benn. l.c. i. 210; King, l.c. 136.

A tree 40 to 60 ft. tall, glabrous except the inflorescence. Leaves coriaceous, elliptic-lanceolate to lanceolate acute or acuminate, base acute, shining above, sub-glaucescent beneath, reticulations and 3 or 4 pairs of nerves distinct, 3 to 4 in. long, 1 to 1·5 in. wide; petioles thick 35 in. long. Racemes axillary tomentose, 3 to 6 in. long on terminal panicles 6 in. or more long. Flowers 35 in. long, greenish yellow or dark yellow, on short stout pedicels. Sepals broad ovate blunt, tomentose outside. Petals oblong blunt glabrous keel pubescent. Filaments hairy below. Ovary sessile, tomentose; ovules 4, base and style cylindric pilose. Fruit globular tomentose. **Hab.** Dense forests. Malacca, Batang Malaka. Selangor, Kwala Lumpur. Perak up to 6700 ft. altitude. Gunong Batu Putih. Penang, Batu Feringhi (Curtis). **Distrib.** Mergui. **Native names:** Dudali paya; Rawai.

### Order XIV. Caryophyllaceae.

Herbs. Leaves opposite, simple entire. Flowers bisexual cymose simple or dichotomous, many- or few-flowered. Bracts opposite, edges or all scarious. Sepals 4 to 5 free (or connate). Petals as many, entire bifid or lacerate (or absent). Stamens
3 to 10 insert with the petals; filaments filiform; anthers bilocular. Ovary free 1-celled (rarely 2- to 5-celled). Styles 2 to 5. Ovules 2 to many, from base of ovary or on a central column. Capsule membranous or crustaceous, splitting into as many valves as styles (or with apical teeth). Seeds few or many reniform globose or obovoid. Species 1000, whole world, very rare in tropics.

1. DRYMARIA, Willd.

Diffuse herbs. Leaves flat. Flowers pedicelled small in dichotomous cymes terminal (or axillary). Sepals 5, herbaceous edge scarious. Petals 5, 2- to 6-cleft. Stamens 5 or fewer, perigynous. Ovary 1-celled; ovules many. Styles 3. Capsule 3-valved. Species about 40, 1 in tropical Asia and Africa, 1 Australian, the rest American.


Order XV. PORTULACACEÆ.

Herbs rarely shrubby. Leaves opposite or alternate entire, nodes with scarious or hairy appendages. Sepals 2 imbricate. Petals 4 or 5 fugacious hypogynous or perigynous. Stamens 4 to many; filaments slender; anthers 2-celled. Ovary free or half inferior, 1-celled; ovules 2 or many. Style 2- to 8-fid. Capsule transversely or by 2 or 3 valves, dehiscent. Seeds 1 or many. Cosmopolitan chiefly American, about 125 species.

1. PORTULACA, L.

Flowers in terminal heads; petals 5 . . . . \( \text{(i) P. oleracea} \)
Flower solitary terminal; petals 4 . . . . \( \text{(2) P. quadrifida} \)

\( \text{(i) P. oleracea} \) Linn. Sp. Pl. 445; Dyer in Hook. fil. F.B.I. i. 246; King, l.c. 144.
Annual fleshy, 6 to 12 in. long, nodal appendages scarious. Leaves cuneate oblong obtuse, often purplish or red, 2-25 in. to 1-25 in. long, petiolate. Flowers in few-flowered and terminal heads or dichotomous cymes, sessile, surrounded by scarious bracts. Petals 5, yellow. Stamens 8 to 12. Style 3- to 8-fid. Seed punctate. Hab. A common weed of cultivation, or in waste grounds all over the peninsula from Singapore to Perlis. Distrib. All warm countries. Native name: Segan. Use: As a pot-herb.

\( \text{(2) P. quadrifida} \) Linn. Mantissa, i. 73; Wight, Ill. ii. t. 109; King, l.c. 145. P. geniculata Royle, Ill. 221.

**Order XVI. HYPERICACEÆ.**

Herbs, shrubs or trees. Leaves opposite, often gland-dotted. Stipules 0. Flowers solitary or cymose, terminal (rarely axillary). Sepals 5. Petals 5, rarely 4. Stamens indefinite (rarely definite), 3- to 5-adelphous, rarely free, or all connate. Ovary 3- to 5-carpellary, 3- to 5-celled; styles as many, filiform. Ovules few or many on parietal or axile placentas. Fruit capsular, rarely baccate. Seeds exalbuminous, sometimes winged. Warm and temperate regions of whole world, species about 200.

Herb with yellow flowers . . . . . . 1. **Hypericum**.
Shrubs or trees; flowers pink or white . . . 2. **Cratoxylon**.

1. **Hypericum**, Linn.

Herbs or small shrubs. Leaves opposite, usually sub-sessile and punctate. Flowers solitary, cymose or panicked, yellow (rarely white). Sepals and petals 5 each. Stamens free or connate in 3 bundles, alternating with hypogynous glands. Ovary carpels 1 or more, perfectly 3- to 5-locular. Ovules many, rarely few capsules septicidally dehiscing. Seeds very small not winged. Species 160, whole world, chiefly in temperate regions.
2. CRATOXYLON, Blume.


Petals sub-persistent, no scales at base . . . . (1) C. polyanthum
Petals not persistent with a scale at base.
Shrub; flowers in terminal racemes; leaves obovate . . . . . . . (2) C. microphyllum
Trees; flowers in terminal panicles, deep red . . (3) C. arborescens
Trees; flowers in short axillary cymes flowering with the young leaves.
Flowers rose pink, 75 in. long; capsule 6 in.; valve 25 in. across . . . . (4) C. formosum
Flowers white, 6 in. long; capsule 3 in. long; valve 1 in. across . . . . (5) C. Maingayi

A medium-sized or tall tree with red stems, and bark flaking off, glabrous 30 to 60 ft. tall. Leaves membranous, lanceolate or elliptic-oblong, acute at both ends; nerves 7 to 10 pairs, 1.5 to 3.5 in. long, 75 to 25 in. wide; petioles 1 in. long. Flowers supra-axillary sol.tary or in 2- or 3-flowered cymes, 5 in. across. Sepals elliptic obtuse, green. Petals ob lanceolate, rose pink. Glands large, fleshy oblong. Capsule little longer than the sepals 5 in. long; valves broad. Seeds obliquely winged. Hab. Open woods in the low country. Singapore, Malacca, Negri Sembilan, Perak and Penang. Distrib. India, China, Malay Archipelago to Philippines.

var. Wightii. King, l.c. 146; C. Wightii. Blume, Mus. Bot. ii. 18; Ancistrolobus sp. Wight. Ill. i. 111.
(2) **C. microphyllum** Miq. Fl. Ind. Bat. Supp. i. 500.


(3) **C. arborescens** Blume, Mus. Bot. ii. 17; King, l.c. 146.

A lofty tree with a straight stem 60 to 80 ft. tall. Leaves coriaceous broadly oblanceolate, obovate-elliptic or oblong-obovate, shortly acuminate, dotted on the back; nerves numerous, fine, parallel inconspicuous beneath, 3 to 4'5 in. long, 1'25 in. to 2 in. wide; petioles thick, '25 in. long. Cymes in terminal panicles 4 to 6 in. long. Flowers '3 in. across. Sepals unequal, ovate rounded, '25 in. long. Petals as long, cuneate deep red with laciniate basal scales. Capsule '25 in. long; valves oblong blunt. Seeds winged all round. **Hab.** In woods in the low country. Singapore, Bukit Timah; Garden Jungle. Malacca (Griffith). Selangor, Kwala Lumpur (Burn-Murdoch). Perak, Larut (Kunstler). Penang Hill (Burkill).

var. **Mique!ii** King, l.c. 146; **C. cuneatum** Miq. Fl. Ind. Bat. i. (2), 517.

Small tree. Leaves narrow lanceolate 3 in. long, 1'10 in. wide, acuminate. Flowers smaller; buds much smaller. Leaves very finely reticulate in a specimen from Scortechini. **Hab.** Perak (Wray, Scortechini). Penang, Government Hill (Curtis). Probably a mountain form. **Distrib.** Burma, Borneo and Sumatra. **Native name:** Gerongang. **Use:** Valued as a timber, wood red.


A glabrous tree 30 to 60 ft. tall. Leaves membranous, at first lanceolate acute, then broadly elliptic to oblong, acute or rounded, base narrowed, shining, beneath dotted; nerves 6 to 8 pairs, 3 to 4 in. long, 1'75 to 2'25 in. wide; petioles '25 in. long. Cymes axillary, 2- or 3-flowered. Flowers '75 in. long on '5 in. long pedicles. Sepals elliptic pointed. Petals elliptic clawed, with a narrow scale above the claw, rose pink. Glands oblong crimson. Stamens exert. Capsules cylindric acute, 6 in. long; valves '25 in. across. Seed '3 in. wing obtuse, obovate, unilateral. **Hab.** Borders of woods and open country, whole peninsula from Singapore to Perlis. **Distrib.** Siam, Malay Islands to the Philippines. **Native name:** Mumpat Merah or M. hitam.
A very beautiful tree. It sheds its leaves before flowering, and as the new leaves appear the flowers are produced. The young leaves are at first lanceolate and deep red, then gradually in a few days become green and oblong.


Tree about 40 ft. tall, glabrous. Leaves coriaceous, lanceolate (young) acute, narrowed to base, 2 in. long, '5 in. wide; adult elliptic sub-obtuse, 5 in. long, 2'1 in. wide; nerves numerous, slender; petioles '25 in. long. Cymes axillary appearing after fall of the leaf. Flowers 3 or 4 in a cyme white; pedicels 1 in. long. Sepals oblong. Petals '36 in. long elliptic clawed, basal scale lanceolate acute. Capsule '3 in. long; valves '1 in. across. Seeds '25 in. long; wing unilateral oblong rounded. *Hab.* Hill forests, local. Penang, common all over Government Hill, and very conspicuous in flower. Flowers in March. *Native name:* D'rum.

This tree sheds its leaves as does *C. formosum*, and as the young leaves appear so do the flowers. The flowers and fruit are much smaller than in *C. formosum* and the flowers white.
Order XVII. FLACOURTIACEÆ.

Trees or shrubs. Leaves alternate usually coriaceous. Flowers small, usually unisexual in cymes, fascicles or racemes. Sepals free, connate, 5 to 8. Petals 5, often absent. Stamens 5 to 8 or more. Ovary superior; styles free or connate. Disc usually none. Fruit baccate or capsular. Tropics.

Flowers bisexual; petals 4 to 6.
   Stamens numerous; flowers baccate
   Stamens 5 or 6; fruit capsule
   Flowers unisexual.
   Petals 0, disc present; fruit baccate
   Petals 5 to 8; fruit hard baccate; stamens free
   Sepals free 5; petals 5; stamens 5 to 8
   Sepals free 4; petals 8; stamens 20 to 30
   Sepals connate in a cup; stamens free 20 to 25
   Sepals connate in a spathe-like limb; stamens free 8
   Sepals connate in a tube; stamens connate in a column

1. SCOLOPIA, Schreb.

Spiny or unarmed small tree. Leaves alternate crenulate or entire. Flowers small, bisexual in axillary racemes. Sepals 4 to 6 imbricate. Petals 4 to 6 imbricate. Stamens many with a row of glands outside them; anthers ovoid, the connective produced into an appendage. Ovary 1-celled; style erect. Stigma entire or lobed. Ovules few. Berry 2- to 4-seeded. Species about 15, tropics of Africa, Asia and Australia.

Racemes 3 to 4 in. long, terminal and axillary
   Racemes 1 in. or less, all axillary

(1) S. rhinanthera


Bush or tree, nearly glabrous except the inflorescence. Leaves coriaceous, ovate to ovate-lanceolate acuminate, base rounded, obscurely crenate-dentate; nerves 7 pairs fine, 3 to 5 in. long, 1.75 to 2.5 in. wide; petioles 1.85 in. long, biglandular at the apex. Racemes axillary and terminal, 3 to 4 in. long pubescent. Flowers about 20, 3 in. across; pedicels short. Sepals 4, ovate-lanceolate tomentose outside. Petals 4, larger round, tomentose on edges and midrib. Stamens indefinite; anthers very small; appendages lanceolate glabrous. Stigma entire. Fruit baccate black. Seeds 2 to 6. Hab. Usually on sea-shores, but sometimes inland. Singapore, Serangoon river bank. Malacca. Selangor, Port Swettenham

**Distrib.** Java and Borneo, S. Siam.

*S. crenata* Clos., given by King as from Penang and Perak, can hardly be separated, but in any case it is South Indian and the plants referred to it by King are all *S. rhinanthera*.

![Scolopia rhinanthera](image)

**Fig. 17.**—Scolopia rhinanthera.

(2) **S. Roxburghii** Clos. l.c. 250; Hook. fil. F.B.I. i. 190; King, l.c. 115.

A glabrous shrub or tree 20 to 30 ft. tall spiny below. Leaves coriaceous ovate to ovate-lanceolate, shortly or rather long acuminate, base cuneate or rounded, edge crenate or nearly entire; nerves 5 pairs decurrent on midrib, 4·5 to 6·5 in. long, 1·75 to 3·3 in. wide; petioles 3·5 in. long biglandular at tip. Racemes pubescent 1 in. long or less, 2- to 6-flowered, tomentose. Sepals and petals 5 to 6 each ovate, tomentose, 1 in. long. Stamens indefinite; appendages ciliate. Ovary ovate. Stigma 3-lobed. Fruit sub-globose 1 in. through. **Hab.** Forests to 500 ft. altitude. Malacca (Maingay). Penang, Government Hill (Curtis). Perak, Larut (Kunstler). 

**Distrib.** Burma, Sumatra.
2. **ERYTHROSPERMUM**, Lam.

Trees or shrubs. Leaves alternate. Racemes simple or panicled. Flowers small, bisexual. Sepals 4 to 6 imbricate. Petals 4 to 6 small. Stamens 4 to 6; anthers lanceolate-sagittate, connate dilate. Ovary 1-celled; style short. Stigma entire or lobed. Ovules many on 3 to 4 parietal placentas. Capsule coriaceous 3- to 4-valved. Seeds few; testa coriaceous or fleshy. Species 8, 6 Mascarene, 1 Ceylon, 1 Malay Peninsula.

(1) **E. Scortechinii** King, l.c. 116.

Small tree 30 to 40 ft. tall glabrous. Leaves thickly membranous oblong-elliptic cuspidate, crenate-serrate, base narrowed; nerves 5 to 6 pairs, inarching 25 in. from edge, 4 to 5 in. long, 2 to 2.5 in. wide; petioles 5 in. grooved. Racemes 2 to 4 paniculate, terminal one 3 to 4 in. long in flower, twice as long in fruit. Flowers unknown. Ovary glabrous; ovules 12 to 20; style glabrous. Stigma 3-lobed. Capsules on 5 in. long pedicels, globular, smooth 35 in. through. Seed 1 globular with red pulp. *Hab.* Very rare. Perak, no locality given (Scortechini).

3. **FLACOURTIA**, Commers.

Spiny or unarmed trees with alternate leaves usually more or less crenulate. Flowers unisexual (rarely hermaphrodite) in short axillary racemes or fascicles, small apetalous. Sepals 5. Stamens indefinite, rising from a fine 5-lobed or entire fleshy disc. Ovary flask-shaped; styles 4 to 6 free or connate for part of their length. Fruit baccate, globose with 4 or 5 flat seeds. Species 8, Indo-Malayan.

Trees; leaves large.

Leaves 6 in. long, 2.5 in. wide, elliptic cuspidate; styles far apart . . . . . . . . . . . . (1) **F. Rukam**

Leaves 3 to 4 in. long, 1.25 in. wide, lanceolate; styles connate

Bush; leaves small obovate . . . . . . . . . . . . (2) **F. Cataphracta**

(3) **F. sepiaria**

(1) **F. Rukam** Zoll. and Moritz, Verz. 33; Hook. fil. F.B.I. i. 192; King, l.c. 117.

A small tree, very thorny below. Leaves elliptic, narrowed at the base, edges crenulate, cusp 1 in. long; nerves 7 or 8 pairs, 6 to 7 in. long, 2.5 in. wide, membranous glabrous; petioles 3 in. long. Flowers unisexual in small axillary fascicles, numerous; pedicels pubescent. Sepals ovate obtuse, pubescent. Disc 5-lobed, white or yellow. Stamens in male numerous. Pistillode 0. Female, as in male but no stamens; disc less lobed. Pistil flask-shaped; styles 4 to 6 spreading. Berry globose; styles widely spreading, 5 in. through, purplish green. *Hab.* Common in damp lowland woods. Singapore, Johor. A form with fewer nerves
and more glabrous flowers occurs at Pekan in Pahang, Tapah and Goping in Perak and in Penang, also in Borneo at Sarawak.

var. *domestica* Ridl. Unarmed tree. Leaves smaller and pubescent on the branches; petioles and nerves beneath. Cultivated and around villages. Malacca and Perak. *Distrib.* Borneo, etc. This fruits earlier than *F. Cataphracta*, in September. The fruit is eatable, but not so good as that of *F. Cataphracta*.

var. *erythrocarpa* Ridl. Small tree quite unarmed. Leaves broad, ovate acuminate crenate, 6 in. long, 2 in. wide; petioles and branches softly pubescent. Flowers not seen. Fruit globose about 4 in. through, bright red, sweet; styles distant 8. In cultivated ground in Singapore and Penang.

A very distinct plant in its absolutely unarmed stem and bright red sweet fruit. It cannot be *F. inermis* Roxb., as that has the styles all connate into a star, whereas they are separate in this plant. It is probably a distinct species, but I have only seen one or two trees of it and no flowers.


A spiny tree about 20 ft. tall. Stem armed with strong dense branched spines at the base. Branches unarmed. Leaves membranous, glabrous lanceolate acuminate crenulate or entire, dark green (red when young), 3 to 4 in. long, 1'25 in. wide. Flowers unisexual in small axillary tufts. Sepals green ovate, edges hairy. Stamens in males yellow, numerous from a yellow ring-shaped disc. Females as in males, but with a flask-shaped pistil, and a stout cylindric style with 4 recurved arms free only at tip. Fruit globose ½ in. through (rather smaller than in *F. Rukam*) dark brown red, pulp greenish yellow enclosing 4 or 5 flat seeds. *Hab.* Common in all villages. *Distrib.* Malay Islands.

This is the true Rukam and the best eating one. When ripe it is of a firm texture and very astringent, but after rubbing in the hands a short time it becomes quite soft and sweet. The tree is usually at least unisexual.


4. HYDNOCARPUS, Gaertn.

Trees, medium to large. Leaves alternate, coriaceous, serrate or entire. Flowers solitary or in fascicles or racemes, axillary unisexual. Sepals 5 imbricate. Petals 5 with a scale at base. Males, stamens 5 to 8; anthers reniform with large connectives. Females, stamens sterile or abortive. Ovary 1-celled. Stigmas to 6 spreading, lobed. Ovules many, on 3 to 6 parietal placentas. Berry large globose, rind hard. Seeds many in pulp, testa crustaceous, albumen oily. Species 12, Indo-Malayan.

Leaves entire.

Flowers small to 95 in.; fruit globoso; 75 in. (1) H. nana

Flowers 1 in. across; fruit large globose.

Leaves coriaceous, large, elliptic (2) H. castanea

Leaves thinly coriaceous, lanceolate-elliptic (3) H. Curtisii

Leaves coriaceous, oblong cuspidate (4) H. Scortechinii

Fruit long, pear-shaped; flowers 3 in. across (5) H. cucurbitina

Fruit, ovoid velvety; flowers 5 in. across (6) H. Wrayi

Leaves spiny on edge; flowers rather large (7) H. ilicifolia


Small tree 10 to 20 ft. tall. Stem 2 to 3 in. through glabrous. Leaves sub-coriaceous, ovate or oblong-lanceolate, long acuminate, base rounded or cuneate unequal, edges minutely serrulate; nerves 5 to 8 pairs more or less pubescent prominent beneath, 2.5 to 5 in. long, 75 to 2.5 in. wide; petioles 2.5 to 3.5 in. long. Stipules linear-lanceolate pubescent. Male cymes short 2 in. long pubescent. Flowers white 25 in. across. Sepals round pubescent, imbricate. Petals smaller fleshy, with long white silky hairs outside; scales small oblong. Females, solitary on 5 in. long pedicels. Ovary tomentose. Stigmas 3 large. Fruit globular, brownish green velvety-tomentose 1 in. through. Seeds 3 or 4 plano-convex, 5 in. long. Hab. Forests 300 to 1500 ft. altitude. Selangor, Sungei Buluh. Perak, Goping; Tea Gardens; Thaiping Hills (Kunstler). Province Wellesley, Permatang Bertam. Penang, Telok Kumba (Curtis).

var. pubescens. A pubescent form at Goping, Perak (Kunstler).

(2) H. castanea Hook. fil. F.B.I. i. 197; King, l.c. 118.

Tree 50 to 60 ft. tall, 8 to 12 in. through. Leaves stiffly coriaceous, elliptic or oblong, apex blunt, base blunt unequal; nerves 4 to 9 pairs, strongly elevate, 7 to 14 in. long, 2.5 to 4.5 in. wide; petioles thickened at both ends, geniculate above 75 to 1 in. long. Flowers white, fragrant, in axillary clusters of 2 to 6; pedicels pubescent, 1.25 in. long. Sepals obovate imbricate, outside tomentose. Petals 6 in. long, linear-oblong; scales linear obtuse. Stamens, filaments subulate; anthers ovate. Females as male,

Fig. 18.—Hydnocarpus Curtisii.


A shrub or treelet 15 to 25 ft. tall, glabrous. Leaves coriaceous, oblong-lanceolate, apex acuminate, base unequally rounded or cuneate; nerves 7 to 11 pairs, elevate beneath, 6 to 12 in. long, 2.25 to 3 in. wide; petioles 2 in. long stout. Male flowers in short axillary cymes, 7.5 in. across. Sepals ovate blunt, minutely pubescent 3 in. long. Petals narrow oblong blunt, 5 in. long; scales linear 4 in. long. Anthers longer than filaments. Female flowers on shorter pedicels. Ovary long, ovoid tomentose. Stigmas
3 bifid. Fruit globose, light grey, tinged brown, velvety, 1 in. through, 1'5 in. long, with a long ridged papilla. Seeds '4 in. long, plano-convex. Hab. Thin stony woods. Penang common, Waterfall, about 600 ft. altitude (Curtis). Lankawi, Burau (Robinson).

(4) **H. Scortechinii King, l.c. 120.**
Glabrous tree. Leaves coriaceous, elliptic-oblong acuminate, base rounded, unequal; nerves 7 or 8 pairs, 5 to 7 in. long, 2'5 to 3 in. wide; petioles 2 in. long. Cymes small '6 in. long, 2- or 3-branched with many bracts. Males on pedicels '75 in. long. Sepals elliptic, blunt, puberulous. Petals smaller; scales nearly as long linear. Anthers narrow. Females on short pedicels. Ovary round below, cylindric above, ridged glabrous. Stigma large. Fruit ovoid, glabrous, 2 in. through. Hab. Dindings, Pangkor (Curtis and Scortechini).

(5) **H. cucurbititina King, l.c. 120; Ann. Bot. Gard. Calc. v. (2), 129, pl. 149.**
Tree 60 to 80 ft. tall. Stem 1'5 to 2 ft. through. Leaves coriaceous (young ones mealy) elliptic-oblong, shortly cuspidate, base rounded; nerves 5 to 6 pairs slender, prominent as are reticulations, 3'5 to 5 in. long, 1'5 to 2'25 in. wide; petioles thick 25 in. long. Cymes dioecious '75 to 1 in. long, axillary, pedunculate branched. Male flowers '3 in. across. Sepals ovate blunt, pubescent outside. Petals pale green ovate-round, glabrous; scales nearly as large, edges white, ciliate. Filaments conical; anthers ovate, cordate. Females fewer. Ovary cylindric silky. Fruit obovate-cylindric, tip mammillate, base narrowed, 3 to 5 in. long, dark brown. Seeds 1 or 2'1 in. long. Hab. Open jungle. Rare. Perak, at Goping, 500 to 1000 ft. altitude (Kunstler).

(6) **H. Wrayi King, l.c. 121; Ann. Bot. Gard. Calc. v. (2), 130, pl. 150.**
Tree 15 to 25 ft. tall. Stem 3 to 5 in. through, puberulous. Leaves coriaceous large elliptic shortly abruptly acuminate, base obtuse, glabrous except midrib and 8 to 9 pairs puberulous nerves, elevate inarching, reticulations prominent, 8 to 10 in. long, 3'5 to 5 in. wide; petioles stout 5 in. long. Flowers male, 5 in. across in very short axillary cymes. Sepals round pubescent. Petals little smaller; scales fleshy cuneate apex toothed. Stamens 15, short glabrous; filaments thickened at base. Fruit narrow ovoid tapering to both ends, 3 in. long, 1'75 in. through, velvety yellow covered with brown fluff; apical mammilla 75 in. long, crowned by 3 bifid stigmas. Seeds '75 in. long. Hab. Forests in the low country. Perak, Larut (Kunstler); Relau Tujor (Wray).

A small bushy tree. Leaves coriaceous, oblong acuminate or lanceolate, long-acuminate, edges nearly entire or thorny serrate,
base acuminate; nerves 7 pairs, reticulations distinct, 3 or 3.5 to 6 in. long, 1.25 to 2.25 in. wide; petioles 3 in. long. Flowers in axillary fascicles or racemes. Buds globular, on pedicels 2 in. long, softly golden velvety. Sepals 4, in 2 pairs round concave, brown, imbricate. Petals 4 (or 8) smaller, erose ciliate; scales sub-quadrilateral. Stamens 20, white; filaments short pubescent. Fruit globular velvety, 1.5 in. through. Hab. On rocky limestone hills, often very abundant. Lankawi at Kwah. Perlis, very common on and round limestone rocks. Distrib. Cambodia and Java.

5. TARAKTOGENOS, Hassk.

Trees with entire alternate leaves. Flowers in axillary cymes, some bisexual, others male only. Males, sepals 4, in decussate pairs, imbricate round concave. Petals 8 in 2 rows smaller, with a fleshy cuneate scale often dentate at the tip to each petal. Stamens 20 to 32; filaments short; anthers cordate. Female flowers, sepals often 3, petals 6 and stamens 17. Ovary long ovoid sulcate with 4 deflexed stigmatic lobes, i-celled; ovules many on 4 parietal placentas. Fruit large globose or ovoid with a hard fibrous or woody rind, and several seeds imbedded in pulp. Seeds, testa hard, albumen copious, cotyledons large cordate. Species 3 or 4, Indo-Malayan.

Quite glabrous except petals; stamens 20 to 24. (1) T. Scortechinii
Leaves pubescent to tomentose beneath; stamens 32. (2) T. Kunstleri.

(1) T. Scortechinii King, l.c. 122.
Large glabrous tree. Bark dark coloured. Leaves coriaceous, oblone, lanceolate in equilateral or oblone, edges undulate, apex shortly bluntly acuminate, base narrowed; nerves 4 to 5 ascending, prominent beneath, reticulations prominent, above smooth, 3.5 to 7 in. long, 1.5 to 2.75 in. wide; petioles 5 to 7.5 in. long. Cymes trichotomous 1 in. long; peduncles 5 in. long axillary. Male flowers 5 to 6 in. across on pedicels 2.5 in. to 35 in. long. Sepals round, glabrous. Petals silky outside; scales less than half as long. Stamens 20 to 24; filaments hirsute. Anthers sagittate. Hab. Perak, Bujong Malacca (Scortechini).

var. gracilipes, King, l.c. Specimens with smaller leaves and slender pedicels.

Tree 40 to 60 ft. tall, 10 to 15 in. through. Branchlets puberulous. Leaves bright green, coriaceous unequal-sided, oblong-lanceolate to elliptic cuspidate; nerves prominent beneath, puberulous, 5 or 6 pairs, 4.5 to 6 in. long, 1.5 to 3 in. wide; petioles 3 to 5 in. long, puberulous. Cymes dense, many-flowered. Male flowers as in

6. PANGIUM, Reinwtd.

A lofty tree about 50 ft. tall. Leaves entire or 3-lobed, ovatecordate, acuminate. Flowers in axillary racemes, unisexual. Sepals 2 or 3 concave. Petals 5 or 6 with large scales at the base. Male flowers, stamens 20 to 25; filaments broad flat; anthers ovate. Pistillode 0. Females, ovary ovoid, 1-celled, 2 parietal placentas many-ovuled. Staminodes 5 or 6. Stigma sessile 2- to 4-lobed. Fruit large, oblong-ovoid; pericarp woody wrinkled. Seeds many large ovoid. Albumen large oily. One species only.


Leaves reddish buff pubescent beneath, 6 to 8 in. long, 4 to 5 in. wide; petioles 2 to 4 in. long. Male flowers in racemes 4 in. long, few-flowered. Bracts linear 1 in. long. Flowers 1'5 in. across, greenish white. Female flowers solitary on a 3-in. peduncle. Fruit from 7 to 12 in. long, 3'75 in. through or more, brown. Seeds 2 in. long, roughly triangular in an oily pulp. Hab. By riverbanks and in villages. Selangor, road to Bukit Kutu; Batu Caves. Pahang, banks of Pahang River. Perak, Temengoh; Ulu Bubong (Kunstler). Kelantan. Distrib. Malay Islands. Native name: Kepayung or Payung. Seeds also known as K'luak. Use: The seeds boiled, cut up and macerated in water are eaten, the oil extracted used in cookery. Fresh seeds and oil contain a poisonous glucoside breaking down and producing prussic acid, used in dart poison by Sakais, and the bark is used as a piscicide (Gimlette, Malay Poisons 76). The oil is also used for attracting fish.

7. SCAPHOCALYX, Ridley.

Small trees. Leaves alternate 3-nerved, thin, coriaceous. Flowers unisexual, fascicled from pubescent extra-axillary tubercles on the branches, pedicelled. Calyx spathaceous covering the rest of the flower and splitting on one side or at the top with 4 lobes. Petals narrow, as long as calyx or longer, 5. Stamens 6; filaments short; anthers linear or lanceolate longer. Pistillode 0. Female
flowers unknown. Fruit globose crowned by 6 to 8 minute stigmas. Seeds numerous imbedded in pulp. Species 2, Malay Peninsula.

Calyx splitting along one side persistent boat-like
Calyx splitting in 4 at the top; flowers very small

(1) S. spathacea
(2) S. parviflora

Tree 10 to 25 ft. tall. Leaves elliptic base cuneate, 3-nerved; lateral nerves from midrib to side nerve about 18 pairs, 6 to 8 in. long, 2 to 3 in. wide; petioles '15 in. long. Pedicels slender '5 in. long. Calyx boat-shaped beaked, '4 in. long. Petals linear acuminate, '3 in. long. Stamens 6; filaments very short hairy; anthers linear acuminate, much longer. Fruit white in. through crowned with 6 to 8 minute stigmas. Seeds numerous. Hab. Forests. Malacca, Bukit Kamuning (Derry). Negri Sembilan, Tampin Hill (Goodenough, Burkill). Selangor, Ulu Gombak; Weld's Hill (Foxworthy).

(2) S. parviflora Ridl. l.c.
Leaves as in S. spathacea, but broader, ovate-elliptic acuminate; lateral nerves 13 pairs, 9 in. long, 4 in. wide; petioles '20 in. long. Flowers male, very small '3 in. wide; pedicels '1 in. Calyx splitting into 4 acute points tipped with hairs '15 in. long. Petals 4, little shorter, white, lanceolate acute. Stamens 6; anthers linear lanceolate; filaments very short. Hab. Perak, Temengoh (Ridley).

8. RYPAROSA, Bl.

Trees. Leaves entire alternate often glaucous beneath. Flowers small unisexual. Males in long axillary racemes. Females in shorter racemes or solitary. Calyx globose, at length 3- to 5-cleft. Petals 5 imbricate. Male flowers, filaments united in a column with 5 anthers at the top. Female flowers with large silky scales at the base of the petals, 5 staminodes, a 1-celled ovary, placentas, parietal with 2 ovules. Stigmas 2 or 3 sessile emarginate. Fruit baccate; pericarp tomentose. Seeds 1 or 2. Species about 10, Malay Peninsula, Java and Sumatra.

Racemes axillary on branches long slender.
Leaves thick; peduncles short 1·5 in. long . . (1) R. Wrayi
Leaves thin; peduncles slender 6 in. long . . (2) R. Hullettii
Leaves narrow, lanceolate; racemes velvety
Racemes axillary and terminal short stout sub-globose . . . . . (3) R. Wallichii
Racemes from trunk.
Leaves oblanceolate 6 to 10 in. long; racemes dense . . . . (5) R. Scortechinii
Leaves lanceolate pale, 15 in. long; racemes lax . . (6) R. fasciculata

Tree 60 to 70 ft. tall. Stem 10 to 24 in. through, glabrous except flowers. Leaves coriaceous, ovate-lanceolate to elliptic obtuse, base
narrowed; nerves 4 pairs sub-erect and midrib prominent beneath, 6 to 10 in. long, 2.5 to 4.5 in. wide; petioles 1 to 1.25 in. long, winged at top. Racemes axillary and from below the leaves 6 to 9 in. long, elongating in fruit. Flowers dark yellow. Males, pedicel 1 in. long. Calyx teeth 3, broad ovate, reflexed. Petals 5 oblong-ovate pubescent outside; scales triangular silky. Stamen-tube pubescent; anthers 5 ovate. Females, disc annular with 5 conical staminodes. Ovary globular, pubescent. Stigmas 2 sub-bifid yellow. Fruit globular, .75 in. through, creamy grey with light spots, pubescent, 1-seeded. Hab. Dense jungle 400 to 600 ft. altitude. Perak, Ulu Bubong (Kunstler).

(2) R. Hullettii King, l.c. 126.
Glabrous. Leaves membranous, obovate-elliptic, glabrous, abruptly cuspidate sub-acute, base narrowed, light green above, pale green beneath; nerves 3 pairs ascending and midrib prominent beneath, 5 to 7 in. long, 3 in. wide; petioles 1.5 in. long. Male racemes axillary 12 to 15 in. long, puberulous. Calyx with 3 ovate teeth. Petals 5 ovate; scales densely silky. Staminal tube glabrous; anthers 5 ovate. Female flowers, calyx cup-shaped. Pistil cylindric with a 4-lobed stigma. Fruit fusiform 4-angled reticulate pustular 1.5 in. long. Hab. Dense forest, local and rare. Singapore, Bukit Timah fern valley and Chan Chu Kang.

A tree. Branchlets covered with red hair. Leaves glabrous above coriaceous lanceolate-oblong, base slightly narrowed, apex acuminate acute, base beneath; midrib hairy; nerves 5 pairs elevate beneath, at first hairy, 8 to 10 in. long, 2 in. wide; petioles 1.5 in. long. Male, spikes 6 to 9 in. long, rachis hairy. Bracts small lanceolate. Flowers scattered yellow 2 in. across; pedicels .25 in. long. Sepals ovate short blunt hairy. Petals 4 or 5 much longer, ovate hairy inflexed; scales half the size of the petals, hairy. Staminal column glabrous; anthers 4 or 5 oblong. Hab. In forests. Singapore, Garden Jungle. Penang, "A climber from the hills, October" (Wallich 7847B and Herb. Finlayson 7847A).

The spikes in Wallich's specimens (very young) are borne in the axils of the leaves, in the Singapore plant they are fully developed on the trunk.

A big tree 40 to 100 ft. tall, 15 to 24 in. through, glabrous. Leaves coriaceous, glossy dark green, ovate-oblong to oblong bluntly short acuminate, base narrowed beneath, reticulate; midrib and nerves 5 to 7 pairs prominent, 5 to 8 in. long, 2.5 to 3.5 in. wide; petioles 1.25 to 1.75 in. long, swollen and bent at apex. Racemes axillary 1 to 3 together, male ones 6 to 8 in., females 3 to 4 in. long. Male, calyx pubescent, teeth ovate. Petals oblong lanceolate pubescent outside; scales silky. Staminal tube
glabrous. Female, no staminodes. Ovary ovoid angled tomentose. Stigmas obovate. Fruit globular yellow r\'5 in. through. Seeds 5 or 6 oblong, r75 in. long. Hab. Dense forest, 500 to 3000 ft. altitude. Perak, Goping; Batang Padang; Ulu Kerling; Larut Hills (Kunstler).


Spreading tree r5 to 40 ft. tall, 6 to 8 in. through. Branchlets and inflorescence rusty. Leaves coriaceous, oblong-lanceolate or oblanceolate shortly acuminate narrowed from middle to base, glabrous dark green above, bluish grey beneath; nerves 5 or 6 pairs and midrib prominent, r0 to 15 in. long, 4 to 6 in. wide; petioles 2 to 2r5 in. long thickened and bent at tip. Racemes in tufts from tubercles on stem and branches. Males 8 to 12 in. long, females shorter. Male flowers, calyx tomentose splitting into 3 ovate segments. Petals 4 oblong; scales round silky. Female flowers purple. Ovary tomentose 4-angled; styles 2. Fruit angled when young, transversely oblong when ripe and r5 in. long by 1 in. wide, velvety brown or black. Seeds 2. Hab. Thick forests under 1000 ft. altitude. Pahang, Kwalah Tenok. Selangor, Ginting Bidai. Perak, Larut (Kunstler). Penang, Waterfall. Kelantan, Kwalah Lebir.


Big tree 50 to 60 ft. tall. Stem r0 to 15 in. through. Leaves coriaceous glabrous, narrow oblong acuminate, base narrowed, deep green; midrib and nerves 7 pairs and reticulations beneath elevate, 9 to 15 in. long, 2r25 to 3r25 in. wide; petioles r to 1r25 in. long. Racemes fascicled on trunk and large boughs, 4 to 7 together, from 6 to 8 in. long. Sepals and petals reflexed, rounded, both tomentose. Stamens glabrous. Female flowers, staminodes conic. Stigmas large, reniform. Fruit sessile, globose-pear-shaped, apex mammillate, tomentose 2 in. long, r5 in. through, yellowish green. Seeds about 6. Hab. Dense forest, Malacca, at Selanor. Sungei Ujong, Bumban (Cantley). Perak, Chanderiang and Ulu Bubong (Kunstler). Native names: Tajam B'lat; Musakana Putih; Rambai Ayam.

**Order XVIII. Guttiferæ.**

Trees or shrubs with yellow or greenish resinous juice. Leaves opposite, coriaceous or more rarely membranous. Flowers solitary, fascicled, racemose or panicled, axillary or terminal, white, yellow or red, regular, unisexual or bisexual. Sepals 2 to 6 imbricate or in decussate pairs. Petals 2 to 6, rarely 0, usually imbricate. Male flowers, stamens usually indefinite, free, or filaments connate.
monadelphous or in as many bundles as there are petals, a rudimentary pistil or 0. Female flowers, staminodes various. Ovary 1- to 2- or many-celled; style slender or none. Stigmas as many as ovary-cells, free or connate. Ovules 1 to 2 or many, axile, or erect from cell-base. Fruit baccate, drupaceous, or rarely dehiscent. Seeds large exalbominous. Tropics of Asia, America and Africa, about 320 species. (King, Journ. As. Soc. Beng. Ixix. 147.)

Flowers unisexual on different trees; fruit baccate; stigmas sessile
Flowers bisexual.
Calyx dividing into 2 lobes
Calyx 4- to 5-lobed.
Ovary 1-celled; ovule 1; flowers white, numerous; stigma peltate
Ovary 1-celled; ovules 4; flowers few; stigma 4-fid
Ovary 2-celled; ovules 4; flowers very large; stigma peltate

1. GARCINIA, L.

Tree of medium or large size, rarely shrubs, with abundance of yellow resinous latex. Leaves opposite, coriaceous. Flowers solitary or fascicled, axillary or terminal, unisexual. Sepals 4 to 5 decussate. Petals 4 or 5 decussate. Male flowers, stamens indefinite in fascicles or forming a globose or conic mass, rarely free. Pistillodes present or not; anthers sessile or on short filaments 2- to 4-celled dehiscing by slits or pores or circumsciss. Females, staminodes free or connate. Ovary 2- to 12-celled. Stigma sessile or sub-sessile peltate, entire or lobed. Ovules solitary in each cell attached to the inner angle. Berry with a fleshy or coriaceous rind. Seeds with a pulpy aril. Species about 100, tropical Asia, Africa and Polynesia.

i. Eu-GARCINIA. Sepals and petals 4.
(a) Stamens in males on both sides of 4 fleshy processes; anthers usually 2-celled (4-celled in G. cuspidata).
Flowers very small; anthers 2-celled.
Leaves 2 to 3 in. long by .9 to 1 in. wide; flowers panicked
Leaves 2 to 3 in. by 1.75; flowers densely crowded
Flowers twice as large
Leaves lanceolate; flowers in cymes of 3 moderately large
Leaves elliptic blunt, 4 by 3 in.; flowers .25 in. long
Anthers 4-celled. Habit of G. rostrata
(b) Stamens in male in a 4-lobed mass; anthers 2-celled; leaves and flowers large stiff coriaceous; fruit large; pericarp crustaceous.
Leaves broad, ovate; nerves conspicuous

(1) G. eugeniæfolia
(2) G. rostrata
(3) G. merguensis
(4) G. lanceolata
(5) G. diversifolia
(6) G. cuspidata
(7) G. Hombroniana
Leaves elliptic-lanceolate; nerves very slender faint.
Leaves ovate; flowers very large, pink (no male trees known), female with abortive stamens.
(c) Stamens 2-celled in an unlobed mass.
Stamens in a cone.
Stamens on a stipitate receptacle; leaves strong nerved, sub-coriaceous.
(d) Stamens in whorls on a fleshy receptacle.
Flowers large red; fruit large pulpy lobed.
(e) Stamens on a flat or convex sessile receptacle.
Anthers cuneate, connective large, 2-celled.
Leaves and fruit large; fruit lobed, pink.
Leaves very large; strongly ribbed; fruit apple-like, sessile, green.
Leaves stiff obovate; nerves fine inconspicuous.
Leaves large elliptic; fruit green, pulpy; flowers small, fascicled.
Leaves large oblong-elliptic; flowers 15 in. wide; stamens in a globose head.
Leaves thin; fruit as big as cherry; anther-cells orbicular.
Leaves 2 in. long lanceolate; flowers solitary.
Leaves 3 in. long elliptic cuspidate; flowers sessile, terminal.
Leaves 3 in. long ovate, very coriaceous.
Flowers solitary axillary.
Flowers minute in short cymes; leaves elliptic blunt.
Anthers 4-celled.
Leaves coriaceous; flowers small; fruit pulpy, small.
Leaves 3 to 6 in. long; stamens sub-sessile; fruit oblong umbonate.
Leaves 2 to 3 in. long; stamens on a column; fruit globose, not umbonate.
Leaves 4 to 5 in. long; stamen-heads sessile; fruit elliptic umbonate.
Leaves membranous, elliptic acuminate 4 in. long; flowers cuneate.
Anthers surrounding a central connective, dehiscing transversely.
Leaves sub-coriaceous 2 to 4½ in. long; flowers female nearly 5 in. wide.
Leaves sub-coriaceous, elliptic 5½ in. long; flowers 5 in. across, solitary.
Leaves large; nerves sunk above; flowers very small in fascicles.
Leaves thin ovate long-cuspidate 2 in. long; nerves faint; flowers solitary or paired.
Dubious; leaves large; flower solitary terminal.

(ii) XANTHOCHYMY. Sepals and petals 5; filaments connate in 5- (or 4-) pedicelled spathulate bodies; anthers at top very small.
Leaves very coriaceous 9 to 20 in. long; nerves strong.

(8) G. penangiana
(9) G. Mangostana
(10) G. Malaccensis
(11) G. Maingayi
(12) G. atroviridis
(13) G. costata
(14) G. Griffithii
(15) G. clusiæfolia
(16) G. bancana
(17) G. Curtisii
(18) G. Forbesii
(19) G. montana
(20) G. Murdochchii
(21) G. monantha
(22) G. minutiflora
(23) G. nigrolineata
(24) G. globulosa
(25) G. parvifolia
(26) G. Kunstleri
(27) G. Gaudichaudii
(28) G. uniflora
(29) G. dumosa
(30) G. urophylla
(31) G. opaca
(32) G. nervosa
Leaves 5 to 10 in. long coriaceous; nerves not strong.
Leaves elliptic coriaceous, 5 in. long; flowers numerous, crowded, rather small.
Leaves thin, coriaceous, 8 in. long; flowers crowded in terminal head, large.
Leaves coriaceous, 5 in. long; flowers solitary; fruit large, pear-shaped.

(1) *G. eugeniæfolia* Wall. Cat. 4873; Hook. fil. F.B.I. i. 268; Pierre, Fl. For. Cochinchine, vi. pl. 6 (partly); King, l.c. 150.

A tree 50 to 60 ft. tall or less. Leaves thinly coriaceous, elliptic acuminate at each end; nerves very fine numerous and parallel, 2 to 3½ in. long, 9 to 1½ to 3½ in. wide; petioles 2 to 2½ in. long. Male flowers 2 in. across, white in axillary fascicles of 20 to 30. Pedicels 2 in. long. Sepals 4 orbicular, outer pair small, inner as large as petals. Petals 4 orbicular. Stamens numerous forming 4 orbicular-oblong fleshy processes with anthers on both sides. Rudimentary stigma large hemispheric, style cylindric. Females 2½ in. across in axillary peduncled cymes of 3 flowers. Sepals and petals as in male, no staminodes. Stigma large, sub-papillose nearly covering the ovary. Fruit 75 in. through. *Hab.* In forests in low country, Singapore. Dindings. Perak. Penang (Wallich). *Distrib.* Tenasserim, Andamans. *Native name:* Tentulang Merah. *Use:* In house-building.

(2) *G. rostrata* Benth. and Hook. fil. Gen. Plant. i. 174; Pierre, Fl. For. Cochinchine, vi. pl. 91B; King, l.c. 151.


A tree 30 to 40 ft. tall. Branches terete. Leaves ovate-elliptic to lanceolate, caudate-acuminate, base cuneate; nerves indistinct, 3 to 3½ in. long, 1½ to 1½ in. wide; petioles 2½ in. long. Male
flowers '15 in. wide in axillary cymes of 3 to 6 flowers; pedicels '2 in. long. Sepals 4, outer ones ovate orbicular, inner ones orbicular. Petals 4 orbicular. Anthers on both sides of 4 fleshy processes. Rudimentary style cylindric long. Stigma discoid. In bisexual flowers the petals are orbicular reniform, and the stigma is sessile large convex. In female flowers there are no staminodes, the stigma hemispheric. Fruit globular '75 in. wide covered by the concave smooth stigma. 


Distrib. Tenasserim and Cambodia. 

Use: This yields the Malay varnish, Getah Luli (Wray). Native name: Lulai.

(4) G. lanceolata Ridl. n. sp.

Small tree. Leaves lanceolate acuminate blunt, base cuneate; nerves over 20 pairs very fine and inconspicuous, 3 in. long, '75 in wide; petioles '1 in. long. Male flowers 3 together in very shortly peduncled cymes; pedicels '1 in. long. Sepals orbicular '1 in.
long. Petals orbicular, thin, apparently white. Stamens in 4 broad oblong masses, narrowed at base entirely covering the pistillode; anthers minute very numerous on both sides. Pistillode large. Stigma very large orbicular convex. Hab. Lankawi, Pulau Terutau at Telok Hudang (Haniff).

(5) G. diversifolia King, l.c. 153.

Tree 40 to 60 ft. tall. Branches 4-angled yellowish. Leaves lanceolate sub-acute to elliptic shortly bluntly cuspidate, base cuneate; nerves numerous visible above only, 2.5 to 4.5 in. long, 1.5 to 2.75 in. wide; petioles 2 to 4 in. long. Male flowers 75 in. across in 3- to 6-flowered axillary cymes; pedicels 2 to 4 in. long. bracts orbicular. Sepals 4 orbicular, outer ones small, united at base and denticate, inner ones as large as the petals. Petals 4 ovate orbicular. Stamens numerous on 4 processes; anthers sessile, 2-celled, with thick bifid connectives. Pistillode, style cylindric. Stigma large hemispheric entire, papillose. Female flowers as in males, but cymes fewer-flowered and often terminal. Staminodes 0. Ovary, globose. Stigma sessile discoid entire. Fruit sub-globular 6 in. through. Hab. Mountains at 3000 to 3500 ft. altitude. Perak, Gunong Batu Putih (Wray).

This has the habit of G. densiflora King.

(6) G. cuspidata King, l.c. 152.

Tree 60 to 70 ft. tall. Leaves elliptic-ovate sub-spathulate cuspidate, base narrowed; nerves sub-horizontal distinct 1 in. apart, inarching with an intra-marginal nerve, 2.5 to 3.25 in. long, 1.5 to 1.75 in. wide; petioles 3 in. long. Male flowers 15 in. across in short peduncled axillary 6- to 9-flowered cymes; buds pyriform; pedicels 3 to 6 in. long. Sepals 4 equal, orbicular. Petals 4 white thin orbicular, a little larger. Stamens on both sides of 4 fleshy processes; filaments short and thick; anthers 4-celled. Style cylindric short. Stigma capitate small concealed by the stamens. Hab. Forests, rare. Perak at Selama (Wray) and Ulu Bubong (Kunstler). Female flowers and fruit unknown.


Tree resembling a mangosteen, but more strict with whitish bark, unisexual, about 30 to 60 ft. tall. Leaves oblong to elliptic, slightly narrowed at the base, with numerous parallel slightly ascending nerves, 6 in. long, 3 in. wide; petioles 25 in. long. Male flowers 75 in. across, creamy white. Sepals 2 outer orbicular cherry red as is the pedicel, 2 inner cream, with central red bar. Petals ovate obtuse, yellow. Stamen-mass 4-lobed. Female flowers, sepals and petals as in male. Ovary short broad, covered by the large sessile pulviniform, slightly lobed stigma. Fruit globose, like a small mangosteen 2 in. across bright pink. Seeds numerous, pulp white acid with a peach flavour. Whole fruit


Tree 30 to 40 ft. tall, 8 to 15 in. through. Branchlets 4-angled. Leaves oblong-lanceolate to lanceolate acuminate blunt, base narrowed; nerves very numerous, fine faint, 4·5 to 7 in. long, 1·5 to 3 in. wide; petioles 5 in. long. Male flowers in terminal fascicles of 3 to 6; pedicels slender 25 in. to 5 in. long. Sepals, outer ones round fleshy 25 in. long red, inner ones larger elliptic obtuse. Petals longer, creamy white. Stamens united into a slightly 4-lobed mass; anthers short, broad. Pistilode o. Females solitary larger; peduncles thicker. Ovary globular. Stigma large hemispheric corrugate 4-lobed. Fruit globular 175 in. long. Seeds few. *Hab.* Forests usually at about 1000 ft. altitude. Perak, Thaiing Hills. Penang, upper part of the hill.

Vesque separates *fascicularis* Wall. from *G. penangiana* King, but the plants seem to me identical.

(9) *G. Mangostana* Linn. *Sp. Pl.* 635; Pierre, *Fl. For.* Cochinchine, i. 54; *King, l.c.* 156; *Bot. Mag.* t. 4847.

A tree about 20 to 30 ft. tall. Bark smooth. Leaves thickly coriaceous, elliptic-oblong acute, base cuneate, deep shining green; nerves numerous, inarching with a double extra-marginal nerve, 6 to 10 in. long, 2·5 to 4·25 in. wide; petioles 75 to 1 in. long. Female flowers 2 in. across, solitary or paired at the ends of branches, on stout 5 in.-long pedicels. Sepals 4 rounded yellowish. Petals 4 ovate dark rosy pink, larger. Stamens 15 to 20, all free, slender with small elliptic white anthers, all abortive. Ovary globular 4- to 8-celled. Stigma sessile 4- to 8-rayed yellow. Fruit depressed globular 3 in. through, deep brown crimson, rind thick rose pink within. Seeds 6 to 8 enclosed in a white juicy aril. Cultivated all over the peninsula. Not known in a wild state. I have never seen a male tree, male flowers or a fertile stamen, though the seeds are almost always fertile. The male flowers described by Roxburgh and King are doubtful. *Native name:* Manggis. *Use:* A very popular fruit, the rind, which is astrangent, used in dysentery.


Tree. Branchlets 4-angled, drying dark. Leaves elliptic-oblong, short blunt acuminate, base narrowed; nerves faint, horizontal 4 to 8 in. long, 1·5 to 2·5 in. wide; petioles 4 to 6 in. long channelled. Male flowers 4- to 6-fascicled terminal; pedicels 35 to 65 in. long, thick. Sepals elliptic-orbicular sub-similar. Petals twice as long, red ovate clawed. Stamens very numerous in a sub-cylindric
conic mass; anthers broadly ovoid 2-celled, connectives broad. Female flowers 1·5 to 2 in. across terminal solitary. Ovary globose, 8-celled. Stigma sessile convex corrugated, deeply 8-lobed. Hab. Very rare, only known from Maingay’s specimen from Malacca. This closely resembles Hombroniana, but the stigma is lobed.

(ii) **G. Maingayi** Hook. fil. F. B. I. i. 267; King, l. c. 158; Pierre, *Fl. For. Cochinchine*, vi. pl. 17.

A tree 40 to 60 ft. tall. Branchlets thick 4-angled. Leaves oblong-elliptic tip blunt rounded or shortly apiculate, base cuneate; nerves 9 to 13 bold elevated, deep green, 4·5 to 9 in. long, 2·25 to 3·25 in. wide; petioles 7·5 in. long not wrinkled. Male flowers in terminal or axillary peduncled umbels 3 to 12 in a head, 1 to 1·25 in. across white or light yellow, whole inflorescence as much as 1·5 in. long. Sepals orbicular, outer ones rather smaller than inner ones. Petals larger, ovate-orbicular. Stamens forming a dense globular mass; filaments slender in rows on a stipitate receptacle. Pistillode cylindric, discoid stigma. Female flowers solitary terminal sub-sessile. Staminodes few. Ovary globose 4- to 6-celled. Stigma large convex papillose slightly 4-lobed. Fruit globose 2 to 2·5 in. through, crowned by the discoid lobed style, which in some forms is borne on a stout grooved style and is 8-lobed. Hab. Forests. Malacca (Maingay). Dindings, Pangkor; Telok Sera (Curtis). Perak, Thaiping Hills in low country (Kunstler). Ulu Leding (Wray).

(iii) **G. atroviridis** Griff. in Hook. fil. F. B. I. i. 266; Pierre, *Fl. For. Cochinchine*, vi. pl. 80, fig. c; King, l. c. 159.

A handsome tree 20 to 60 ft. tall. Leaves deep green (red when young) narrow oblong sharply acuminate, base cuneate; nerves numerous inarching 0·5 to 1 in. from the edge, 4·5 to 8 in. long, 1·25 to 2 in. wide; petioles 6 to 7·5 in. long. Male flowers 1·25 in. across in terminal clusters of few-flowered cymes; pedicels 2·25 to 7·5 in. long. Sepals, outer ones oblong or orbicular, inner ones thin-edged, larger. Petals large bright crimson orbicular-ovovate. Stamens, filaments slender inserted in whorls on a fleshy receptacle; anthers narrow oblong, forming with large convex. Stigma a globose mass. Female flowers terminal solitary. Sepals and petals as in male, but petals smaller. Staminodes attached to an annulus. Ovary cylindric ribbed 12- to 16-celled. Stigma convex, pileate deep red. Fruit 3 in. or more through sub-globose, top flattened with many large ribs and grooves, brilliant orange yellow, juicy. Hab. Wild and occasionally cultivated, in forests at 1500 ft. altitude. Singapore. Johor. Malacca. Perak. Penang. Native name: Asam Gelugur. Use: Fruit dried and eaten in curries or stewed, also used in medicine.

(iii) **G. costata** Hemsl. King, l. c. 161.

Tree 50 to 70 ft. tall, 12 to 18 in. through. Leaves dark green, thinly coriaceous, elliptic acute, base cuneate; nerves elevate
13 to 18 pairs, 6 to 14 in. long, 3'5 to 6 in. wide; petioles 1 to 1'5 in. long. Male flowers 1 to 1'25 in. across in terminal cymes of 3 to 5; pedicels stout '25 to '5 in. long. Sepals equal orbicular. Petals larger, pale yellow, tinged reddish, orbicular-ovate. Stamens forming an oblong 4-angled mass with stigma; filaments inserted on a fleshy receptacle; anthers cuneate. Stigma large discoid. Female flowers solitary terminal. Staminodes 12. Ovary grooved. Stigma discoid with radiating grooves. Fruit depressed spheroidal, 3 in. by 2 in. with many grooves, pale rose to crimson. Hab. Forests. Perak, Thaiping Hills 2000 to 3000 ft. altitude and Gunong Bubu (Kunstler). Native name: Glugor. Use: Fruit eaten.

In foliage and flowers closely resembling G. Maingayi, but in fruit resembling G. atroviridis.

(14) **G. Griffithii** T. Anders. in Hook. fil. F.B.I. i. 266; King, l.c. 161.

A smooth-barked tree usually about 40 to 60 ft. tall, with angled yellowish branches. Leaves large coriaceous bullate oval or oval-elliptic, light green, base narrowed; nerves 16 to 24 pairs bold, 9 to 16 in. long, 4 to 8 in. wide; petioles '6 in. long. Male flowers '75 in. across (hardly expanding) in dense 3- to 10-flowered cymes in leaf axils on tubercles; pedicels '25 in. long. Sepals equal orbicular fleshy. Petals oblong blunt fleshy, green. Stamens 25 to 40 in a square flat-topped mass; anthers broad oblong. Pistil-lode none. Female flowers in few-flowered axillary cymes. Perianth as in males. Staminodes in 4 bundles. Ovary ribbed 12-celled; style short. Stigma peltate papillose, edges crenate. Fruit 3 in. through globose flattened at the top, brownish green, resembling a russet apple, acid. Hab. In woods, common, Singapore, Malacca and Perak. Native name: Kandis Gajah.


Tree. Branches black not angled. Leaves stiffly coriaceous obovate, base cuneate; nerves very fine ascending inconspicuous above, almost invisible beneath, 5 to 5'5 in. long, 2'25 to 3 in. wide; petioles '5 in. long stout not rugose. Male flowers in fascicles upon tubercles, axillary 10 or more together, very small. Bracts ovate numerous. Pedicels thick 25 in. long. Sepals 4, 2 outer ones coriaceous, orbicular concave, 2 inner thinner, obovate-oblong. Petals oblong obtuse as long. Stamens connate into a sub-conic mass not lobed; anthers sessile, minute 2-celled; cells separated by the broad triangular connective. Pistillode o. Hab. Mountains, rare, Pahang at Wray's camp on Gunong Tahan (Ridley).

(16) **G. bancana** Mig. Fl. Ind. Bat. Supp. 494; King, l.c. 162.

A tree 20 to 80 ft. tall. Stem 18 to 24 in. through. Branchlets stout, nodular, black. Leaves coriaceous broadly obovate-lanceolate, tip rounded or mucronulate, base narrowed to petiole; nerves very numerous, close and parallel, keel prominent, 5 to 7 in. long,

(17) *G. Curtisii* Ridl. n. sp.

Tree. Branches hardly angled. Leaves lanceolate obtuse or acute, base long-narrowed; nerves numerous parallel inarching near the margins, 5 to 10 in. long, 1.5 to 3.5 in. wide; petioles 1 in. long. Male flowers in terminal or axillary fascicles with slender pedicels 2.5 in. long. Sepals 4, orbicular sub-equal 1 in. long. Petals oblong obtuse a little longer. Stamens numerous in a globose head with very short filaments; anthers 2-celled oblong-quadrates with narrow connective. Pistillode o. *Hab*. Penang, near Waterfall and at Telok Bahang (Curtis 691; 240).

(18) *G. Forbesii* King, l.c. 162.

A small tree about 15 ft. tall. Leaves thin coriaceous oblanceolate short acuminate, base cuneate, 3.5 to 5 in. long, 1.5 to 2.5 in. wide; petioles 3 to 4 in. long. Male flowers 2.5 in. wide in clusters of 3 or 4 axillary. Sepals small round. Petals orbicular crimson. Stamens in a convex mass, the connectives small; anthers sub-sessile sub-ornicular 2-celled. Female flowers solitary. Petals red or orange. Stigma sessile convex covering the ovary, papillose. Fruit pulpy globose as big as a cherry, red. Aril of seeds red. *Hab*. In lowland forests, Singapore, Garden Jungle; Bukit Mandai. Johor, Tanjong Kupang. Pahang Kwala Tenok, Tahan River. Perak, Upper Perak 300 ft. altitude (Wray). *Distrib*. Sumatra.

(19) *G. montana* Ridl. n. sp.

A small tree 15 ft. tall. Branches 4-angled. Leaves thickly coriaceous, lanceolate bluntly acuminate; nerves invisible except the midrib, 2 in. long, 1.75 in. wide or smaller; petioles 3 in. long. Male flowers solitary, terminal 2.5 in. across greenish yellow, on pedicels 12 in. long, thick. Sepals ovate obtuse. Petals rounded. Stamens crowded into a sessile sub-globose head; anthers numerous, linear. Pistillode o. Female flowers terminal. Sepals and petals as in males. Style cylindric. Stigma capitate. Berry flask-shaped beaked 1.75 in. long. *Hab*. On Mt. Ophir, at 3000 ft. altitude on the Padang Batu (Ridley).


Branches slender yellow, angled. Leaves coriaceous elliptic abruptly blunt-cuspidate, base cuneate; nerves very fine, 3 in.


(23) G. nigrolineata Planch. in Hook. fil. F.B.I. i. 263; Pierre, Fl. For. Cochinchine, vi. pl. 81, fig. r.


A straight tree with scaly bark, 60 ft. or more tall. Leaves elliptic acuminate, many-nerved, 2 to 3 in. long, 1.5 in. wide; petioles 25 in. long. Male flowers in terminal and axillary clusters of 6 or 8, yellow 2 in. long. Sepals rounded gibbous. Stamens 20 in a short cylindric column; anthers square at the top. Female flowers larger 4 to 5 in. an umbel axillary and terminal. Sepals rounded orbicular. Stigma sessile round, pustular. Fruit globose orange not umbonate 5 in. through. Stigmas almost concealed in a depression. Hab. Common in woods. Singapore, Malacca, Selangor and Perak. Native name: Kandis. Fruit eatable.


(26) **G. Kunstleri** King, l.c. 165.

Shrub 6 to 15 ft. tall. Branches not angled. Leaves membranous oblanceolate acuminate; nerves faint, 3·5 to 5 in. long, 1·15 to 1·8 in. wide; petioles 3·5 to 6 in. long. Males 1·5 in. across, in fascicles of 3 to 6. Petals broad ovate. Stamens 15 in a convex mass; anthers 4-celled, connective broad. Females solitary. Petals o. Stigma convex, papilllose 10-lobed. Fruit pulpy orange yellow sub-globose 1·5 in. through. *Hab.* Limestone rocks, Perak, Kwala Dipang (Kunstler, Scortechini); Tapa (Wray).


Tree 20 to 40 ft. tall. Branchlets yellowish angled. Leaves thinly coriaceous, ovate-elliptic to ovate-lanceolate, base acute; nerves 5 to 6 pairs inarching 2 in. from the edge, conspicuous, 2·75 to 4·75 in. long, 1·5 in. wide, 2·5 in. long. Male flowers 2 in. across, sessile or shortly pedicelled, 3 to 6 on axillary tubercles, cream colour turning pink with age. Sepals orbicular thin. Petals broadly ovate. Stamens 10 to 20 on a 4-angled receptacle; anthers with peltate tops, cells round the edge; filaments shorter. Pistilode 0. Female flowers nearly 5 in. across, axillary solitary. Ovary globose. Stigma sessile, 4-lobed. Fruit globular, pericarp leathery, 6 to 7·5 in. through. Seeds 4. *Hab.* Perak, Thaiping Hills; Gunong Batu Putih. Penang, Telok Bahang, a shrub (Curtis). *Distrib.* Cochin-China.

var. minor Ridl. Leaves 3 in. long, 1·25 in. wide. Fruit smaller. Johor, Kota Tinggi. Malacca (Griffith).

(28) **G. uniflora** King, l.c. 167.

A small tree 8 to 16 ft. tall. Branches rather stout. Leaves ovate-oblong to elliptic-oblong thinly coriaceous, acuminate, base cuneate; nerves 12 to 20 pairs fine but prominent; 5·5 in. to 7·5 in. long, 2·5 to 4·25 in. wide; petioles 75 to 1 in. long, thick

**FL.M.P.I.**

(29) G. dumosa King, l.c. 167.
A bush or shrub 3 to 4 ft. tall. Branchlets angled, yellow. Leaves thinly coriaceous ovate-lanceolate to oblong-lanceolate caudate-acuminate, base acute, dark green, drying lighter colour; nerves 7 to 9 pairs, prominent, 4'5 to 5'5 in. long, 1'5 to 2 in. wide; petioles '25 in. long. Male flowers 2 in. across, in dense 6- to 10-flowered fascicles, axillary; pedicels 1 in. long. Sepals membranous orbicular, outer ones shorter and thicker. Petals smaller fleshy, yellow or yellowish green. Stamens on a receptacle, filaments short; anthers reniform. Pistillode o. Females in fewer flowered fascicles. Staminodes 10. Stigma convex with 8 radiating ridges. Fruit ovoid pointed. Hab. At altitudes of 100 to 200 ft. Perak, Batu Togoh and Thaiping (Wray).

(30) G. urophylla Scort. in King, l.c. 167.
A tree 30 ft. tall. Branchlets thinly coriaceous, ovate-lanceolate-caudate-acuminate, base cuneate; nerves 5 pairs, 2'25 to 3 in. long, '7 to 1'2 in. wide; petioles '15 in. long. Male flowers 2 in. wide, solitary or paired, from axillary tubercles; pedicels 1 in. long or less. Sepals sub-equal ovate orbicular. Petals orbicular. Stamens 6 to 12 with flat circular tops; anthers round the edge; filaments fleshy. Pistillode o. Females axillary solitary. Staminodes 6. Ovary cylindric. Stigma convex tabulate, 4-cleft. Fruit ovoid- orbicular '4 in. long, '35 in. wide. Hab. Perak (Scortechini); Gunong Inas at 3900 ft. altitude (Yapp). Distrib. Sumatra.

Doubtful Species

(31) G. opaca King, l.c. 160.

The flower resembles that of G. anomalala Planch, but the foliage is totally different. King's description of G. opaca appears to belong partly to this plant, but two out of three specimens so labelled by King are G. Hombroniana: Male flowers not known.

A medium-sized tree (40 to 80 ft. tall, *vide* King). Branchlets angled, 2 angles winged. Leaves pubescent beneath, deep green coriaceous, oblong-lanceolate or oblong-ovate, narrowed to the rounded or cordate base; nerves 15 to 20 pairs very prominent beneath, inarching with an intra-marginal nerve 1 in. from edge, 9 to 20 in. long, 3'5 to 7 in. wide; petioles 1'25 in. long. Female flowers 1'75 in. across, yellowish green, in axillary fascicles of 8 to 10; pedicels 1 to 1'25 in. long pubescent. Sepals 5 unequal, coriaceous pubescent. Petals 5 much larger, orbicular. Disc of 5 fleshy glands with 5 minute staminodes between them. Ovary ovoid 5-celled. Stigma 5-rayed. Fruit ovoid, yellow, blotched red, 2 in. long, 1'5 in. through, with an excentric mammilla and 5-lobed stigma. Seeds 2. **Hab.** Forests. Not rare, Singapore, Malacca, Selangor and Perak. **Distrib.** Sumatra.

(33) **G. dulcis** Kurz, For. Flora Burma, i. 92; Pierre, Fl. For. Cochinchine vi. 4; King, l.c. 169. Xanthochymus dulcis Roxb. Cor. Pl. t. 270; Wight. Ic. 270; Bot. Mag. t. 3088.

Medium tree 20 to 40 ft. tall. Branchlets 4-angled, yellow. Leaves deep green coriaceous ovate-oblong, shortly acuminate, base rounded; nerves 10 pairs, inarching near edge, not very prominent, 5 to 10 in. long, 1'75 to 4'5 in. wide; petioles 1'4 to 1'6 in. long stout. Flowers globular hardly expanding 2'5 in. across, greenish yellow, unisexual or male and bisexual mixed, in dense many-flowered fascicles in the leaf axils; pedicels 2'5 to 3'5 in. long. Sepals 4 to 5 orbicular, 3 outer smaller. Petals usually 5, larger. Stamens 40 in pedicelled fan-shaped groups. Disc in male corrugated, fleshy, in female 5-lobed. Stigma in males 0, in bisexuals, 5-rayed. Fruit 2'5 to 3 in. long globular, ovoid or pear-shaped, peduncled, pulpy yellow. Seeds 1 to 5 oblong. **Hab.** In orchards and village compounds cultivated. Singapore, Perak, etc. **Distrib.** Malay Islands. **Native name:** Mundu. **Use:** Fruit eaten, raw or cooked. It makes excellent jam.

(34) **G. glomerata** Vesque, DC. Monogr. 320. G. densiflora King, l.c. 171 (not of Vieillara).

Tree 60 to 80 ft. tall. Branches 4-angled. Leaves thickly coriaceous, broad elliptic to elliptic-oblong sub-acute or blunt, base cuneate, midrib stout; nerves 10 to 12 pairs inarching 1 in. from edge, 4'5 to 6 in. long, 2'5 to 3'75 in. wide; petioles 1'6 in. long channelled. Male flowers 1'35 in. across, in dense many-flowered clusters, 1 to 1'5 in. across; pedicels 1'2 to 1'35 in. long. Sepals 5, 3 outer larger orbicular puberulous, edges ciliate, inner 2 as large as petals. Petals 5 orbicular, fleshy yellow. Stamens in 5 fan-shaped branches of 12; filaments fleshy; anthers with 2 orbicular cells. Disc corrugated fleshy 5-lobed. Pistillode, style cylindric. Stigma oblong, small. Female flowers and fruit unknown. **Hab.** Rare in hill jungle. Perak at Goping (Kunstler).
(35) **G. Prainiana** King, l.c. 171.

A stout cylindric tree about 30 ft. tall. Branchlets not angled. Leaves deep green coriaceous, elliptic-oblong, narrowed to the rounded or cordate base; nerves 12 to 15 pairs inarching near edge, rather prominent, 4½ to 9 in. long, 1½ to 4 in. wide; petioles 2½ in. long, stout. Male flowers 4 in. across in dense 6- to 12-flowered terminal cymes. Bracts lanceolate keeled. Sepals 5 orbicular, fleshy. Petals 5 sub-orbicular pink. Stamens in a 5-lobed ring 2-celled. Pistillode globose. Fruit globose flat-topped fleshy yellow, 2 in. through. Stigma smooth concave, sessile. Seeds flat with sweet pulp. **Hab.** In Campongs and orchards. Perak, Kwala Dipang, Pahang, Temerloh and Pahang River. **Native names:** Cherapu; Chupu; Chekow; Menchepu. **Use:** Fruit eaten like mangosteens.

Female flowers not seen.


A tree. Branchlets yellow angled. Leaves coriaceous, elliptic, sub-acute shortly narrowed at the base; nerves very numerous horizontal, meeting in an intra-marginal nerve close to the edge, very fine, margin not thickened, 3½ to 5½ in. long, 1½ to 2½ in. wide; petioles very stout wrinkled ½ in. long. Male flowers unknown. Females solitary, axillary, from tubercles covered with short ovate bracts. Fruit obovoid-pear-shaped, yellow, 2½ to 3 in. through, on a 1½-in. long peduncle. Sepals small ovate. Stigma small 5-lobed, lobes rounded. Seeds 2 or 3 reniform brown, 1 in. long, ½ in. wide. **Hab.** Penang, Penara Bukit (Curtis 3094).

Near but distinct from **G. densiflora**.

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(1) **O. siamensis** T. Anders. *F.B.I.* i. 270.

Leaves oblong-lanceolate shortly blunt-acuminate; main nerves very inconspicuous, very finely and conspicuously reticulate all over, 7 in. long, 2 in. wide; petioles thick yellow 7½ in. long. Flowers 1 or 2 together 5 in. across, white fragrant. Berry fusiform about 1 in. long narrowed to both ends with persistent coriaceous sepals at base. **Hab.** Langkawi, Burau (Robinson). **Distrib.** Pegu and Siam.
3. CALOPHYLLUM, L.

Trees, rarely shrubs, with opposite shining coriaceous leaves with innumerable very slender parallel nerves at right angles to midrib. Flowers bisexual in axillary or terminal panicles white. Sepals and petals 4 to 12, or petals 0, imbricate in 2 or 3 series. Stamens indefinite; filaments filiform free or connate at base; anthers 2-celled, dehiscence vertical. Ovary 1-celled; style slender. Stigma small peltate; ovule 1 erect. Drupe with a thin fleshy pericarp. Seed ovoid or globose. About 35 species, chiefly tropical Asiatic, a few American.

The generic Malay name for these trees is Bintangor, from Bintang, a star, in allusion to the bright flowers. The timber of all is highly valued in shipbuilding.

**Series A. No petals.**

Flowers axillary solitary or in pairs rarely in very short panicles, very small.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves obovate</td>
<td>(1) C. parvifolium</td>
</tr>
<tr>
<td>Leaves lanceolate; flowers in pairs</td>
<td>(2) C. lanceola</td>
</tr>
<tr>
<td>Leaves lanceolate; flowers in panicles of 5</td>
<td>(3) C. rupicolum</td>
</tr>
<tr>
<td>Flowers in axillary fascicles</td>
<td>(4) C. Kunstleri</td>
</tr>
<tr>
<td>Flowers in axillary racemes, quite glabrous.</td>
<td></td>
</tr>
<tr>
<td>Leaves less than 5 in. long</td>
<td></td>
</tr>
<tr>
<td>Leaves ovate to ovate lanceolate; pedicels twice as long as flowers</td>
<td>(5) C. pulcherrimum</td>
</tr>
<tr>
<td>Leaves elliptic oblong; pedicels as long as flowers</td>
<td>(6) C. Prainianum</td>
</tr>
<tr>
<td>Leaves elliptic lanceolate; racemes densely crowded; pedicels not exceeding flowers</td>
<td>(7) C. floribundum</td>
</tr>
<tr>
<td>Buds, petioles, inflorescence pubescent.</td>
<td></td>
</tr>
<tr>
<td>Bush. Leaves ovate or elliptic 1 to 1.5 in. long</td>
<td></td>
</tr>
<tr>
<td>Trees. Leaves obovate obtuse</td>
<td>(8) C. pisiferum</td>
</tr>
<tr>
<td>Trees. Leaves elliptic</td>
<td>(9) C. retusum</td>
</tr>
<tr>
<td>Leaves narrow oblong 3 in. long</td>
<td>(10) C. oblongifolium</td>
</tr>
<tr>
<td>Leaves more than 5 in. long</td>
<td>(11) C. ferrugineum</td>
</tr>
<tr>
<td>Leaves narrow elliptic 6 to 12 in. long</td>
<td>(12) C. spectabile</td>
</tr>
<tr>
<td>Midrib only pubescent</td>
<td>(13) C. Curtisii</td>
</tr>
<tr>
<td>Whole leaf beneath tomentose</td>
<td>(14) C. molle</td>
</tr>
<tr>
<td>Flowers sub-panicled terminal</td>
<td>(15) C. canum</td>
</tr>
</tbody>
</table>

**Series B. Petals 4 or more.**

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leaves elliptic thinly coriaceous</td>
<td>(16) C. inophyllum</td>
</tr>
<tr>
<td>Leaves obovate retuse thickly coriaceous</td>
<td>(17) C. inophylloide</td>
</tr>
<tr>
<td>Leaves elliptic ovate small; petals 4 to 6</td>
<td>(18) C. venustum</td>
</tr>
<tr>
<td>Leaves elliptic; flowers and fruit small; petals 4</td>
<td>(19) C. foetidum</td>
</tr>
<tr>
<td>Leaves oblong sub-sessile</td>
<td>(20) C. subsessile</td>
</tr>
<tr>
<td>Leaves oblong petiolate</td>
<td></td>
</tr>
<tr>
<td>Inflorescence rufous tomentose</td>
<td>(21) C. Wallichianum</td>
</tr>
<tr>
<td>Inflorescence glabrous; flowers 35 in. across; fruit globose 1 in. through</td>
<td>(22) C. Griffithii</td>
</tr>
<tr>
<td>Flowers 1 in. across; fruit ellipsoid 5 in. long</td>
<td>(23) C. macrocarpum</td>
</tr>
<tr>
<td>Leaves sessile orbicular</td>
<td>(24) C. rotundifolium</td>
</tr>
</tbody>
</table>
(1) **C. parvifolium** Vesque, DC. Monogr. 604. C. microphyllum *T. Anders. in F.B.I. i. 272; King, l.c. 173 (not of Choisy).

A shrub with angled branchlets. Leaves obovate cuneate or obovate obtuse much narrowed at base, '75 to 1'5 in. long, '35 to '75 in. wide; petioles '1 to '2 in. long. Flowers solitary or in pairs axillary, very small. Sepals sub-orbicular. Petals 0. Fruit pea-shaped '25 in. long. *Hab.* Mountains, Johor, Gunong Pantai. Malacca, Mt. Ophir (Griffith, Maingay).

(2) **C. lanceola** Ridl.

A small tree. Leaves lanceolate narrowed nearly equally to both ends, tip acuminate obtuse, base acuminate to petiole, 2 in. long, '75 in. wide; petioles '25 in. long. Flowers axillary solitary or in pairs. Perianth unknown. Drupe small globose apiculate '25 in. long on slender peduncles '5 to '75 in. long. *Hab.* Kedah Peak, about 4000 ft. altitude (Ridley 5751).

(3) **C. rupicolum** Ridl. Trans. Linn. Soc. iii. 278.


(4) **C. Kunstleri** King, l.c. 174.

A tree 40 to 60 ft. tall, 12 to 18 in. through. Branchlets 4-angled, glabrous except the buds; (branchlets, petioles and base of inflorescence red pubescent. Leaves narrowly elliptic-oblong obtusely acuminate, base tapering; nerves very close, 3'5 to 5 in. long, 1'25 to 1'4 in. wide; petioles '3 to '4 in. long. Flowers in solitary axillary fascicles from the axils of older or fallen leaves, 1'5 in. long, 1- to 6-flowered. Bracts at base of pedicels 4 ovate pubescent. Flower '25 in. across; pedicels unequal in long or less. Sepals 4, outer obovate oblong, inner oblong obtuse. Petals 0. Drupe oblong-globose, glabrous '3 in. long. *Hab.* Pahang Kwantan. Perak, Ulu Kerling and Thaiping (Kunstler). Penang, Muka Head; Batu Feringhi (Curtis). Lankawi, Kwah (Curtis). Native name: Buitangor Ara.

(5) **C. pulcherrimum** Wall. Cat. 4848; Hook. fil. F.B.I. i. 271; Pierre, Fl. For. Cochinchine, pl. 104; King, l.c. 174.

Glabrous tree 20 to 80 ft. tall, 15 to 20 in. through. Branchlets 4-angled. Leaves lanceolate to elliptic-lanceolate bluntly acuminate, base long narrowed, 1'75 to 2'5 in. long, '8 to 1'2 in. wide; petioles '3 in. long. Racemes solitary 1 to 2 in. long from axils of older leaves spreading 5- or 6-flowered. Flowers '25 in. across; pedicels '5 in. long. Sepals broadly ovate, inner slightly the larger. Petals 0. *Hab.* Common in forests, Singapore (Wallich 4848); Changi. Malacca, Merlimau and Bukit Sabukor. Pahang, Rumpin

*C. mesuæfolium* Wallich, Cat. 4850, Singapore, is, I think, a scrap of a seedling of this plant.


A glabrous tree 40 to 60 ft. tall, 10 to 15 in. through. Leaves elliptic-oblong, shortly bluntly acuminate, base narrowed acute, 3 to 3.5 in. long, 1 to 1.5 in. wide; nerves fine conspicuous parallel close; petioles 5 in. long. Racemes solitary axillary lax 2 in. long; pedicels 2.4 to 5 in. long slender. Flowers about 7, '25 in. across. Sepals 4, outer ones orbicular, inner ones larger thinner orbicular-oblong. Fruit spherical 1 in. diameter. Hab. Forests, Singapore, Garden Jungle. Perak, Thaiping (Kunstler), Negri Sembilan, Pengkalan Kempas (Foxworthy).
(7) **C. floribundum** Hook. fil. F.B.I. i. 272; King, l.c. 175.

Tree glabrous. Branchlets glaucous angled. Leaves elliptic-lanceolate bluntly acuminate, base narrowed acuminate; nerves very numerous and close, 1-24 to 1-5 in. long, 5 to 6 in. wide; petioles 2-5 in. long. Racemes very numerous and short 1 in. long; pedicels 1 in. long or little longer. Flowers 25 in. across. Sepals outer broadly ovate, inner as long broadly obovate thinner. Stamens short. Fruit oblong globose 25 in. long, Hab. Singapore and Malacca (Maingay). Pahang, Betimbang Chini (Foxworthy). Native names: Bintangor Batu; Bintangor Che Relis.

Perhaps a form only of C. pulcherrimum.


A bush with dense branches. Branchlets angled with decurrent ribs from the petioles, red hairy. Leaves ovate or elliptic obtuse, 1 to 1-5 in. long, 75 in. wide, base blunt or rounded; nerves close conspicuous on both surfaces, petioles 2 in. long hairy. Racemes numerous 5 in. long; peduncles hairy. Outer sepals orbicular 1 in. long obtuse, inner ones longer thinner sub-spathulate blunt. Drupe globose, 25 in. long, creamy yellow. Hab. In swamps, Malacca (Griffith and Maingay). Distrib. Cochin-China.

Confused with the very distinct C. retusum of Wallich by all botanists except Planchon.

(9) **C. retusum** Wall. Cat. 4846.

Tree. Branchlets, buds and peduncles densely hairy. Leaves obovate obtuse or retuse, base cuneate, 2-25 in. long, 2-25 in. wide; nerves very fine above, almost invisible beneath; petioles 25 in. long. Racemes 6-flowered; peduncles hairy above glabrous 1 in. long; pedicels 25 in. long. Sepals orbicular coriaceous, 1 in. long, inner ones thinner. Petals 0. Hab. Rare. Singapore (Wallich, Cantley).

(10) **C. oblongifolium** Ridl. C. pulcherrimum var. oblongifolium T. Anders. in F.B.I. i. 271.

A tree 50 to 60 ft. tall, 15 to 20 in. through. Buds and peduncles and petioles ferruginous-hairy. Leaves elliptic-oblong blunt, long narrowed to base, 2 to 3 in. long, 75 to 1 in. wide; nerves very fine and close; petioles 5 in. long. Racemes axillary 1-5 to 2-5 in. long lax; peduncle hairy; pedicels 5 in. long. Flowers 5 in. across. Sepals oblong ovate, inner ones slightly larger. Petals 0. Fruit oblong, 1 in. long. Hab. Malacca (Maingay). Pahang, Sungai Mentiga, Chini (Foxworthy). Perak, Ulu Bubong (Kunstler); Ulu Slim (Kunstler).

Differs from C. pulcherrimum Wall. in its hairy buds, peduncles and petioles, and the form of the leaf, the much longer racemes and flowers, nearly twice as large, and the oblong pointed fruit.


A large tree about 80 or more ft. tall. Branchlets 4 angled.
Leaves elliptic oblong coriaceous, tip round retuse, glabrous except the midrib red tomentose beneath, 3 in. long, 1-5 in. wide; petioles 5 in. long. Racemes spreading axillary 2-5 to 3 in. long. Flowers 8, glabrous; peduncle 1 in. long red-tomentose; pedicels 5 in. long or less. Flowers 25 in. across. Sepals 4, outer ones ovate smaller, inner sub-orbicular. Petals 0. Drupe ovoid narrowed at top glabrous, 1 in. long. Hab. Forests, rare. Singapore, Garden Jungle (Ridley).


A very lofty tree, 30 to 100 ft. tall, glabrous except the buds and young parts, which are rufous-pubescent. Leaves oblong obtuse or sub-acute, base narrowed; nerves very numerous, 6 to 12 in. long, 1-5 to 3 in. wide; petioles 5 to 75 in. long. Inflorescence axillary umbelliform; racemes 2 in. long. Outer sepals orbicular-boat-shaped, inner ones thinner obovate. Petals 0. Drupe spherical 75 in. through. Hab. Common in forests. Singapore, Malacca. Penang (Wall. 4843), Pahang on Gunong Tahan; Kwantan (Foxworthy). Distrib. Malay islands and Cochinchina.

(13) C. Curtisii King, l.c. 176.

A small tree. Young branches, petioles and inflorescence rufous-pubescent. Leaves narrowly elliptic blunt or retuse, base narrowed; nerves very fine and close, midrib pubescent, 2 to 2-75 in. long, 1 to 1-4 in. wide; petioles 4 in. long. Racemes solitary or in pairs, axillary umbellate dense 3- to 5-flowered, 75 in. long. Bracts at base boat-shaped ferrugineous. Flowers 25 in. across; pedicels 2 in. long, lengthening in fruit to 5 in. long. Sepals 4, outer oblong sub-obovate rufous-tomentose, inner smaller oblong, sub-glabrous. Petals 0. Fruit ovoid. Hab. Rare. Penang Hill at 500 ft. altitude (Curtis).

(14) C. molle King, l.c. 177.

A tree 40 to 80 ft. tall. Young shoots, buds, under-surface of leaves and fruit softly tomentose. Leaves narrow oblong gradually narrowed above to the blunt tip, base rounded or slightly narrowed, above glabrous except midrib, beneath tomentose, 5 to 8 in. long, 1-25 to 2-25 in. wide; petioles 4 in. long. Racemes solitary axillary, 1 in. long, 1- or 2-flowered densely tomentose. Sepals 4 rounded-oblong tomentose. Petals 0. Fruit globular, 1 in. long. Hab. Not common, woods at 1500 to 2000 ft. altitude. Perak, Thaiping 300 to 800 ft. altitude (Kunstler); Tapa Road (Foxworthy). Penang, back of Western Hill and Moniot’s Road (Curtis). Distrib. Sumatra.

(15) C. canum Hook. fil. F.B.I. i. 271; King, l.c. 177.

Tree 40 to 80 ft. tall, glabrous except inflorescence. Leaves narrow elliptic oblong, bluntly short acuminate, base acute; midrib stout; nerves very fine, 5 to 7 in. long, 1-75 to 2-25 in. wide;


A glabrous tree 60 to 80 ft. tall. Main stem short and very stout. Leaves elliptic or obovate-oblong, tip rounded or emarginate, base acute, deep shining green, 4 to 6 in. long, 2'5 to 3'5 in. wide; petioles '75 in. long. Racemes very many in upper axils, 4- to 6-flowered. Flowers '75 in. wide; pedicels slender, 1 to 1'75 in. long. Sepals 4, inner pair petaloid. Petals 4 longer; filaments 4-delphous. Ovary stipitate. Fruit globular green 1 in. through. Hab. Seashores in sandy places common, also often planted. Singapore, Pahang. Malacca, Perak, Penang. Distrib. Seashores of Africa, S. India, Ceylon, Malaya, Australia and Polynesia. Native names: Bintangor Bunga; Penaga Laut; Pudik. Use: In shipbuilding for knees of boats.

(17) C. inophylloide King, l.c. 178.

A glabrous tree, except buds and young pedicels hairy, 60 to 80 ft. tall, 2 to 3 ft. through. Leaves thickly coriaceous obovate or obovate-oblong, tip retuse or emarginate, edges thickened, narrowed to cuneate base; midrib stout, 3'25 to 4'5 in. long, 1'75 to 2'75 in. wide; petioles '6 to 1 in. long. Racemes from upper axils, 2 to 3 in. long, few-flowered. Flowers '75 in. across. Sepals outer rounded, inner larger petaloid. Petals 4 narrower. Fruit ovoid '75 in. long. Hab. Forests. Singapore, Garden Jungle and Changi. Perak, Tapa (Burn-Murdoch). Batang Padang district (Kunstler).

(18) C. venustum King, l.c. 180.

A small tree rising to 30 ft. tall, glabrous. Leaves elliptic-ovate retuse, base cuneate; nerves rather distant, 1'75 to 3 in. long, 1 to 1'5 in. wide; petioles '3 to '4 in. long. Racemes solitary axillary 2'5 in. long, 3- to 5-flowered, spreading. Flowers '5 in. across, on pedicels '75 in. long. Sepals 4 orbicular. Petals 4 to 6 narrower, oblong blunt. Hab. Mountains. Pahang, Gunong Tahan (Robinson) at 5000 ft. altitude. Perak, Batang Padang district (Kunstler).


A straight tree about 80 ft. tall and 8 in. through. Leaves elliptic narrowed at base and shortly narrowed to blunt tip, 1'5 to 3'5 in. long, 1 to 1'25 in. wide; petioles '5 in. long. Flowers in lax axillary 8-flowered racemes 3 in. long. Flowers '25 in. across foetid; pedicels slender '5 in. long. Bracts very small ovate.


A glabrous tree 60 to 80 ft. tall, 2 to 3 ft. through. Branchlets 4-angled. Leaves elliptic-oblong, tip obtuse or emarginate, base cordate, 3-5 to 6 in. long, 1.75 to 2.5 in. wide; petioles very short and thick 1 in. long. Racemes solitary axillary few-flowered 3-25 in. long. Flowers 5 in. across on pedicels 25 to 5 in. long. Sepals rounded orbicular. Petals ovate blunt little longer. Fruit globose 1 in. through, minutely pubescent. Hab. Rare in low wet ground in dense jungle, Perak, Thaiiping (Kunstler).

(21) C. Wallichianum Planch. and Triana, l.c. 249; Hook. fil. F.B.I. i. 273; King, l.c. 179.


(22) C. Griffithii T. Anders. F.B.I. i. 273; King, l.c. 179.

A fine tall tree, glabrous. Branchlets quadrangular. Leaves oblong or elliptic-oblong acute or blunt, base cuneate, 4 to 6 in. long, 1.75 to 2 in. wide; petioles 4 to 6 in. long. Racemes solitary axillary 1.5 to 2.5 in. long. Flowers about 7, 0.35 in. across; pedicels 2 to 5 in. long. Sepals 4, outer ones orbicular, inner ones longer and narrower. Petals 4 oblong obtuse. Fruit globose 1 in. through. Hab. On river-banks in the south, not very common, Singapore, Sungai Morai. Johor, Bukit Tana Abang (Kelsall). Malacca, Ching (Griffith). Penang, Government Hill (Curtis).

(23) C. macrocarpum Hook. fil. F.B.I. i. 273; King, l.c. 179.

A tall straight tree with pendulous branches. Branchlets 4-angled. Leaves narrow oblong, or elliptic-lanceolate bluntly short-acuminate, base narrowed, 5 to 10 in. long, 2 to 3 in. wide; petioles 1 to 1.25 in. long. Racemes axillary solitary 2 in. long, 6- to 10-flowered. Flowers 1 in. across; pedicels 1 to 1.25 in. long. Sepals 4, outer ones puberulous outside, inner ones larger oblong petaloid. Petals smaller ob lanceolate clawed. Drupe ellipsoid 5 in. long, 3 in. through, dark green. Seed ellipsoid 2 in. long, 1.5 in. through. Hab. Overhanging streams and near the sea, not common, Singa-

Remarkable for its very large fruit.

Shrub. Leaves crowded rigidly coriaceous sessile broadly elliptic to orbicular, retuse, base cordate, 2 to 2.5 in. long and as wide. Flowers 1 or 2 terminal on peduncles 4 in. long. Sepals, outer ones coriaceous orbicular 2 in. long, inner ones ob lanceolate obtuse much smaller. Petals obovate clawed, rounded 4 in. long. Fruit unknown. *Hab.* Mountains at 5000 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson).

**Doubtful Species**

**C. marginatum** Wall. *Cat.* 4845.
Penang Hill (Porter). Portions of a seedling of some *Calophyllum* with curious bivalve bud-galls. Quite common in Singapore, Penang, etc., but what it eventually becomes I do not know.

Tree. Buds scurfy. Leaves stiff narrow linear-lanceolate blunt, base cuneate, midrib raised on both sides, edge thickened, 3.5 in. long, 5 in. wide; petioles 15 in. long. Fruit oblong globose 6 in. long; pedicels 6 in. long apparently solitary axillary. *Hab.* Malacca, Mt. Ophir (Ridley).

Perhaps near *C. spectabile*, but leaves very narrow. I could not get flowers.

**4. KAYEA**, Wall.

Trees or shrubs never large, hardly resinous except the fruit. Leaves opposite more or less coriaceous; nerves few distant. Flowers white or pink bisexual, large and solitary or smaller and collected in terminal panicles. Sepals and petals 4 each, imbricate. Stamens numerous free or connate at base; anthers 2-celled. Ovary 1-celled; style slender. Stigma 4-fid. Fruit sub-drupaceous dry. Seeds thick. Species 12 or more, tropical Asia.

- Flowers in panicles terminal . . . . . . . (1) *K. rosea*
- Flowers racemose, 1.5 in. across . . . . . . . (2) *K. Wrayi*
- Flowers 5 in. across.
  - Leaves broad strongly nerved . . . . . . . (3) *K. racemosa*
  - Leaves smaller, nerves inconspicuous . . . . . (4) *K. ferruginea*
- Flowers cymose terminal.
  - Leaves 9 to 18 in. by 3 to 4 in., nerves strong; flowers 1.25 in. across . . . . . . . . (5) *K. grandis*
  - Leaves 3 to 5 in. long, nerves strong; flowers 1.75 in. wide . . . . . . . . . . . . . . . . . . . . . . . . . . . (6) *K. nervosa*
Flowers 1 to 3 terminal and axillary, 1 in. across; fruit ovoid beaked; pedicel of flowers '75 in. long. 

Fruit conic beaked; flowers sub-sessile. 

Fruits fascicled terminal '1 in. across; pedicel '15 in. long. 

Flowers always solitary very small; leaves 2 to 3.5 in. long; leaves obovate acutate. 

Leaves lanceolate acuminate. 


(2) **K. Wrayi** King, l.c. 181. 
A small glabrous tree with thick often whorled branches. Leaves very thickly coriaceous broadly elliptic obtuse or shortly acuminate; nerves prominent beneath only 15 pairs, 3 to 4.5 in. long, '75 to 2.25 in. wide; petioles thick '4 in. long. Racemes axillary or terminal 2 to 3 in. long stout, 3- to 5-flowered. Flowers white 1 to '25 in. across; pedicels '5 to '25 in. long. Sepals orbicular nearly equal, inner pair thinner. Petals much larger broad obovate or orbicular clawed. Stamens much shorter. **Hab.** Mountain forests. Rare. Perak, Gunong Berumbun at 7000 ft. altitude (Wray). 

(3) **K. racemosa** Planch. and Triana, l.c. 269; King, l.c. 181; Hook. fil. F.B.I. i. 276. 
A glabrous tree 40 to 60 ft. tall. Leaves coriaceous elliptic-oblong with a short blunt point, base cuneate; nerves 18 to 25 pairs elevate beneath, 6 to 9 in. long, '15 to 2.5 in. wide; petioles '75 in. long. Racemes short '5 in. long few-flowered crowded into heads, terminal or axillary. Flowers '5 in. across. Sepals rounded. Petals thin longer. Stamens numerous short. **Hab.** Hill forests. Penang (Curtis, Maingay). Perak, no locality (Scortechini). 

A fairly large straggling tree. Leaves coriaceous stiff lanceolate caudate-acuminate, 3 to 9 in. long, 1 to 2 in. wide; nerves very fine 10 to 12 pairs, reticulations fine, visible beneath; petioles '25 to '5 in. long. Racemes 1 or more, axillary or extra-axillary. Flowers 2 or 3, '5 in. across; pedicels thick '5 in. long or less. Sepals orbicular. Petals broadly ovate slightly smaller. Stamens much longer. Fruit 1 in. through, enlarged sepals leathery, scurfy

A tree 40 to 80 ft. tall. Leaves coriaceous oblong to elliptical-oblung sub-acute narrowed at base; nerves 20 to 25 pairs prominent, 9 to 18 in. long, 3 to 4'5 in. wide; petioles '4 to '75 in. long. Flowers crowded in axillary cymes 6 or more together '1'25 in. across, white; pedicels stout '5 in. long. Sepals pale green round, inner ones thinner than outer ones. Petals elliptical-oblung longer. Fruit turbinate 2 to 2'5 in. through, completely enveloped by the thickened sepals. Hab. Not rare in forests. Pahang, Sungai Chenei (Fox). Malacca (Maingay); Nyalas; Selanor. Negri Sembilan, Gunong Berumbun (Cantley). Perak, Gunong Bubu, and Thaiping Hills at 500 to 1000 ft. altitude (Kunstler). Penang, Telok Bahang (Curtis). Distribution, Lumut; Telok Sera. Native names: Chindarahan Gajah; Bunuai. Use: For timber, wood heavy, sinks in water, dark coloured, squares from 5 to 8 in. (Cantley).

Tree 30 to 40 ft. tall and 10 to 15 ft. through. Branchlets hairy scabrid. Leaves elliptic or ovate-elliptic obtuse or shortly acuminate, base rounded, 3 to 5'5 in. long, 1'5 to 2'5 in. wide; nerves 12 pairs, elevate beneath, secondaries nearly as much so; petioles '1 in. long hairy. Flowers solitary terminal or several axillary, white, 1'5 in. across, on peduncles '1 in. long. Bracts at base lanceolate acuminate. Sepals unequal, outer ones orbicular, inner ones oblong obtuse twice as big. Petals thin oblong-ovate. Fruit sub-globular beaked leathery, '75 in. through. Hab. Rare in dense jungle in low wet ground. Perak, Thaiping (Kunstler). Distribution. Burma.

The Malacca (Maingay) specimens quoted by King as this species are, I think, *K. rivulorum*.

(7) *K. Kunstleri* King, l.c. 182; Ann. Bot. Gard Calc., v. (2), 143, pl. 173. A large shrub or small tree up to 50 ft. tall. Leaves thinly coriaceous in distant pairs elliptic-lanceolate acutely long-acuminate mucronulate, base long narrowed, 4 to 6 in. long, 1 to 2'25 in. wide; nerves 20 to 24 pairs prominent; petioles '25 to 4 in. long. Flowers solitary axillary or several together, also terminal, white 1'75 in. across; pedicels '75 in. long with several lanceolate subulate bracts at the base. Sepals unequal. Petals oblong acuminate '5 in. long. Fruit ovoid apiculate to conic-beaked 1'5 in.

King separates the shrubby plant of Penang Hill in part from his *K. Kunstleri*, but retains the specimens (1418 Curtis), obviously the same plant, under *Kunstleri*. Allowing for reasonable variation in specimens, I keep them all as one species.


A small straggling tree. Branches with long internodes. Leaves lanceolate with a long cusp, base hardly narrowed, 5 to 6 in. long, 115 to 2 in. wide; nerves 14 pairs elevate beneath; petioles 1 to 2 in. long. Above each pair of leaves are 4 ovate acuminate sessile stipular-like leaves, '25 in. long. Flowers solitary or 3 terminal sub-sessile. Bracts ovate acuminate. Sepals ovate '5 in. long. Petals longer linear-oblong narrowed. Stamens long. Fruit conic acuminate 115 in. long, '5 in. through. *Hab.* Over streams in forests, Malacca at Sungei Hudang. Selangor, Kanching (Ridley). **Native name:** K'luet.


Tree? Branches slender. Leaves coriaceous lanceolate acuminate blunt, base narrowed, edge thickened; nerves very faint, midrib prominent, 2 in. long, '5 in. wide; petioles '15 in. long. Flowers 5 or 6 fascicled on ends of branches, very small, about '1 in. across; pedicels slender '25 in. long. Sepals orbicular. Petals 4 oblong. *Hab.* Perak, Tapa (Burn-Murdoch).

The flowers are very young and may be bigger when open.

(10) **K. caudata** King, *l.c.* 183.

Slender tree 20 to 30 ft. tall. Leaves membranous obovate elliptic abruptly caudate, base narrowed; nerves 12 to 14 pairs, 3 to 315 in. long, 1 to 115 in. wide; petioles '15 in. long. Flowers solitary on very short pedicels. Sepals coriaceous ovate. Petals pale pink. Fruit ovoid-cylindric tapering to tip, 2 to 215 in. long, 1 to 1125 in. through. *Hab.* Perak, Gunong Batu Putih (Wray); Batang Padang (Kunstler); Tapa.

(11) **K. elegans** *King, l.c.* 183.


5. **MESUA, L.**

Trees. Leaves opposite stiffly coriaceous; nerves very numerous slender. Flowers bisexual showy, axillary or terminal solitary. Sepals and petals 4 each imbricate. Stamens very numerous;
filaments filiform; anthers oblong 2-celled. Ovary 2-celled; style long; ovules 2 in each cell erect. Stigma peltate. Fruit thinly woody 1-celled, at length 4-valved, 4-seeded. Species 2 or 3, tropical Asia.


Usually a tall straggling tree when wild, bush-shaped with short stem in cultivation. Leaves linear-lanceolate to oblong-lanceolate acute, base acute, deep smooth green above, white or glaucous beneath (when young pink); 3 to 6 in. long, 75 to 1'25 in. wide. Flowers 3 in. across. Sepals orbicular fleshy. Petals ovate long white. Stamens white; anthers yellow. Very fragrant. Fruit ovoid-conic or sub-globose 1 to 2 in. long. *Hab.* Dry woods not rare. Malacca. Negri Sembilan. Pahang. Selangor, Perak. Province Wellesley. Penang, Lankawi. *Distrib.* India, Cambod, Siam. *Native names:* Matopus; Penaga Lilin, Penaga Sabut; Penaga Putih; Penaga Suga; Penaga Kunyet. *Use:* The wood, though small, is extremely hard, and used for cart axles, tool-handles, etc. Flowers dried used in medicine.

(2) **M. lepidota** T. Anders. *in Hook. fil. F.B.I.* i. 288; *King, l.c.* 185.

A glabrous tree 60 to 80 ft. tall. Leaves coriaceous narrow elliptic or oblong-lanceolate acuminate, base acute; nerves indistinguishable, 2 to 3 in. long, 75 to 1'2 in. wide; petioles 15 in. long. Fruit solitary terminal pedicelled, ovoid or depressed globular apiculate 1 in. through with 4 lignified sepals at base; pericarp thick dehiscing vertically into 2 or 3 valves. Seeds 2 planoconvex or 1 globose. *Hab.* Malacca, Sungei Hudang; Merbinau and Batang Malacca (Derry). Pahang, Bentong (Foxworthy). Perak, Goping (Kunstler). *Native names:* Jambu Dulek; Kelat putih.

Flowers of this remarkable tree have never been met with. Young trees cultivated in the Singapore Botanic Gardens resembled *M. ferrea* in habit.

**Order XIX. TERNSTRÆMIACEÆ.**

Trees or shrubs (rarely climbers, *Actinidia*). Leaves alternate, entire or serrulate. Flowers white or pink, often showy, bisexual or unisexual, solitary on pedicels, rarely racemed or panicked. Sepals 5, often unequal. Petals 5, imbricate. Stamens numerous, adnate to corolla; anthers basi-fixed or versatile. Ovary superior, free (except *Anneslea* half-inferior) 2- to 3- (or many)-celled; styles as many as cells; ovules 2 to 8 in cell. Fruit capsular or baccate. About 300 species, tropics of Asia and America, rare in Africa, few in temperate zone. The Sauraujas are sometimes nowadays referred to *Dilleniaceae*; I retain them here as they have been so long classed as *Ternstræmiaceae*. 
Peduncles 1-flowered.
Fruit half inferior, drupaceous
Fruit superior; anthers basifixed; flowers bisexual.
Fruit drupaceous
Flowers large, long-pedicelled; fruit large
Flowers small, short-pedicelled; fruit very small.
Anthers versatile; peduncle 1-flowered.
Fruit large, indehiscent
Fruit dehiscent, globose; seed winged
Fruit dehiscent, oblong; seed winged
Fruit small, dehiscent; flowers small
Peduncles many-flowered.
Climber; flowers unisexual
Trees (or shrubs); flowers bisexual lateral cymose, baccate
Flowers in terminal crowded panicles; capsule dehiscing from base

1. ANNESLEA, Wall.

Glabrous trees or shrubs. Flowers in terminal corymbs, large, white. Sepals 5, lower part fleshy, connate and adherent to ovary. Petals 5 connate by bases. Stamens numerous, filaments short, inserted on a torus; anthers elongate 2-celled with a long apiculus. Ovary half immersed in torus, 3-celled; style cylindric trifid; ovules many. Fruit a berry crowned by sepals. Seed oblong flattened, testa hard. Species 2, Burma and Cambodia and Malay Peninsula.

(1) A. crassipes Hook. fil. in Choisy, Mem. Ternst. 41; Dyer, in Hook. fil. F.B.I. i. 280; King, l.c. 187.

A stout shrub or small tree. Leaves coriaceous obovate or oblanceolate with a blunt point or oblange-lanceolate acute, base narrowed; nerves 6 to 8 pairs very inconspicuous, margin often crenulate, midrib prominent, 2:5 to 6 in. long, 1:5 to 2:25 in. wide; petioles 6' to 1 in. long. Flowers 1 to 1:25 in. across in corymbs of 3 to 6; pedicels 5' to 1:25 in. long recurved thick. Free part of sepals yellow or red, 65 in. long. Petals smaller acute white. Stamens about 30. Fruit ovoid 1 to 1:5 in. long bearing the much enlarged sepals near the top. Hab. Mountains in open spots and woods at from 3000 to 7000 ft. altitude. Malacca, Mt. Ophir. Pahang, Gunong Tahan. Perak, Gunong Inas (Yapp); Gunong Batu Putih (Wray); Gunong Kerbau (Haniff); Gunong Bintang, Kedah boundary (Kloss). Distrib. Cochin-China. The var. obovata King, l.c. is not worth keeping up.

2. ADINANDRA, Jack.

Trees, of medium size. Leaves coriaceous. Peduncles solitary axillary recurved bibracteate at the apex. Flowers white. Sepals 5 orbicular coriaceous usually slightly unequal often silky outside. Petals 5 connate at the base. Stamens many often 1- 4-delphous, inner ones smaller; anther-cells narrow, connective prolonged to a point usually silky. Ovary 3- to 5-celled; style elongating entire

Fl.M.P., 1.
or shortly 3- to 5-fid; ovules many in each cell. Fruit globose green or brown, subtended by the calyx and crowned by the style. Seeds many, small. Species about 20, chiefly Malayan, a few Indian, and 1 African.

Whole plant glabrous except the stamens. Flowers hardly expand.

Nerves invisible
Nerves conspicuous 9 to 11 pairs
Glabrous except the buds silky; branchlets angled; leaves large
Leaves and buds glabrous; sepals silky.
Buds glabrous; nerves 6 to 8 pairs
Buds silky; nerves 15 to 20 pairs
Leaves pubescent beneath.

Petals glabrous ovate acute
Petals glabrous oblong blunt
Petals silky; branchlets pilose; nerves 7 to 9 pairs
Branchlets pilose; nerves 10 to 14 pairs

A small tree about 20 ft. tall and 6 in. through glabrous. Leaves coriaceous oblong-lanceolate to elliptic usually shortly blunt acuminate, base narrowed, edge entire or obscurely serrulate; nerves invisible, 2 to 4 in. long, 1-25 to 1-75 in. wide; petioles 1 to 2 in. long. Flowers pendulous on peduncles 4 to 75 in. long. Bracts 2 ovate close to calyx. Sepals rounded ovate blunt. Petals longer oblong-lanceolate connivent, white apiculate. Stamens 30; filaments united at base, pilose; anther-connective pilose. Fruit 4 to 5 in. through baccate green. Hab. In secondary jungle, in open country extremely common all over the peninsula. The flower is fertilised by the bee Xylocopa, and the fruit dispersed by bats. Distrib. Malay islands. Native names: Tiup-Tiup; Medang Petutu; Kayu Gula (Penang).

1 A. dumosa Jack, in Mal. Misc. ii. No. 7, p. 50; Dyer, in Hook. fil. F.B.I. i. 282; King, l.c. 188.


A fairly large glabrous tree 30 to 40 ft. tall. Leaves ovate narrowed at the base or obovate blunt, base sub-acute, margins entire or slightly glandular-serrate coriaceous; nerves fine 6 to 8 pairs rather faint, with reticulations somewhat conspicuous, inarching within the margin, black glandular dotted on the back, 1.5 to 2.75 in. long, 5 to 1.5 in. across; petioles 25 in. long. Flower 1 in. across; peduncles 5 in. long glabrous. Bracts small, ovate close to flower. Sepals orbicular minutely pustular coriaceous silky, eventually glabrescent, 5 in. long. Petals expanded much longer oblong glabrous except for a silky line running up to the tip. Anthers silky on back and tip. Pistil glabrous. *Hab.* Mountains at altitudes of 5000 to 6000 ft. Pahang, Gunong Tahan (Robinson) at 5500 ft. altitude. Perak, Thaiping Hills at the top near the cottage at 5000 ft. altitude (Ridley); Gunong Kerbau (Robinson). The flowers very large and wide-expanded for the genus.


Tree 20 to 80 ft. tall, 1.5 to 2 ft. through. Buds silky. Leaves thinly coriaceous elliptic-oblong, tip rounded or with short blunt point, base narrowed, glabrous drying greenish yellow; nerves 15 to 20 pairs doubly inarching fine but conspicuous, 5 to 7 in. long, 2 to 3.25 in. wide; petioles 2.5 in. long, stout winged to base. Flowers 1.4 in. across on peduncles 1 to 1.25 in. long. Sepals sub-equal round, inner ones a little wider, edges ciliolate. Petals larger round. Stamens 40 to 50 silky. Ovary smooth. Fruit globose 7.5 in. through, glabrous. Seeds few large reniform. *Hab.* Johor, Kota Tinggi. Selangor, Langat River. Pahang River; Bentong (Foxworthy). Perak, Thaiping Hills (Kunstler). *Distrib.* Sumatra, Java. *Native name:* Kelat Pamah.

(6) **A. maculosa** T. Anders. in *Hook. fil.* F.B.I. i. 282; King, l.c. 189.

Tree 40 to 60 ft. tall. Branchlets pubescent. Leaves coriaceous glabrous above, often puberulous beneath, elliptic to oval-oblong abruptly blunt acuminate entire, base acute; nerves 8 to 10 pairs indistinct, 3.5 to 5.5 in. long, 1.5 to 2.25 in. wide; petioles 2.5

(7) **A. Hullettii** King, l.c. 191.
A tree about 40 ft. tall. Branchlets tomentose. Leave coriaceous elliptic-oblong shortly acuminate, base acute, edges denticulate, glabrous above, tomentose beneath; midrib prominent; nerves 10 pairs, 3'5 to 5'5 in. long, 1'5 to 2'5 in. wide; petioles 25 in. long tomentose. Sepals outer ones larger round tomentose, inner ones smaller ovate, centre of backs tomentose only. Petals longer oblong blunt glabrous. Stamens 40 to 50; anthers pubescent. Berry silky globose small. Hab. Woods in the south of the peninsula. Singapore, Garden Jungle (Hullett); Selitar. Johor, Sedenah (Ridley).

(8) **A. villosa** Choisy, Mem. Ternstr. 24; Dyer, in Hook. Fil. F.B.I. i, 283; King, l.c. 190.
Tree 40 to 50 ft. tall. Branchlets pilose. Leaves coriaceous oblong-lanceolate or elliptic, shortly acuminate entire or faintly crenulate, base rounded, glabrous above except midrib sparsely or rather thickly pubescent, hairy beneath; nerves 7 to 9 pairs, inarching within the edge, 4 to 5'5 in. long, 1'5 to 1'75 in. wide; petioles 2 in. long pilose. Flowers 75 in. long; peduncle pilose 4 in. to nearly 1 in. long. Bracts ovate, in middle of peduncles. Sepals sub-equal round fleshy pilose outside. Petals ovate, silky outside, edges glabrous. Ovary silky, 5-celled. Fruit 5 in. through silky. Hab. Mountain woods 3000 to 4000 ft. altitude Selangor, Sempang mines. Perak, Thaiping Hills, and Gunong Batu Putih (Wray). Distrib. Tavoy.

A small tree. Leaves sub-coriaceous ovate or ovate-oblong shortly acuminate, base rounded or acute, edge minutely serrulate above glabrous, below sparsely pubescent, with many black glandular dots; nerves 10 to 14 pairs inarching within the margin, elevate on both sides, 3'5 to 5 in. long, 1'4 to 2'25 in. wide; petioles 2 to 25 in. long. Flowers 6 in. across on short 25 in. strigose or hairy peduncles. Bracts ovate acute close to calyx. Sepals broadly ovate acute, outer 2 larger thick, serrulate, silky outside. Petals smaller ovate acute connivent glabrous except for a silky patch on back. Stamens 30; filaments glabrous. Fruit appressed pubescent 7 in. through. Hab. Penang (Wallich). Perak, Waterloo (Curtis). Lankawi at Kwah. Distrib. Cambodia.
3. TERNSTRÆMIA, L.

Trees or shrubs. Leaves coriaceous entire or crenate serrate; peduncles solitary axillary in the axils of leaves, or of minute bracts, or fascicled. Flowers usually unisexual white or yellow. Sepals 5 umbricate. Petals 5 connate at the base. Stamens many adherent to corolla-base; anthers glabrous. Ovary 2- or 3-celled; ovules 2 in each cell; style simple or o. Stigma 2- or 3-lobed. Fruit baccate. Seeds few large. Tropical Asia and America, about 300 species.

Flowers about 1 in. across.
Leaves very thick; nerves almost or quite invisible.
Fruit 1'25 in. long; seeds 1 or 2 . . . . (1) T. bancana
Fruits 1'75 in. long; seeds 4 . . . . (2) T. penangiana
Leaves oblanceolate thinner; nerves visible;
fruit very large . . . . (3) T. Wallichiana
Flowers under 1 in. across.
Leaves 4'5 in. long ; peduncles 1'5 in. long . (4) T. Scortechinii
Leaves 3 in. long; flowers small; peduncles 1'5 in. long
Leaves 3 in. long, obovate —— 7
Leaves 3 in. long oblanceolate . . . . (6) T. montana


Tree 30 ft. or more tall. Bark pale. Leaves thickly coriaceous oblanceolate-obovate or elliptic obtuse, with a short abruptly blunt point, narrowed at base to petiole, entire; nerves invisible when alive, inconspicuous 5 to 7 pairs when dry, 4 to 6 in. long, 1'5 to 2'25 in. wide; petioles 6 to 1'75 in. long, thick. Flowers about 1'75 in. across, white scattered about below the upper leaves axillary and extra-axillary; peduncles 1'75 to 1 in. long. Sepals coriaceous rounded, outer ones larger than inner. Petals larger round clawed. Stamens pubescent. Ovary globose. Stigma bifid. Fruit sub-drupeaceous ovate-oblong 1'25 in. long, strawberry coloured. Seeds 1 or 2 oblong brilliant red, 1'75 in. long. Hab. Usually near the sea, occasionally in land. Singapore, Selitar; top of Bukit Timah Hill; Johor, Tana Merah. Dindings, Lumut; Bruas and Pangkor. Pahang, Rumpin River (Evans). Distrib. Banca. Native names : Kwak; Tengah Hutan; Medang Pergam.

The Singapore plant has short thick rounded leaves obovate. The Dindings ones are oblanceolate with more conspicuous nerves, like the Banca one.

(2) T. penangiana Choisy, Mem. Ternstr. 30; King, l.c. 193.

Tree. Leaves thick coriaceous obovate blunt, base narrowed; nerves 5 to 9 pairs inconspicuous, 4 to 6 in. long, 1'75 to 2'5 in. wide; petioles 1 in. long. Flowers unisexual solitary axillary; peduncles 1'5 in. long. Sepals round. Petals larger cream colour. Stamens numerous in males, none in females. Stigmas 2, 6-


Tree 50 to 60 ft. tall. Leaves thinly coriaceous obblanceolate sub-acute, base narrowed; nerves 5 to 7 pairs invisible in life, 3·5 to 7 in. long, 1·5 to 3 in. wide; petioles 6 to 75 in. long. Flowers unisexual 8 to 1·25 in. across, cream colour solitary axillary; pedicels 75 in. long. Sepals round. Petals larger with a broad claw, edges denticulate. Stamens very numerous (reduced to filaments in the female). Stigmas 2 large reniform. Berry oblong to globular 1 to 1·5 in. long with sepals at base thickened. Seeds 4 oblong. *Hab.* Near the sea, Singapore, Changi; Pulau Tekong. Pahang, river mouth; Kwantan (Foxworthy). Tringganu (Ridley). Penang Hill (Wallich 4456, Curtis), at 2500 ft. altitude. *Distrib.* Andamans and Nicobars, Cambodia, Siam. *Native name:* Medang Bunga Lawang.


Tree 20 to 30 ft. tall. Leaves coriaceous whorled obblanceolate, tip shortly bluntly acuminate, narrowed to base entire; nerves invisible, 3 to 5 in. long, 1·25 to 2 in. wide; petioles 4 to 5 in. long. Flowers unisexual waxily yellow, 6 to 7 in. across, axillary solitary or fascicled; peduncles 1 to 1·5 in. long. Sepals sub-equal round. Petals much larger orbicular to reniform clawed. Anthers sub-sessile. Female flowers with fewer stamens. Ovary imperfectly 2-celled. Stigmas 2, flat, each divided into 3 or 4 lobes with thick wrinkled edges. Fruit ovoid 75 in. long and 2 in. through black. Seeds 2 horseshoe-shaped. *Hab.* Not common in mountain forests. Perak, Thaiping Hills at 300 to 500 ft. altitude (Kunstler, Scortechini); Gunong Berumbun (Ridley), 6000 ft. altitude. Pahang, Kluang Terbang (Barnes).

(5) **T. Maclellandiana** Ridl. *Journ.* F.M.S. Mus. vi. 140.

Small tree 20 ft. tall. Leaves thickly coriaceous obovate obtuse; nerves 3 pairs hardly visible, 3·5 to 5 in. long, 1 to 2 in. wide; petioles stout 25 in. long. Flowers 1·5 in. across white; peduncles 1·5 in. long solitary axillary. Sepals short rounded. Petals twice as long, base oblong, above obovate-rounded denticulate. Stamens sub-sessile; anthers longer than filaments. *Hab.* Pahang, Gunong Tahan on the Padang at 5500 to 6000 ft. altitude (Robinson and Ridley).


Branches stout. Leaves thick coriaceous obblanceolate blunt long narrowed to the petiole; nerves above invisible, beneath often distinct, 3 or 4 pairs inarching some way from the edge,
2.5 to 3 in. long, 1 to 1.25 in. wide; petioles 0.25 to 0.5 in. long. Flowers in the upper axils of the leaves or below the leaves. Pedicels short and thick 0.20 in. long. Flowers over 0.5 in. across glabrous. Sepals sub-equal round coriaceous. Petals coriaceous round denticulate. Stamens glabrous; anthers linear-oblong, longer than the filament. Hab. Perak, Gunong Kerbau at 4500 ft. altitude (Robinson).

4. EURYA, Thunb.


Petals and sepals rounded.

Branches glabrous.

Branches velvety; leaves thick blunt; nerves depressed.

Petals ovate acute; leaves thin

Fruit pubescent; leaves thin elliptic cuspidate; pedicels long slender

(1) E. acuminata

(2) E. monticola

(3) E. Wrayi

(4) E. trichocarpa

(1) E. acuminata DC. Mem. Ternstr. 26; King, l.c. 195. E. angustifolia Wall. Cat. 1405.

A shrub or small tree about 15 ft. tall. Branchlets slender pubescent. Leaves thinly coriaceous oblong-lanceolate or oblanceolate acuminate, serrulate, base acute, glabrous above pubescent or not beneath, 2.5 in. to 3.5 long, 0.5 to 0.75 in. wide; petioles 0.1 in. long or none. Flowers 0.25 in. across in 2- to 6-flowered clusters; pedicels short pubescent. Sepals unequal, outer ones smaller, round pubescent. Petals white larger and thinner glabrous. Male flowers, stamens 12 glabrous. Pistillode conic or 0; styles none. Female flowers, sepals and petals narrower. Stamens 0. Ovary ovoid conic glabrous 3 or 2 cells. Styles 3 free or united. Fruit globular 1.15 in. across. Hab. Open country. Common and variable all over the peninsula except Singapore. Indo-Malaya.


Tree 20 to 30 ft. tall. Branches and young leaves silky-velvety hairy. Leaves entire, coriaceous blunt, base rounded, 0.75 to 2 in. long, 0.5 to 0.75 in. wide; nerves depressed above, nerves and midrib hairy beneath. Flowers glabrous. Styles connate for two-thirds of their length. Hab. Mountains 5000 to 6000 ft. altitude. Perak, Gunong Berumbun (Ridley). Gunong Kerbau (Haniff).

This species most resembles E. Ceylanica Wight, but the leaves are larger.

(3) E. Wrayi King, l.c. 196.

Small tree. Branchlets hairy. Leaves thinly coriaceous oblong-
lanceolate, base rounded broad, margins serrulate, beneath sparingly hairy, 2 to 2.75 in. long, '5 to '7 in. wide; petioles hardly any. Flowers narrow ovate pointed glabrous '2 in. long, hardly expanding solitary axillary or in 2- to 6-flowered umbels; peduncles '1 to '15 in. long. Sepals ovate acute unequal. Petals ovate acute. Stamens 15. Ovary ovoid glabrous. Hab. Perak. Tapa (Wray).


Branches slender, young parts appressed silky hairy. Leaves lanceolate acuminate at both ends, or elliptic caudate membranous bluntly serrulate, above glabrous, beneath with appressed hairs when young; midrib thickly appressed hairy, '1.5 to 3.5 in. long, '75 to '1 in. wide; petioles '1 in. long red hairy. Flowers small on pedicels '1 in. long, hairy, solitary or in pairs. Sepals rounded sparingly silky, outer ones a little smaller. Styles 3 to 5 connate at the base. Fruit globose '1 in. through densely appressed hairy. Hab. Rare in mountains. Selangor, Semangkok Pass (Ridley). Perak, Gunong Kerbau at 4200 ft. altitude (Robinson). Distrib. Amboina, Sumatra.

5. PYRENARIA, Bl.

Shrubs and trees. Leaves sub-membranous serrate. Flowers axillary sub-sessile. Sepals usually 5, unequal, graduating from bracts to the petals. Petals connate at the base white. Stamens very numerous adnate to base of petals. Ovary 5-celled; styles 5, free or partly united; ovules 2 in each cell. Fruit drupaceous, fleshy. Seeds oblong, large with thick woody testa, albumen none. Species about 7, Indo-Malaya.

Leaves hairy beneath
Leaves glabrous

(1) P. acuminata

Leaves hairy beneath . . . . . . . (1) P. acuminata
Leaves glabrous . . . . . . . . (2) P. Kunstleri

(1) P. acuminata Planch. in Choisy, Mem. Ternstr. 84; King, l.c. 200.

Small tree about 20 ft. tall. Branchlets tomentose. Leaves oblanceolate or lanceolate to elliptic acuminate serrulate, base slightly narrowed blunt, above glabrous except nerves beneath hairy; nerves 10 pairs, 5.5 to 7 in. long, '1.8 to 2.5 in. wide; petioles '3 to '4 in. long. Flowers solitary axillary; pedicels short thick '1 in. long. Bracts 2, ovate, silky-tomentose. Sepals ovate acuminate 5.5 to 7 in. long, '1.8 to 2.5 in. wide. Petals '5 in. long, white, oblong silky-tomentose outside. Stamens numerous; filaments 4 times the length of the anthers. Styles united below. Fruit globose, green 1.5 in. long, like a small hard apple slightly hairy outside, cell-walls woody. Seeds few, large reniform. Hab. In forests. Common. Whole peninsula to Province Wellesley. Singapore, Garden Jungle; Chan Chu Kang. Johor, Mt. Austin (Maingay). Pahang, Kwantan (Foxworthy). Selangor, Batu Tiga. Perak,
Batang Padang and Ulu Bubong (Kunstler). *Distrib. Medang Gelugur; Lidah Kerbau (Buffalo-Tongue); Samak Jantan; Lidah Lumbu; Perupoh.


Tree 15 to 40 ft. tall, completely glabrous except the flowers and very young leaf-buds. Leaves elliptic or oblanceolate acuminate serrulate, base entire acute; nerves 6 to 8 pairs, 5 to 2.5 in. wide; petioles 3 to 4 in. long. Flowers 75 in. across; peduncles 1 in. long. Sepals round pubescent outside. Petals round, glabrous white. Anthers ovate, 4 or 5 times as long as filaments. Ovary 5-celled, pubescent. Fruit 1.25 in. long, ovoid, resembling that of *P. acuminata*, globose yellow and covered with hairs. *Hab.* Forests to 4000 ft. altitude. Perak, Thaiping Hills (Kunstler); Pahang, Telom (Ridley).

*P. Wrayi* King, seems identical, but King says it has 6-merous flowers with 3 styles. It was collected at Relau Tujor in Perak by Wray.

**6. SCHIMA**, Reinwtd.

Trees. Flowers showy white, solitary axillary or the upper most shortly racemcd. Sepals 5, sub-equal, united below. Petals 5, much larger, connate at the base. Stamens many adnate to base of petal, shorter. Ovary 5- rarely 4- or 6-celled; ovules 2 to 6 in each cell. Styles united or partly free at the tip. Stigmas spreading. Capsule woody, depressed-globose, loculicidal with a persistent axis. Seeds flat, kidney-shaped. Species 4 or 5, tropical Asia.


Tree 40 to 50 ft. tall. Leaves sub-coriaceous elliptic or elliptic-lanceolate acuminate more or less crenate, base narrowed and rounded, glabrous; nerves 9 to 10 pairs, 4.5 in. long, 1.4 to 2.5 in. wide; petioles 75 to 1.25 in. long, flat. Flowers 1 to 1.5 across, axillary often crowded at the branch ends and forming false corymb; peduncles 1 to 1.5 in. long, pubescent or glabrous. Sepals rounded, glabrous or nearly so, edges ciliate. Petals obovate or crowded, pubescent at base, edges ciliate, white. Ovary hemispheric, silky. Fruit 1.2 to 5 in. across, silky when young, glabrous when old. *Hab.* Mountain woods from 2000 ft. altitude upwards. Common on all the ranges, but rarely in the low country. Selangor, Bukit Hitam (Kelsall). Perak, Gunong Inas (Wray); Thaiping Hills. Penang, upper part of the hill. Lankawi at Batu Asap and Kwah. Setul on Bukit Rajah Wang. *Distrib.* Burma, Cambodia, Malay islands.
var. *rigida* Ridl. Small tree 20 to 25 ft. tall. Leaves very stiffly coriaceous, 2"5 to 4"5 in. long, 1"75 to 2"5 in. wide, lanceolate acuminate, ovate or elliptic, base slightly narrowed, margins usually distinctly crenulate; petioles stout 15 in. long. Peduncles 2 in. long, stout, glabrous. Flowers and fruit rather larger, glabrous except the edges of the sepals, which are much smaller than in the typical form. Pahang, Gunong Tahan (Ridley), 5000 to 5500 ft. altitude. A mountain form with very much stiffer, larger leaves.

7. **GORDONIA**, Ellis.

Trees or shrubs. Leaves coriaceous, entire or slightly crenate. Flowers rather large, white, often sub-sessile, solitary in leaf-axils, bibracteolate. Sepals usually 5 unequal, graduating from bracts to sepals, coriaceous, silky, rounded. Petals united at the base or free, imbricate. Stamens indefinite, 5-adelphous or monadelphous, adnate to petals. Ovary 3- to 5-celled.; style 1 (rarely 3). Stigma round sometimes lobed. Ovules pendulous 4 to 8 in each cell. Capsule oblong-conic woody, loculicidal, column persistent. Seeds flat, winged. Species about 15, tropical Asia and N. America.

Trees or shrubs, quite glabrous except the flowers.

- Tall tree; petiole winged to base. (1) **G. singaporeana**
- Tree; petiole not winged to base; leaves rather thin. (2) **G. multinervis**
- Tree 100 ft. tall; petiole not winged; leaves stiff. (3) **G. concentricicatriz**
- Shrub; petiole not winged; bracts numerous. (4) **G. imbricata**
- Trees; branchlets and buds pubescent.
- Style 1.
  - Stamens very numerous. (5) **G. penangensis**
  - Leaves glabrous 2 to 5 in. long. (6) **G. Taipingensis**
  - Leaves glabrous 1½ in. long. (7) **G. Maingayi**
  - Midrib hairy, back of leaf all hairy. (8) **G. hirtella**
  - Styles 3; stamens 30. (9) **G. Scortechinii**

(1) **G. singaporeana** Wall. Cat. 1457. G. grandis King, l.c. 203.

A strict tree 60 to 100 ft. tall, quite glabrous except the flowers. Leaves coriaceous, serrate-crenate above, narrowed and decurrent to the base of the petiole; nerves 10 to 12 pairs inarching 15 in. from margin, 4½ to 6 in. long, 1½ to 3 in. wide. Flowers white, 2 in. across, solitary axillary on pedicels 3 in. long, puberulous. Bracts few, small, fugacious. Sepals round coriaceous, silky outside. Petals much larger. Stamens very numerous; anthers oblong; style 1. Ovary ovoid. Capsule woody, 1 to 1½ in. long, hairy, bluntly 4-angled. Seeds 6 in. long, wing 5 in. long. *Hab.* Forests especially in the south. Common. Singapore, common. Johor, Malacca, Perak, Thaiiping; Penang, rifle range (Curtis).

Wallich's specimens were obtained in the small islands round Singapore.
(2) G. multinervis King, l.c. 205.

A tree 40 to 50 ft. tall, glabrous except the flowers. Leaves thinly coriaceous obovate rounded at tip or mucronate, faintly crenate-serrate narrowed to the petiole; nerves 12 to 18 pairs inarching '2 in. from the edge, 5'5 to 8 in. long, 2'5 to 3'25 wide; petioles '2 to '25 in. long, stout. Flowers 1'25 in. across; peduncles '5 to '6 in. long. Bracts few small fagacious. Sepals round silky outside. Petals similar larger and thinner, spreading. Anthers short ovate one-fourth the length of the filaments. Ovary ovoid-conic silky, 5-celled; style 1. Stigma discoid 5-lobed. Hab. Woods and forests. Singapore, Bukit Timah (Ridley). Malacca, Brisu (Derry). Perak (Scortechini). Native name: Samak Pulut.

(3) G. concentricicatriz Burkhill, Journ. Roy. As. Soc. S. Br. 76, p. 153, figs. 10, 11; Cubitt, ibid. 78, p. 49, pl. 3.


A low shrub, with coriaceous oval-oblong or oblanceolate leaves, tip obtuse, quite entire or faintly serrulate, base narrowed roundish; nerves 12 pairs, thick but inconspicuous, 1'27 to 2'25 in. long, '9 to 1'1 in. wide; petioles '15 in. long. Flowers solitary axillary sub-sessile in the upper axils, buds elongate obovoid. Bracts numerous passing into the sepals, orbicular and pubescent outside with scarious edges. Petals larger orbicular minutely pubescent outside, with a brown coriaceous patch on the back at the tip. Stamens numerous; anthers ovate one-fourth of the length of the filaments. Ovary ovoid-conic pubescent 3-celled; style 1, 5-ridged. Fruit under 1 in. long, '4 in. through, 5-angled pubescent, subtended by the long imbricate cup formed by sepals and bracts. Seeds '75 in. long. Hab. Open places on mountains from 4000 ft. altitude upwards. Pahang, Gunong Tahan 5000 to 6000 ft. altitude; Kluang Terbang (Barnes). Perak (Scortechini); Gunong Kerbau at 4500 to 5500 ft. altitude (Robinson).


A tree 30 to 40 ft. tall, 10 to 15 in. through. Branchlets silky pubescent. Leaves thinly coriaceous glabrous lanceolate-elliptic acuminate, edges serrulate or entire, base acuminate; nerves very faint sometimes almost invisible 5 to 7 pairs inarching doubly within the edge, 2'5 to 4 in. long, 1 in. to 1'75 in. wide; petioles
'25 in. long rather thick at base. Flowers 1'25 in. across cream white or yellow; pedicels very short silky. Sepals round silky outside. Petals round narrowed at base, backs silky. Stamens very numerous; anthers oblong. Ovary conic, silky; style stout pubescent 5-lobed. Capsule 5- or 6-angled, 1'25 to 1'5 in. long, conic hairy or glabrous, valves acute. Hab. Open forest. Singapore, very rare, Selitar. Penang Hill, common.


A tree 30 to 40 ft. tall. Branchlets pubescent. Leaves coriaceous oblancoate obscurely serrulate in the upper part, base gradually attenuate, glabrous except pubescent midrib and edges beneath; nerves 6 pairs indistinct 2'5 to 3 in. long, 1 to 1'4 in. wide; petioles 25 in. long. Flowers sub-sessile 75 in. across. Bracts, sepals and petals all silky. Sepals and petals orbicular. Stamens numerous shorter. Ovary ovoid-conic silky 4- or 5-celled; styles 1. Stigmas 4 or 5. Capsule 4- or 5-angled woody, 1 to 1'25 in. long, 5 to 6 in. through, backs of valves flat. Seed 9 in. long. Hab. Hill forests. Malacca (Maingay). Perak (Scortechini, Wray), about 1000 ft. altitude.


A tree. Buds and shoots appressed silky. Leaves coriaceous elliptic-lanceolate acuminate, base narrowed sub-acute; margins crenulate near the tip; nerves very fine much reticulate and secondary nerves and reticulations almost as distinct as the primaries or quite invisible beneath; midrib prominent, above glabrous, beneath appressed hairy, 3'5 to 6 in. long, 1'5 to 2 in. wide; petioles 25 in. long. Flowers rather small cream colour; pedicels silky 1 in. long or less. Sepals orbicular silky tomentose 2 in. long. Petals obovate silky on the back. Stamens apparently few. Fruit 75 in. long appressed pubescent outside, valves sub-acute. Hab. Forests on mountains. Selangor, Bukit Kutu at 3000 ft. altitude. Perak, Gunong Batu Pahat, lower camp (Wray).

(9) **G. Scortechinii** King, l.c. 204.

Tree. Branchlets and buds puberulous. Leaves coriaceous narrowly elliptic blunt or sub-emarginate, slightly narrowed to base; nerves 8 pairs very inconspicuous, 2 to 3 in. long, 8 to 1'4 in. wide; petioles 25 in. long. Flowers solitary axillary 6 in. across; pedicels very short pubescent. Sepals unequal orbicular silky outside. Petals twice as large puberulous outside. Stamens
about 30; anthers ovate. Ovary ovoid pubescent, 3-celled; styles 3, pubescent. Hab. Perak (Scortechini).


Shrubs with small coriaceous leaves. Flowers in axils of bracts below the terminal leaves or in pseudo-spikes (the leaves being suppressed), small, bisexual. Petals and sepals 5 each. Stamens 5, basifixed dehiscing by terminal pores. Ovary 5-celled; cells 2-ovuled. Capsule loculicidally dehiscing. Seeds winged above. Species 2, 1 Chinese, 1 Malayan.


Glabrous or more or less tomentose shrubs often climbing. Leaves usually membranous entire or serrate. Flowers unisexual or bisexual in axillary cymes. Sepals 5, connate at base. Petals 5, somewhat contorted imbricate. Stamens many. Ovary many-celled. Styles as numerous, divergent and elongate after flowering. Fruit baccate. Species 25, China, Japan and Himalaya, 2 Malayan.


Scandent, 30 to 60 ft. tall. Leaves membranous, ovate acuminate to sub-rotund, minutely glandular-dentate, base rounded or cordate, above glabrous except nerves and midrib, beneath tomentose; nerves 5 pairs, 3 to 4 in. long, 2'5 to 3'5 in. wide; petioles 1'25 to 1'5 in. long. Cymes tomentose spreading; peduncles 1'5, lengthening to 3 in. long in fruit. Flowers unisexual, numerous, 3'5 in. across. Sepals ovate, blunt, tomentose. Petals larger, oblong-obovate. Stamens glabrous; anthers cordate. Ovary (in males 0 or rudimentary) pilose. Fruit ovoid, 3'75 in. long, 4 in. through, crowned by 15 to 20 styles. *Hab.* Hill woods, local, not common, climbing on trees. Muar at Biawak (Curtis). Perak, Thaiping Hills. Selangor, near Ulu Selangor. *Distrib.* Hong Kong, Sumatra.

10. **SAURAUJA**, Willd.

Trees or shrubs. Branches and leaves strigose or scaly when young. Leaves crowded towards the ends of branches, membranous or chartaceous, usually serrate. Inflorescence cymose, sub-paniculate from the axils of fallen leaves, sometimes from the trunk. Flowers usually bisexual, rather small, white or pink. Sepals imbricate. Petals 5, connate at base. Anthers many, dehiscing by pores or suturally. Ovary 3- to 5-celled; styles as many, free or connate. Fruit baccate. Species about 60, tropical Asia and America.
Flowers in small fascicles on the branches; stamens dehiscing suturally.
Styles 3; fruit slightly exceeding calyx; ovary glabrous (1) S. tristyla
Styles often 5.
Fruit covered by calyx; ovary pubescent . . . (2) S. nudiflora
Stamens dehiscing by pores; flowers panicked from branches and trunk, white . . . (3) S. grandis
Flowers in large fascicles on tubercles on the trunk and large branches.
Flowers white; sepals hairy . . . . . (4) S. cauliflora
Flowers pink; sepals glabrous . . . . . (5) S. rubens

(1) S. tristyla DC. Mem. Ternsir. 31, t. 7; King, l.c. 197.
Ternstroemia pentapetala Jack, Malay Misc. i. 5, 40.

(2) S. nudiflora DC. Mem. Soc. Geneve i. 422; King, l.c. 198.
A bush or tree up to 30 ft. tall. Branchlets scaly. Leaves oblanceolate, sharply shortly acuminate, minutely glandular-serrate, base acute, glabrous except midrib and 12 or 13 pairs of nerves; puberulous above, hairy beneath, 6 to 10 in. long, 2.25 to 3.75 in. wide; petioles '5 to 1.25 in. long. Flowers white solitary or 2 or 3 in a fascicle, on tubercles in axils of leaves or of fallen leaves; pedicels '5 to 1 in. long. Sepals round. Petals oblong-ovate emarginate. Stamens 25 to 30; anthers dehiscent suturally. Ovary pubescent; styles 3 to 5 united in lower half. Fruit covered by the accrescent calyx. Hab. Mountain forests; less common than S. tristyla, but not rare; Pahang, Tahan River. Selangor, Semangkok Pass. Perak, Thaiping Hills; Temengoli; Relau Tujor (Wray); Ulu Kal (Kunstler).

A large tree 60 ft. or more tall. Young parts hairy. Leaves elliptic sub-acute, base broad, above dark green, beneath white (young leaves red) undulate serrate, adults glabrous, young ones hairy; nerves 12 pairs elevate beneath, 9 to 12 in. long, 5 to 5.5 in. wide; petioles 1.5 in. long. Panicles usually pendent from branches, occasionally on trunk; peduncle 4 in. long, branches

(4) *S. cauliflora* Bl. Bijdr. 120; DC. Mem. Soc. Geneve i. 425; var. calycina King, l.c. 199.

A fair-sized tree. Young branches, petioles and leaves covered with long paleaceous hairs. Leaves elliptic-oblong, acutely acuminate, base slightly narrowed blunt, edges serrate-aristate, above glabrous, beneath hairy on nerves and midrib; nerves 12 to 14 pairs, 6 to 10 in. long, 2 to 4 in. wide; petioles very hairy, 1 to 2½ in. long. Flowers ¼ in. across white, on slender hairy pedicels, 1 in. long, from tubercles on stem and branches. Sepals round, outer ones hairy, inner ones larger glabrous, thinner. Petals obovate-oblong, much longer than the sepals, united below. Styles 3, united at base. Stamens 25, dehiscing by apical pores. Fruit enveloped in the hairy sepals ¼ in. long. Seeds ovate-rounded, compressed. *Hab.* Limestone woods. Rare. Selangor, Batu Caves. Perak, Batu Kurau (Scortechini). *Distrib.* Java.

The peninsular variety differs in the hairier branches, petiole and sepals, and rather smaller corolla.


A large shrub or small tree 20 ft. tall, glabrous. Leaves oblanceolate acute, narrowed to base, decurrent on petiole, edges entire, 9 in. long, 4 in. wide; petioles 1½ in. long. Flowers numerous in fascicles on the trunk; pedicels 2 in. long. Buds rose pink. Sepals ovate orbicular, deep rose ¼ in. long. Petals ovate orbicular, white. Stamens 20, free from petals; anthers opening by pores. Ovary glabrous; styles united half their length. *Hab.* Hill woods, local, Selangor, Semangkok Pass (Ridley).


Trees or shrubs. Leaves semi-amplexicaul. Flowers solitary in upper axils. Bracts large, leaf-like. Sepals and petals 5 each. Stamens numerous 5-adlphous; anthers versatile. Ovary 5-celled; styles distinct or wholly united; ovules many in many imbricating rows. Capsule acuminate, septicidal from base with persistent axis. Seeds linear sub-cylindric. *Species* 4, tropical Asia and America.


A slender tree about 20 ft. tall, occasionally on mountains, shrubby, glabrous. Leaves thinly coriaceous, sessile, oblanceolate
acute entire, base truncate; nerves 15 pairs, 3 to 4½ in. long, '5 to '75 in. wide. Flowers 1 to 1·25 in. wide; peduncles crowded at ends of branches. Sepals ovate rounded green, edged red. Petals white flushed and tipped on the back with pink, obovate. Stamens white; anthers fawn colour. Fruit '75 in. long, narrow ovoid acuminate. Hab. Open country usually in damp spots, common all over the peninsula at low elevations and at 3000 ft. altitude on Mt. Ophir (dwarf mountain form). Distrib. Borneo. Native names: Poko Riang Riang (Cicada tree); Kuat-Kuat. Use: Timber red; good for building, though small.

**ORDER XX. DIPTEROCARPACEAE.**

Resinous trees tall to vast, rarely small. Leaves alternate, coriaceous, simple entire. Flowers small or medium, white, yellow or pink, fragrant, in axillary and terminal panicles, often secund. Bracts usually small. Sepals free or connate in a short tube more or less free or adnate to the base of the ovary. Petals contort, free or connate at the base. Stamens numerous, 15, 10 or 5, free or adnate to petals, hypogynous; anther 2-celled, connectives often awned or prolonged. Ovary slightly immersed in a torus, 3-celled; ovules 2 in a cell; style subulate. Stigmas 1 to 3, minute. Fruit nut-like, 1-seeded, surrounded by the persistent sepals, 2 or more of which are prolonged into linear or oblong wings, the rest shorter occasionally (Pachynocarpus) not prolonged, the calyx forming an adnate cup. Species about 300, tropics of India, Siam, Cochin-China, Ceylon and Malaya, 1 in the Seychelles.

These trees are among the biggest in the forests, and produce the valuable timbers known as Serayah, Meranti, Merawan, Chengei or Penak, Damar Laut, Resak (see "Timbers of the Malay Peninsula," *Agric. Bull. Straits Settlements*, new series, vol. i. 52). They also produce the resin, Dammar, used in varnishes, and for torches (Shorea, Hopea, Balanocarpus), and wood oil, Minyak Keruwing (Diptocarpus), and camphor, Kapur Barus (Dryobalanops) (see "Dammara and Wood Oil," Ridl. *Journ. Roy. As. Soc. S. Br. xxxiv. 89"). The trees flower and fruit in some cases annually, in others sexennially, and many not till they have attained their full size in about 30 years or even much later. On account of their great height specimens are very difficult to procure. (King, *Journ. As. Soc. Beng.*, lxii. Part II, No. 2, p. 87.)

Sepals prolonged as wings; fruiting calyx with a distinct tube covering the fruit.

Tube quite free from the fruit.

Sepals developed into long wings, 4
Sepals developed into wings 2, the others very short
Tube adnate to fruit; wings 2

1. **Dryobalanops**
   2. **Diptocarpus**
   3. **Anisoptera**

Fl.M.P., 1.
Sepals united at base only. In fruit developed into erect wings longer than fruit.

Wings 3 long, 2 shorter.
Flowers large; petals broad, thin .......................... 4. Pentacme
Flowers small; petals narrow.
Fruit small, pericarp coriaceous; wings much longer
Fruit large, pericarp woody; wings hardly longer
All 5 wings equally long ................................... 5. Shorea
Wings 2 large, 3 small ........................................ 6. Pachychlamys

Sepals free to base.
Wings 2 long, 3 shorter ovate.
Leaves stiff coriaceous .......................... 7. Parasoreia
Leaves thin coriaceous .......................... 8. Hopea

Sepals in fruit all equal, often shorter than fruit.
Stamens 10 to 15; sepals in fruit oblong or ovate
Stamens 30 to 36; sepals orbicular ....................... 9. Cotyleleobium
Sepals not winged in fruit, reduced to a small cup.
Sepals in fruit coriaceous, separate ..................... 10. Synaptea
Sepals in fruit woody-corky, forming a more or less lobed cup, or short corky processes 11. Vatica

1. DRYOBALANOPS, Gaertn.

Very large trees containing camphor. Leaves coriaceous. Flowers in panicles or racemes terminal and in the upper axils. Calyx-tube short, free with oblong lobes. Petals lanceolate. Stamens 35 to 45; filaments short; anthers bifid at the tip, connective apiculate. Ovary 3-celled; cells 2-ovuled; style entire. Fruit conic elongate in a cup formed by the connate bases of the sepals; wings 5, elongate equal. Species 7, Malay Peninsula and islands.

Leaves short, ovate cuspitate, base round .......................... (1) D. aromatica
Leaves oblong lanceolate acuminate, base broad .......................... (2) D. Beccariana

(1) D. aromatica Gaertn. Fruct. iii. 49, t. 186. D. Camphora Colebr. Asiat. Research xii. 535; Davies, Agric. Bull. Straits ix. 297; Ridley, loc. 299. (Fig. 23, a, b, c, p. 213.)

Tree 150 ft. tall, buttressed, girth 35 ft. Leaves stiff coriaceous ovate abruptly acuminate, base round, 3 in. long, 225 in. wide, deep green polished; nerves very fine close parallel and numerous; petioles 5 in. long. Panicles terminal 2 in. long. Flowers white, fragrant. Sepals lanceolate acute, 25 in. long, scurfy on the back. Petals as long, thin, lanceolate, blunt. Fruit 1 in. long, the wings oblong, 3 in. long, 5 in. wide, finely ribbed, cup sub-globose, 5 in. long and wide. Hab. Forests, usually gregarious, the whole forest consisting of this tree only; lowlands on low hills. Johor, Endau River; Penyabong (Foxworthy). Pahang, Rumpin River; Kwantan. Selangor, Kanching. Negri Sembilan, Seremban (Kinsey). Perak, Kanding (Burkill). Distrib. Sumatra, Borneo. Native name: Kapur Barus. Use: This tree produces camphor oil and camphor, which is collected by the Malays for sale, chiefly to the Chinese.
This is the original source of camphor, the Formosa Laurel-camphor being a discovery of much later date. (For the story of the collection, Camphor language, etc., see Journ. Roy. As. Soc. S. Br. 26, p. 35, and Journ. F.M.S. Mus. ix. 53, 59.) Timber highly valued for building, deep red, heavy and close in texture. Bark used by Malays for walls of houses.

(2) D. Beccariana Dyer, Journ. Bot. 1874, p. 100, pl. 142, figs. 6, 7.

Big tree. Leaves oblong-lanceolate acuminate, base rounded; nerves very numerous, fine and closely parallel, 2 to 3 in. long, 5 to 1 in. wide. Young leaves caducously scurfy on the back; petioles 25 in. long. Panicles terminal and in upper axils, lax 4 in. long. Flowers white, fragrant. Sepals lanceolate, 2 in. long, sub-acute. Petals thin, oblong, twice as long. Stamens half as long. Fruit 5 in. long, cup very short, 1 in. long, wings linear-oblong, 2 in. long, 25 in. wide. Hab. Pahang, Endau River (Watson); Buntar, Rumpin (Foxworthy). Selangor, Rantau Panjang (Foxworthy). Perak, Bikum (Foxworthy). Distrib. Borneo (Sarawak). Native name: Keladan.

2. DIPTEROCARPUS, Gaertn.

Vast trees more or less stellate-pubescent. Leaves usually large, sometimes sinuate-crenate; lateral nerves connected by marginal loops. Stipules large, enclosing the terminal bud, caducous. Flowers, the largest in the order, white or pink, very fragrant. Calyx-tube free. Petals contort at base, pubescent on the back. Stamens numerous; anthers linear, equivalved, acuminate. Ovary 3-celled; ovules 2 in each. Fruit large, enclosed in calyx-tube but free; wings 2, long. Species 60, Indo-Malaya.

The timber is inferior. The resin takes the form of wood-oil and is obtained by cutting a large hole in the tree-trunk and burning it within. It is known as Minyak Keruwing.

Ripe fruit globose, not angled or winged.

Young branches, petioles and nerves stiffly hairy.

Fruit quite glabrous
Fruit stellate hairy
Young branches and leaves pubescent
Branches glabrous
Ripe fruit with 5 tubercles on top, globose
Ripe fruit oblong, 4-angled, glabrous
Ripe fruit oblong, 4-angled, grey-velvety
Ripe fruit prominently 4-winged.

Leaves glabrous; fruit very large winged to base (8) D. grandiflorus
Leaves glabrous; fruit large not winged to base (9) D. Kunstleri
Leaves hairy beneath; fruit unknown (10) D. rigidus
Leaves pubescent on nerves small; fruit small pubescent (11) D. costatus
Fig. 22.—Dipterocarpaceæ.

a. Hopea Curtisii.  
c, d. Anisoptera Curtisii.  
b. Isoptera borneensis.  
e. Pachychlamys Thiseltoni.  
f. Dipterocarpus grandiflorus.
Fig. 23.—Dipterocarpaceae.

a, b, c. Dryobalanops aromatica.  d, e. Vatica Ridleyana.
f. Balanocarpus Curtisii.
(1) **D. crinitus** Dyer, *in Hook. fil. F.B.I.* i. 296; King, *l.c.* 90.
A vast tree 90 to 100 ft. tall. Young branches, petioles, underside of leaves, midrib and nerves, pedicels and outside of bracts covered with stiff yellow hairs in fascicles. Leaves very coriaceous ovate or obovate acute, base round blunt, sparsely hairy; midrib thickly hairy above (glabrescent when old); nerves 12 to 18 pairs very prominent beneath, 5 to 6 in. long, 2·5 to 3 in. wide; petioles 1·5 to 2 in. long. Racemes about 6-flowered. Flowers pink, 2 in. long. Calyx glaucous glabrous. Petals puberulous linear blunt. Stamens 15. Fruit ovoid, glaucous glabrous, 75 in. long, wings linear-oblong blunt, 1-nerved, reticulate, 3·5 in. long, 5 in. wide. *Hab.* Forests, common. Johor, Bukit Jitan; Penyabong (Foxworthy); Pahang, Lipis (Phillips); Bentong (Foxworthy). Malacca, Sadanen. Selandor. Negri Sembilan. Selangor. *Distrib.* Bornoe, Sumatra. *Native names:* Gombang; Minyak Keruwing Bulu; Keruing Pekat; Keruing Bobi; Menkeluang (Pahang). *Use:* Timber for houses and bridges; bark for house walls.

(2) **D. Duperreanu** Dyer, *in Hook. fil. F.B.I.* i. 296; King, *l.c.* 91.
A big tree about 100 ft. tall. Branchlets and buds densely rough hairy. Leaves elliptic, shortly blunt acuminate; nerves 9 to 10 pairs, above glabrous, beneath softly tomentose with tufted hairs, edges undulate, base shortly narrowed or truncate, 8 to 9 in. long, 5 in. wide; petioles densely hairy, 1·5 in. long. Flowers 6 to 8 sessile in a spike. Calyx-tube oval-cylindric, shortly hairy. Petals linear-oblong pink, 1·8 in. long. Fruit globose 1 in. long, wings linear-oblong, 6 in. long, 1 in. wide; nerves 3, reticulations conspicuous, minutely pustulate with stellate hairs and on nut with bristly hairs. *Hab.* Forests. Pahang, Bukit Goh, Kwantan (Foxworthy). Selangor, Dusun Tua; Weld's Hill, Kwala Lumpur (Foxworthy). Perak (Scortechini). Lankawi, Gunong Raya (Haniff). *Distrib.* Cambodia.

(3) **D. Skinneri** King, *l.c.* 91.
A tree 50 to 70 ft. tall. Bark warty. Buds narrow, golden-silky. Branchlets pubescent. Leaves oblong-elliptic acute or acuminate, base rounded, margins undulate, above glabrous except the hairy midrib, beneath nerves 16 to 19 pairs prominent, hairy, 7 to 8 in. long, 3 to 3·5 in. wide; petioles 7 to 1 in. long, tomentose. Panicles short, 4 in. long, pubescent. Branches 2 or 3 with 3 to 4 flowers each. Calyx campanulate short lobes rounded small, 5 in. long, stellate tomentose, long lobes linear-oblong 5 in. long. Petals linear-oblong, blunt longitudinally half pubescent. Fruit globose, 75 in. through, glabrous; wings coriaceous, linear-oblong blunt, 3-nerved at base, 2 outer nerves running half-way; mid-nerve stouter, much-branched, 5 in. long, 5 in. wide, short lobes obovate-round, 5 in. long. *Hab.* Forests, Province Wellesley, Tasek

In the Province Wellesley specimen the 3 wing-nerves run to the end of the wing, which is 1 in. wide.

var. hirtus Ridl. Young branches covered with stellate hair tufts, and single longer red hairs. Leaves as in type, but nerves fewer, 12 pairs, midrib both sides and nerves beneath covered with appressed hairs; nervules hairy; petioles velvety. Fruit top hairy, small wings very small and folded back. Hab. Pahang (Foxworthy). Probably only a local variety.

(4) D. Kerrii King, l.c. 93.

A lofty tree, quite glabrous except the petals. Leaves ovate-elliptic acute or shortly blunt acuminate, edges undulate, base cuneate; nerves 8 to 11 pairs, elevate beneath, 3 to 4 in. long, 2 to 2'5 in. wide (young leaves 7 in. long, 4'5 in. wide); petioles '9 to 1 in. long. Panicles short, few-flowered. Calyx funnel-shaped '4 in. long, short lobes broad blunt ovate, long ones '3 in. long. Petals linear-oblong, pubescent outside, 1 in. long. Fruit globular-turbinate, lenticellate, 1 to 1'5 in. through; short wings oblong blunt, spreading '12 in. long, long wings linear-oblong, 3-nerved, with numerous short branches, 5 in. long, 1'25 in. wide. Hab. Dense forests. Singapore, Bukit Timah. Malacca, Alor Gajah (Griffith); Sungei Hudang (Derry). Negri Sembilan, Kopis (Foxworthy). Selangor, Kajang (Mitchell). Dindings, Gunong Tunggul (Curtis). Penang, Waterfall (Curtis). Native name: Keruwing Chaia.

This is hardly distinct from D. turbinatus, Gaertn. of India, Assam and Burma, but that has larger and rounder leaves, pubescent buds, and more acute calyx-lobes. Duvaliella problematica Heim, Bull. Mens. Par. 1892, p. 1009, was a name given to what appears to be a scrap of this plant with a long pointed gall, which Heim mistook for a fruit. It was collected in Penang by Curtis, and there is a similar specimen from Cantley.

(5) D. cornutus Dyer, l.c. i. 296; Journ. Bot. 1874, p. 103, t. 143, fig. 15; King, l.c. 93.

A tree 50 to 70 ft. or more tall. Branchlets rufous-tomentose. Leaves coriaceous, oblong blunt at both ends, edges undulate, above glabrous, beneath densely covered with minute whitish tomentum; nerves 16 to 19 pairs, prominent, transverse nervules conspicuous, 9 to 1.4 in. long, 5 to 8 in. wide; petioles 2 to 3 in. long, pale tomentose. Raceme or panicle 4 to 5 in. long, rachis flexuous. Calyx-tube 5-winged tomentose, '5 in. long, lobes linear obtuse longer. Petals oblong or sub-spathulate stellate-canescent. Fruit 1 in. long, turbinate with 5 blunt lobes at the top; wings linear-oblong, blunt, 3-nerved reticulate 7'5 in. long, 1'75 in. wide. Hab. Forests. Common. Singapore (Wallich); Bukit Timah; Changi. Pahang, Pulau Tawar; Bentong (Foxworthy); Negri Sembilan, Pasoh (Foxworthy); Kopis (Kinsey). Perak, Ulu
Selama (Wray); Kwala Kangsar (Foxworthy); Penang, Waterfall. **Distrib.** Sumatra. **Native name:** Minyah Keruwing Dadeh.

A tree 40 to 80 ft. tall. Branchlets and buds glabrous, or when quite young pulverulent. Leaves coriaceous, elliptic acute or elliptic-ovate, base long cuneate, edges undulate, backs glaucescent, glabrous or the nerves appressed hairy. 10 to 13 pairs, 2'5 to 3'25 in. long, 1'3 to 1'75 in. wide; petioles 5 in. long, rather slender. Panicles slender, glabrous, 2 to 3 in. long, 3- to 4-flowered. Flowers 1'25 in. long. Calyx-tube campanulate with 5 ridges, small lobes short round, long ones linear, 2 in. long. Petals oblong blunt, 65 in. long, backs mealy. Fruit ovoid to ellipsoid, 5-angled, glaucous, 1 in. long, outer wings linear-oblong, base narrowed, 2'5 to 3 in. long, 75 in. wide, the inner lobes very short, hardly distinct. **Hab.** Hill forests. Perak, Thaiping Hills, 500 to 1000 ft. altitude (Kunstler). Penang Hill, 500 to 600 ft. altitude (Curtis). **Distrib.** Borneo.

This has the smallest leaves of any of our species.


A large tree 40 to 80 ft. tall. Leaves sub-coriaceous, glabrous, long-elliptic acute or acuminate, base narrowed rounded; nerves 14 pairs slender, prominent beneath, conspicuous above, 6 to 8 in. long, 2 to 2'5 in. wide; petioles 1 in. long. Flowers in silky axillary panicles, 6 in. long, sub-sessile. Calyx-tube 5-angled, silky, 75 in. long, short lobes oblong silky, long ones lorate, over 5 in. long. Petals lorate blunt, pubescent outside, cream yellow tinted rose colour, 2 in. long, 5 in. wide. Fruit pink, glabrous when ripe, 1'25 in. long, obconic, 5-ridged; outer wings lorate lanceolate blunt, 4 in. long, 1 in. wide; nerves 3, branched, inner wings short lanceolate velvety 2 in. long. **Hab.** Overhanging streams in dense jungle chiefly on the east coast. Pahang, Tahan River, very abundant; Lipis (Foxworthy). Tringganu, Sai Telubin (Down). Perak (Scortechini). **Distrib.** Sumatra, Borneo. **Native name:** Neram or Nerrum.

The flowers of this beautiful tree are very fragrant. It is one of the smallest trees in the genus. The wood is red and fairly good.

(8) **D. grandiflorus** Blanco, *F. Filipp.* (Ed. 2), 314; **Dyer, Journ. Bot.** 1874, p. 106, t. 45, fig. 19; **King, l.c. 95.** *D. pterygo-calyx* Scheff. *Obs. Phyit.* ii. 35. (Fig. f, p. 212.)

A vast tree 100 to 150 ft. tall. Branchlets hoary at length glabrous. Leaves stiff coriaceous, ovate-elliptic, base broad, edges entire or undulate, crenate glabrous; nerves 14 to 16 pairs, strongly
elevate, 6 to 9 in. long, 3'5 to 5 in. wide; petioles 2 to 3 in. long. Racemes 4-flowered. Flowers 2 in. long. Calyx-tube '5 in. long, angled with 5 wings for the whole length. Petals linear-oblong, pink, backs mealy 1 in. long. Fruit oblong 2'5 in. long with 5 strong wings, '5 in. wide running the whole length; sepaline wings oblong blunt, coriaceous, 7 to 9 in. long, 1'5 to 2 in. wide; nerves 3 to 5, much-branched, small wings ovate orbicular, '5 in. long. Hab. Common in forests in the whole peninsula from Johor to Kedah (on Kedah peak) and Pulau Adang. Distrib. Lingga, Labuan, Bangka, Philippines. Native names: Minyak Keruwing Dadek; Minyak Keruwing Beku; Minyak Gombang Kechil. Use: Oil used in varnish (Ridl. Journ. Roy. As. Soc. S. Br. xxxiv. p. 93).


A tree 100 to 120 ft. tall, and 2 or 3 ft. through. Branchlets at first pubescent, later glabrous with pubescent rings above each axil. Leaves coriaceous elliptic shortly acuminate, base round or cuneate, edges undulate, glabrous; nerves 16 to 18 pairs prominent, 7 to 11 in. long, 4'5 to 7 in. wide; petioles 1'5 to 2 in. long. Panicles 6 to 8 in. long. Branches 2 from a peduncle 1 in. or more long. Flowers 4 to 6, glaucous, 2'5 to 3 in. long. Calyx-tube obconic with 5 ridges. Petals linear blunt. Fruit dark bluish green 2'5 in. long, 1 in. through with 5 low wings in the upper part about '25 in. wide. Sepaline wings 6 in. long, 1'5 in. wide, oblong, narrowed at base; nerves 3 branched and reticulate, short wings obovate '5 in. long. Hab. Dense jungle, Perak, Thaiping Hills at 300 ft. altitude (Kunstleri).


Branches stout, densely softly hairy. Leaves rigid coriaceous, ovate sub-acute, base shortly narrowed blunt, above glabrous, beneath velvety; nerves 10 to 11 pairs, sunk above, strong elevate as is midrib beneath hairy, 6 in. long, 4 in. wide; petioles 2 in. long, hairy stout. Panicles 4 in. long, glabrous above. Flowers large. Calyx-tube distinctly but narrowly winged, 1 in. long, lobes velvety outside, glabrous inside, short wing oblong blunt, '12 in. long, long wing blunt linear-oblong '75 in. long. Petals linear-oblong, grey velvety both sides 2 in. long. Hab. Johor, Penyabong (Foxworthy).

Nearest to D. Kunstleri, but much more hairy and with fewer nerves to the leaves.

(11) D. costatus Gaertn. Fruct. iii. 50, t. 187.

A tree 60 to 70 ft. tall. Young branches golden velvety. Leaves oblong-ovate acute, base very shortly narrowed, thinly hairy to glabrous except the nerves pubescent above, all pubescent beneath; nerves 12 pairs elevate, 5 in. long, 2'75 in. long; petioles
stout velvety, 75 in. long. Flowers 2 or 3, raceme and calyx-tube golden-pubescent. Calyx-tube 5 in. long, short lobes 1 in. sub-triangular, long lobes linear oblong, 5 in. long. Petals about 75 in. long, glaucous, puberulous outside. Fruit sub-globose, 5 in. long with 5 low wings pubescent. Sepaline wings oblong, narrowed, blunt at tip, glabrous; nerves and reticulations prominent 3-5 in. long, nearly 1 in. wide, short inner lobes ovate 25 in. long, rarely 2 in. long. Hab. Penang Hill (Burkill). Lankawi, Burau Bay (Ridley). Distrib. Tenasserim, Andamans, Siam.

I only found fruit of this, the rest of the description from Burmese specimens.

3. ANISOPTERA, Korth.

Vast trees with butttresses. Leaves usually coriaceous. Flowers in lax terminal and axillary panicles, medium or small, white or yellow. Calyx-tube short adnate to base of ovary. Petals contort at base longer. Stamens indefinite; anthers oblong-ovoid long-awned. Ovary 3 (rarely 4- to 5)-celled; ovules 2 in a cell; style oblong. Fruit adnate to calyx-tube; wings 2 long linear oblong, strongly 3-nerved and reticulate. Species 6, Malayan.

Petals acuminate lanceolate.
Leaves coriaceous, broad oblong, tomentose beneath (1) A. costata
Leaves coriaceous, elliptic, yellow scaly beneath (2) A. Curtisii

Petals oblong blunt.
Leaves coriaceous, yellowish beneath not scaly (3) A. marginata
Leaves sub-coriaceous, green, glabrous (4) A. lævis

Petals linear.
Leaves thin, glabrous (5) A. thurifera


A gigantic tree, 120 to 150 ft. tall with large butttresses. Leaves coriaceous, glabrous above with close yellow brown tomentum beneath, oblong blunt, base broad; nerves 25 pairs elevate beneath, 4 to 6 in. long, 3 in. wide; petioles 1.5 in. long, rough. Panicles axillary and terminal 6 in. long, covered with scurfy wool in tufts. Flowers 25 in. long, yellow. Sepals lanceolate acuminate, tomentose. Petals glabrous, lanceolate acuminate. Fruit globular 1 in. through, tomentose, light brown, outer wings 7 in. long, 1.5 in. wide, linear-oblong obtuse, 3 strong nerves, transverse bars elevate, 3 inner wings very narrow, 1 to 3 in. long, with 2 main nerves. Hab. Dense jungle, Singapore, Garden Jungle. Malacca, Batu Tiga. Negri Sembilan, Kwala Pilah (Burkill). Selangor, Banji, Kajang (Mitchell). Distrib. Borneo, Tenasserim. Native names: Mersawar Ular; Mersawa Merak; Sepah Petri.

(2) A. Curtisii King, l.c. 100. (Fig. 22 c, d, p. 212.)

Tree 80 to 100 ft. tall. Branchlets tomentose. Leaves oblong acute, base obtuse or broadly elliptic, above glabrous, beneath

(3) A. marginata Korth. Verh. Nat. Gesch. Bot. 66, t. 6, fig. 1A to 13A.

A big tree, glabrous except young parts and inflorescence covered with scales and soft pubescence. Leaves elliptic-oblong, yellow brown beneath, thin coriaceous, base rounded; nerves 10 to 14 pairs, elevate beneath, reticulations fine but conspicuous beneath, 2 to 4 in. long, 1.25 to 1.75 in. wide; petioles '2 to '5 in. long. Panicles terminal and in upper axils, 2 to 6 in. long, velvety pubescent. Sepals '12 in. long grey-velvety, lanceolate. Petals oblong rounded, glabrous white, '2 in. long. Stamens numerous; filaments very short; anthers short, oblong with a much longer hair-like process. Ovary pubescent. Hab. Pahang, Tanjong Api, Kwantan (Foxworthy). Distrib. Bangka, Borneo. Native name: Mersawa or Sanai.

(4) A. laevis Ridl. n. sp.

Big tree 100 ft. tall. Leaves glabrous coriaceous, oblong-lanceolate rather abruptly acuminate, base round; nerves fine 10 pairs, reticulations fine and conspicuous on both sides, 3 to 6 in. long, '5 in. wide; petioles '5 in. long. Flowers unknown. Fruit globose '5 in. long, outer wings linear blunt, 3.5 in. long, '25 in. wide; nerves 3, central one broadest, transverse bars and reticulations prominent, inner wings linear, '5 in. long. Hab. Forests. Singapore, Garden Jungle. Malacca, Selandor; Merlimau (Cantley); Machap (Derry). Pahang, Bukit Sungei Nilam, Bentong (Foxworthy). Native names: Mersawa; Lah; Meranti Jamang.

This was referred to A. glabra of Kurz by me in Journ. Roy. As. Soc. S. Br. 54, p. 25, but that, which is only known from fruiting specimens, has larger fruits than this plant.


Tree. Branchlets scurfy. Leaves thinly coriaceous, elliptic-oblong, shortly acuminate, base rounded, margin undulate; nerves fine ascending, 13 pairs, reticulations pustular, beneath scurfy when young, 3.5 to 5 in. long, 2 in. wide; petioles '5 to 1 in. long. Panicles 3 to 5 in. long, lax, scurfy-tomentose. Sepals lanceolate obtuse, densely tomentose, '1 in. long. Petals linear, glabrous.
Stamens 12 to 14. Fruit globose •6 in. long, smooth, outer wings linear spathulate dilated upwards gradually, 3-nerved reticulations prominent, 4 in. long, •5 in. wide near the top, inner wings •1 in. long linear. Hab. Rare in forests. Perak at Sungei Njing, Plus Reserve (Burn-Murdoch). Distrib. Philippines.

4. PENTACME, DC.

Trees with broad leaves obtuse or cordate at the base. Flowers large, panicled. Calyx-tube short, lobes imbricate. Petals broad, thin, rounded. Stamens 15; filaments short, broad; anthers much larger, the cells each bearing 2 appendages and the connective 1, so that each anther has 5 terminal points. Ovary glabrous; style filiform. Fruit ovoid acuminate, free from the sepals, which are connate only at the base; wings 3 long narrow thin, many-nerved, 2 shorter, all narrowed towards base and thin, expanding. Species 3, Burma, Siam, Malay Peninsula north, and Philippines.


A medium-sized tree. Leaves coriaceous, glabrous, elliptic to ovate, shortly acuminate, base broad round sub-cordate; nerves 16 pairs, 5 to 7 in. long, 2•75 to 4•5 in. wide; petioles •75 to 1 in. long. Panicles lax spreading, 6 in. long, axillary. Flowers cream colour, •75 in. wide. Sepals ovate acute, tomentose. Petals 3 times as long, partly puberulous outside. Stamens nearly as long, connective-awn shorter and thicker than the others deflexed. Fruit ovoid apiculate, 1 in. long, wings 4 in. long, •6 in. wide; nerves 9, 3 short, wings linear-oblong, 2 in. or less long, narrow. Hab. Limestone rocks usually near the sea. Kedah Peak, Semling (Bell and Haniff). Lankawi, Pulau Segai; Terutau (Curtis). Perlis, near Chupeng. Native name: Temah Batu.

5. SHOREA, Roxb.

Large, often vast trees 180 ft. tall with buttresses. Leaves entire, coriaceous, rarely large. Stipules large or small, persistent or fugacious. Flowers small or medium in lax panicles usually axillary. Flowers secund, more or less silky. Sepals imbricate 2 external, 3 within. Petals contort, white, yellow or red. Stamens 15, 20 or 30; anthers ovate or oblong, connective usually awned. Ovary 3-celled, often with a stalk (stylopodium), cells 2-ovuled; style subulate. Stigma minute, entire or 3-toothed. Fruit surrounded by the dilate bases of the petals sometimes adnate to it; wings 2 shorter and narrower, 3 long linear-oblong, thin with 8 to 10 nerves. Species about 60, India, Cochin-China, Malay islands.

The timber is of two classes: a soft red wood, Seraya or Meranti, and a dark hard, very valuable wood, Dammar Laut. The Dammar is opaque or
nearly so, yellowish white, yellow or brown. It is only used for torches, caulking boats, etc.

**Anthers without apical appendages.**

Leaves elliptic pustulate beneath 4½ by 2 in. .
Leaves elliptic with scattered stellate hairs beneath, at length glabrous 3 by 1½ in. .
Leaves oblong, 6 in. by 1½ in. pustulate beneath .
Leaves lanceolate, glabrous, glaucous beneath; stamens not ciliate .
Leaves ovate, glabrous, glaucous beneath; stamens ciliate at top .

**Anthers mostly unappendaged, a few minutely appendaged.**

Leaves oblong, pustulate beneath; flowers rough, silky .
Leaves broad elliptic, scurfy beneath; fruit small, wings 3, unequal; flowers unknown .

**Anthers with very short apical appendages.**

Leaves 2½ to 4 in. long; fruit wings 2½ in. long .
Leaves 4 in. long; fruit 3½ in. long; branch tips with large oblong bracts .
Leaves 4 to 6 in. long; fruit 4½ in. long; wings broad, no bracts .

**Anther-appendages much longer than anthers.**

Stamens 20 to 25 .
Flowers 2½ in. long or less; leaves 3 to 4 in. long, ovate-lanceolate.
Nerves 9 to 10 pairs faint; petals not saccate; style short .
Nerves 6 pairs; petals saccate at base; style long .
Flowers 2½ in. long, glabrous; leaves ovate often cordate, 5 to 8 in. long .
Flowers 4 in. long; leaves 5 in. long, strongly nerved with 9 to 11 pairs of nerves .
Flowers 5 in. long, crowded; leaves 4 in. long, stiff .
Flowers 5 in. long in lax panicles; leaves 4 in. long, thin .
Flowers 6½ in. long; panicles large with large bracts .

**Anther-appendages with 3 to many cilia.**

Stamens 30.
Flowers 2½ in. long; petals long, narrow; cilia, from all tips of anthers .
Flowers 1 in. wide; petals ovate blunt; appendages all ciliate .
Flowers 1 in. wide; petals blunt broad; anthers bearded at base and tip .

Stamens 20.
All appendages ciliate; leaves ovate cuspidate, stiff coriaceous; wings of fruit 1½ in. long, 4 in. wide oblong-lanceolate .
Leaves oblong; appendages 2- to 3-ciliate .

Stamens 15.
Outer row only ciliate-appendaged; leaves oblong, rather thin .

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(1) *S. leprosula*
(2) *S. scutulata*
(3) *S. rigida*
(4) *S. Curtisi*
(5) *S. glauca*
(6) *S. sericea*
(7) *S. palustris*
(8) *S. parvifolia*
(9) *S. acuminata*
(10) *S. macroptera*
(11) *S. gratissima*
(12) *S. Ridleyana*
(13) *S. Maxwelliana*
(14) *S. materialis*
(15) *S. pauciflora*
(16) *S. Kunstleri*
(17) *S. gibbosa*
(18) *S. bracteolata*
(19) *S. ciliata*
(20) *S. alba*
(21) *S. barbata*
(22) *S. utilis*
(23) *S. collina*
(24) *S. costata*
Flowers unknown.
Leaves glabrous 4'5 in. long, oblong base broad, round, stiff, coriaceous; fruit globose (25) S. crassifolia
Leaves thin, 2'5 in. to 4 in. long; fruit oblong, conic, silky ...........
Leaves 2 in. long, stellate hairy beneath .......... (26) S. lævis

(i) S. leprosula Mig. Fl. Ind. Bat. Supp. i. 487; Ridl. Straits Agric. Bulletin, viii. 364, pl. iii; King, l.c. 110. S. maranti Burck, Ann. Jard. Buitenz. vi. 217; King, l.c. 120.
A tree 150 to 180 ft. tall, 2 ft. through with buttresses. Branchlets minutely stellate-tomentose. Leaves coriaceous elliptic to oblong acute or sub-acute, base rounded, above glabrous, beneath tomentose with densely stellate hairs on the midrib and nerves; nerves 10 to 13 pairs prominent beneath, 3 to 6 in. long, 1'25 to 3'25 in. wide; petioles '35 to '75 in. long. Panicles axillary and terminal, 1'5 to 4 in. long, stellate tomentose. Flower-branchlets silky. Flowers in two rows, second sessile, cream yellow. Sepals ovate velvety. Petals '3 in. long, oblong-spathulate, silky outside. Stamens 15; filaments dilate longer than anthers, no awns. Fruit ovoid apiculate tomentose, 6 in. long; three outer wings narrow oblong sub-acute, narrowed to base, 7-nerved, reticulate yellow, 3 in. long, '7 in. broad, 2 inner ovate caudate. Hab. Common in forests, Singapore, Pahang, Malacca, Perak, Selangor, Negri Sembilan. Disrib. Sumatra and Borneo. Native names: Serayah Batu; Meranti tembaga; Meranti bunga. Use: Timber used for furniture, boxes and planking, rather soft and red, and not very durable but much used.

S. leprosula has a great variety of galls on it and the leaves have in the axils of the nerves beneath almost invariably linear-oblong elevations, which are the nests of mites (Domatia), Shorea maranti Burck, is based on young plants of this species. The most characteristic galls on this plant are a globose one covered with processes like a Castanopsis fruit, and a perfectly smooth cone-shaped brown one an inch long.

(2) S. scutulata King, l.c. 110.
A large tree. Branchlets stellate, pubescent. Leaves elliptic, rather abruptly acuminate, base broad rounded or truncate, glabrous above, stellate hairy beneath, 3 to 3'5 in. long, 1'5 to 1'75 in. wide; petioles '3 in. long stellate-pubescent. Panicles axillary and terminal, 4'5 to 5 in. long with very short branchlets '25 in. long, stellate pubescent. Bracts ovate hoary '1 in. long. Sepals broad lanceolate blunt tomentose. Petals oblong obtuse, half pubescent outside. Stamens 15, in 3 rows; filaments broad, inner ones longest, awns short, deciduous. Ovary glabrous with 5 pubescent ridges. Fruit ovoid apiculate tomentose, '6 in. long; outer wings linear obtuse, 2'5 in. long, '75 in. wide; nerves 7, transverse nervules distinct, inner wings '8 in. long, linear blunt. Hab. Penang, Government Hill at 1000 ft. altitude (Curtis).

The leaves have the same scaly domatia on the backs in the nerve axils as in S. leprosula.
(3) **S. rigida** Brandis, *Ic. Pl. t. 2402.*


(4) **S. Curtisii** King, *l.c. iii.*

Big tree 60 to 150 ft. tall, 2 to 3 ft. through. Leaves coriaceous silvery grey, oblong-lanceolate acuminate, base sub-acute or nearly rounded, adult leaves glabrous above, minutely pale tomentose beneath; nerves 10 to 14 pairs, ascending slender, 3 to 4 in. long, 1'2 to 1'4 in. wide; petioles '4 to '6 in. long. Panicles axillary and terminal, 2 to 3 in. long, glabrous. Flowers '3 in. long in secund rows of 4 or 5; buds enveloped in broad deciduous bracts. Sepals ovate tomentose. Petals twice as long, linear-oblong, pubescent outside. Stamens 15 in 3 rows; filaments long; anthers ovoid not awned. Ovary ovoid tomentose above. Fruit narrow ovoid, '75 in. long, tomentose; outer wings linear-oblong, 8-nerved. 2'25 in. long, '5 in. wide, inner ones 1 in. long, spathulate. *Hab.* Forests, Singapore, Bukit Timah at 500 ft. altitude. Negri Sembilan, Senaling (Burkill). Malacca, Sungei Hudang (Foxworthy). Penang, Government Hill (Curtis) 500 to 2000 ft. altitude. Perak (Kustler). Native names: Meranti tahi; Meranti Sutra.

(5) **S. glauca** King, *l.c. ii.*

Tree 80 to 100 ft. tall. Branchlets puberulous. Leaves rather stiff, coriaceous, ovate-lanceolate acuminate, base broad round, above glabrous smooth shining, beneath glaucous when young; nerves slender ascending 7 to 9 pairs, 3'5 to 4'5 in. long, 1'4 to 2 in. wide; petioles '45 to '6 in. long, wrinkled. Panicles lax, few-flowered, 3 in. long or more, hoary. Flowers pedicellate about '15 in. wide. Sepals oblong blunt, tomentose both sides. Petals short, broad. Stamens 15; anthers with no awn, ciliate at top; filaments much dilated at the hairy base. Ovary tomentose; stylopodium short. Fruit ovoid-globose, top rounded, '25 in. through, scurfy pale, outer wings oblong-sub-spathulate, 2'25 in. long, '6 in. wide, narrowed at the base; nerves 7 to 12, inner ones nearly as large. *Hab.* Forests. Dindings, Gunong Tunggul (Curtis).

(6) S. sericea Dyer, in Hook. fil. F.B.I. i. 306; King, l.c. 111. 
Tree 50 to 60 ft. tall. Branchlets tomentose. Leaves coriaceous oblong or elliptic-oblong, shortly acuminate or sub-acute, base rounded or sub-cuneate, above glabrous, midrib and nerves depressed, beneath stellate pubescent, and warty especially on midrib and 22 pairs of nerves, 3'5 to 6'5 in. long, 1'5 to 2'75 in. wide; petioles '6 to '8 in. long. Panicles axillary and terminal, 3 to 7 in. long; ultimate branchlets with 4 or 5 secund sessile bracteate flowers. Bracts broad ovate, silky outside. Sepals ovate, golden-silky outside. Petals similar, half silky. Stamens 40 in several rows; filaments longer than the ovate anthers, no awns. Ovary conic silky. Fruit ovoid, '5 in. long, outer wings linear obtuse narrowed to base, 3'5 in. long, '6 in. wide, 10-nerved, 2 inner ones 2'5 in. long. Hab. Singapore, Garden Jungle. Malacca (Maingay). Negri Sembilan, Perhentian Tinggi. Perak, Thaiping (Kunstler). Penang, Telok Bahang (Curtis). Distrib. Borneo. Use: Timber for planks and furniture.

(7) S. palustris Ridl. n. sp. 
Tree. Branches rather stout. Leaves broadly blunt elliptic, base round, thickly coriaceous, above glabrous; nerves sunk beneath, scurfy on the strongly raised midrib and 13 pairs of nerves, 6 in. long, 3'25 in. wide; petioles thick, scurfy, '5 in. long. Panicles axillary, scurfy-pubescent in fruit, 6 in. long. Flowers unknown. Fruit ovoid sub-cylindric acute, '25 in. long, '15 in. through, pale tomentose, much longer than the short calyx-cup which is velvety pubescent, outer three wings thin, oblong-linear, tips round, pubescent at the base, '25 in. long, '25 in. wide, one a little shorter than the other 2; nerves 6 to 8, nervules branched, inner wings linear-acuminate, pubescent hairy '25 in. long. Hab. Malacca, Merlimau (Foxworthy). Native name: Meranti Paya.

Allied to S. sericea, but leaves quite different in shape. Fruit smaller with the 3 large wings unequal.

(8) S. parvifolia Dyer, in Hook. fil. F.B.I. i. 305; King, l.c. 112. 
Tree 40 to 150 ft. tall, 24 in. to 4 ft. through. Branchlets at first densely hairy. Leaves coriaceous, ovate to ovate-lanceolate acuminate-caudate, base sub-cuneate, above glabrous, beneath scurfy on the midrib and nerves; nerves 12 pairs oblique, inconspicuous above, transverse nerves and reticulations very small distinct, 2'5 to 4 in. long, 1 to 1'8 in. wide; petioles '35 to 45 in. long, scurfy. Panicles axillary and terminal, 2 to 4 in. long, many-flowered, scurfy-tomentose. Flowers '25 in. wide white or pink, secund sub-sessile. Sepals ovate acute tomentose. Petals twice as long, elliptic, half silky. Stamens 15; filaments 4 times as long as anthers; awns as long as anthers, deflexed. Ovary puberulous.
Fruit ovoid-globose apiculate; outer wings linear-oblong, tip rounded, base narrowed, thickened base shorter than the nut, 1.5 in. long, 5 to 2.5 wide, inner ones half as long, narrower. Hab. Common in forests. Singapore, Johor, Malacca, Pahang, Selangor and Negri Sembilan. Native names: Meranti Kerap; Meranti Sarang Punai; Meranti Daun Kechil; Meranti Samah; Meranti bunga.

(9) *S. acuminata* Dyer, *l.c.* i. 305; King, *l.c.* 113.
A tree 100 to 150 ft. tall. Branchlets scurfy. Stipules oblong blunt, 5 to 7.5 in. long, 5-nerved, red, long persistent on the branch tips. Leaves ovate to lanceolate acuminate, base usually rounded unequal, drying dark brown; nerves 7 to 9 pairs, prominent beneath, midrib and nerves scurfy, scaly when young, 3 to 4.5 in. long, 1.75 to 2.5 in. wide; petioles 3 to 4 in. long, scurfy. Panicles axillary and terminal 2 to 3 in. long, stellate pubescent, many-flowered. Flowers 3 in. long secund. Sepals ovate, grey tomentose. Petals twice as long, broad ovate pubescent outside. Stamens 15 in 3 rows; filaments longer than anthers; awns minute. Fruit cylindric-conic apiculate, puberulous 2.5 in. long. Sepal bases shorter; outer wings narrow, oblong blunt, narrowed to base, 10- to 12-nerved, 2 in. long, 2.5 in. wide, 2 inner ones narrow linear, 7.5 in. long. Hab. Woods, Malacca, Ayer Panas (Griffith); Bukit Sadanen (Goodenough); Merlimau (Derry). Negri Sembilan (Burn-Murdoch); Pasoh and Pasir Panjang (Burkill). Distrib. Lingga, Borneo. Native names: Rambeh Daun; Meranti Hijau.

(10) *S. macroptera* Dyer, *l.c.* i. 308; King, *l.c.* 113.
Tree 50 to 80 ft. tall. Stem straight smooth, grey. Leaves
coriaceous, narrow-oblong acuminate, base rounded, glabrous; nerves 15 to 20 pairs, ascending transverse; nervules conspicuous beneath, 4 to 6, 1.35 to 1.75 in. wide; petioles 4 to 5 in. long. Panicles axillary and terminal 4 to 7 in. long, scurfy puberulous. Flowers 25 in. long, sessile often secund. Sepals ovate acute, free nearly to base, tomentose yellowish green. Petals narrow oblong, very spirally twisted, crimson outside and half very silky, yellow or pink and glabrous within. Stamens white, 15 in 2 rows; filaments broad at base; awns long, slender. Ovary elongate-ovoid, yellowish green, hairy on stylodium. Fruit 6 to 7.5 in. long, ovoid; outer wings very large oblong blunt, base auricled, 3.5 to 4 in. long, 1 to 1.25 in. wide, red; nerves 9, transverse nervules conspicuous; inner wings short. Hab. The commonest species ranging from Singapore to Pahang, Penang and Perak up to 1200 ft. altitude (Penang). Burkill's var. pallida has white flowers and fruit-wings not so wide at the base. Distrib. Borneo. Native names: Kepong; Kepong Antu. Use: Bark used for walls of houses and rice-bins.

The plant, especially when young, has often cone-shaped galls with white scurfy scales and globose beaked shining galls over an inch long.

(11) S. gratissima Dyer, l.c. i. 307; King, l.c. 115.
A tree about 80 ft. tall. Branchlets glabrescent. Leaves coriaceous glabrous elliptic acuminate, base rounded or shortly cuneate, margins undulate; nerves faint 12 to 14 pairs, 2.5 to 3 in. long, 1.25 to 1.5 in. wide; petioles 6 to 7.5 in. long. Panicles axillary and terminal, 3 to 6 in. long, pubescent. Flowers 25 in. long. Sepals, petals and stamens all cream colour. Sepals pubescent lanceolate. Petals base and edge stellate pubescent. Stamens 15 to 25; awns twice as long as anthers. Ovary pubescent to half-way up the style. Fruit globose, 2.5 in. long, quite covered with the saccate base of sepals; outer wings membranous linear-rounded; nerves 10 to 12, 2 in. long, 2.5 in. wide, inner wings oblong-linear over 1 in. long. Hab. Forests, Singapore, not rare. Flowers in November; Garden Jungle; Kranji, etc. Distrib. Tenasserim.

A tree 60 to 80 ft. tall, glabrous except the inflorescence. Leaves small ovate-lanceolate acuminate, base round, shortly narrowed at tip; nerves 9 to 10 pairs, slender, inconspicuous; nervules few, some parallel, others broken up, no distinct reticulations, thinly sub-coriaceous, 2.5 to 4 in. long, 1.1 to 2 in. wide; petioles 4 to 5 in. long, wrinkled. Panicles 15 to 2 in. long, axillary with few branches, stellate-pubescent. Flowers few, 2 in. wide, pedicelled. Sepals oblong blunt, tomentose. Petals oblong blunt, half puberulous. Stamens 15; filaments dilate below; anthers
short ovate; awns longer. Ovary ovoid-conic, glabrous below, tomentose above. Fruit ovoid apiculate tomentose, outer wings linear-oblong, sub-spathulate, widest at tip narrowing gradually downwards, membranous, 5-nerved, 2.25 in. long, .4 in. wide, inner ones 1.5 in. long narrower. Hab. Forests, Pahang Lipis and Bentong (Foxworthy). Perak, Thaiping Hills 500 to 800 ft. altitude (Kunstler).

I have never seen good specimens of this tree.

(13) S. Maxwelliana King, l.c. 114.

Tree 60 to 80 ft. tall. Stem 10 to 15 in. through, almost glabrous. Leaves small, coriaceous ovate-lanceolate acuminate, often bluntly caudate, shining above, base slightly unequal and very shortly cuneate; nerves 6 to 7 pairs inconspicuous above slender, raised beneath; nervules very numerous, rather irregularly parallel, invisible (upper surface minutely reticulate, dotted), smooth beneath, 3 to 4 in. long, 1.3 to 1.5 in. wide; petioles .4 in. long. Panicles axillary, slender, 4 in. long with branches .25 in. long, stellate-puberulous. Flowers pedicelled. Sepals unequal oblong blunt, pubescent. Petals oblong, bases concave tomentose outside. Stamens 10?; filaments short, broad; anthers elongate; awns as long. Fruit globular tomentose, free from wing bases, outer wings oblong blunt, narrowed downwards, pubescent at least when young, 7-nerved, 1.5 in. long, .4 in. wide, inner ones similar, but only .5 in. long with 5 nerves. Hab. Rare. Open jungle. Perak, Thaiping Hills, 500 to 800 ft. altitude (Kunstler). Penang, Ayer Hitam (Haniff).

This differs from S. Ridleyana in the thicker leaves with different venation and the long slender stellate tomentose panicles.

Allied to this is a plant represented by a specimen collected by Goodenough at Ayer Panas in Malacca, No. 1296, and called Chingal. The small ovate-elliptic caudate blunt leaves are more stiffly coriaceous with fine inconspicuous nerves about 4 pairs, faint, very lax, reticulations short, panicles pubescent; young fruit entirely sparingly tomentose, the smaller wings more than half as large as the longer ones. It is probably a distinct species, but the specimen is insufficient for identification.


A big tree. Leaves ovate or oblong-ovate, shortly acute acuminate, base broad round, occasionally cordate, glabrous stiffly coriaceous, above smooth pale, beneath silvery-scarce; nerves obscure above, elevate beneath, decurrent on the ribbed midrib 10 to 12 pairs, 5 in. long, 3 in. wide (young leaves 9 in. long, 5 in. wide); petioles scaly scurfy or glabrescent, 1 in. long. Panicles axillary and terminal, 3 to 6 in. long with 6 to 10 branches, .5 in. long, bearing 8 to 10 nearly sessile secund flowers; whole panicle white-mealy. Bracts ovate very small caducous. Sepals ovate, round, .05 in. long, white silky. Petals linear .5 in. long, narrow, base ciliate, glabrous inside, silky velvety outside, slightly imbricate,
not contort. Stamens 20, in 3 rows; filaments linear-oblong narrowed above; anthers ellipsoid, hair-like awns with several bristles. Ovary conic; stylodium distinct, all velvety hairy. Fruit ovoid-conic silky, '5 in. long; outer wings linear-oblong, red pubescent, 2 in. long, '25 to '5 in. wide, base narrowed, dilated upwards; nerves 7, nervules transverse conspicuous, inner wings 1 in. long, '25 in. wide. Hab. Forests. Johor, Penyabong (Foxworthy). Pahang, Kwala Rumpin; Baloh, Rumpin (Foxworthy). 

Native name : Balau betul.

The original plant, called Balau by the Malays, was Parinarium oblongifolium, then abundant on the Rumpin River, as this got scarce from timber-cutting the name was transferred to the Shorea. The timber is highly valued, but inferior to the original Balau.

(15) S. pauciflora King, l.c. 116; Brandis, Journ. Linn. Soc. xxxi. 98.

A big tree 90 to 100 ft. tall. Leaves oblong to elliptic acuminate, base round or very shortly cuneate, sub-coriaceous; midrib and nerves prominent, 9 to 11 pairs, scabrous with stellate hairs (also occurring on the young twigs), 4 to 5 in. long, 1'8 to 2'5 in. wide; petioles minutely stellate-hairy, 6 to 7 in. long. Panicles about 4 in. long, pubescent and scurfy. Branches 1 in. long with few sessile flowers, secund, very shortly pedicelled and '4 in. long. Bracts very small, ovate silky, caducous. Sepals ovate, silky-tomentose. Petals '15 in. long, broad elliptic blunt, silky outside, yellow. Stamens '15 in 3 rows; anthers all awned with awns twice as long and minutely hairy. Ovary tomentose above, glabrous below; style much longer. Fruit small globose, wings linear blunt not narrowed below, long ones 3 in. long, '3 in. wide, 8-nerved, shorter ones similar 2'5 in. long. Hab. Local in forests, Penang Hill at 1500 ft. altitude (Curtis).


Tree 80 to 100 ft. tall. Branchlets pubescent. Leaves coriaceous, elliptic, abruptly acuminate, base rounded glabrous; nerves 8 pairs, curved, prominent beneath, 4 to 5 in. long, 2 to 2'4 in. wide; petioles 5 in. long. Panicles axillary and terminal, 4 to 6 in. long, scurfy puberulous. Flowers '5 in. long, sub-sessile, 4 or 5 on the branchlets, secund, muddy brownish yellow with a reddish tinge. Sepals ovate acute tomentose. Petals narrow linear-oblong, silky outside. Stamens 15; filaments as long as anthers; awns curved, much longer. Ovary elongate conic puberulous. Fruit hemispheric tapering to a cone, tomentose; outer wings membranous reticulate oblong blunt, 9-nerved, 3'5 in.
long, '7 in. wide, inner ones linear 2 in. long. Hab. Perak, Thaiping Hills (Kunstler).

A big tree 100 ft. tall. Main branches dilated and flattened at the base; branchlets wrinkled. Leaves sub-membranous glabrous, ovate acuminate, base blunt; nerves 7 or 8 pairs, slender; nervules and reticulations wide few, 3 to 4 in. long, 1·25 to 2 in. wide; petioles 5 in. long. Panicles lax, 2 to 3 in. long of 6 or 7 distant branches 3 in. long, scurfy. Flowers shortly pedicelled, cream white. Sepals ovate blunt, white-tomentose. Petals much longer, linear-oblong blunt, pubescent outside. Stamens 10, 5 inner ones with gibbous filaments, 5 outer ones not gibbous; awns filiform, three times as long as the anther. Ovary puberulous. Fruit cylindric-conic, apiculate, '75 in. long, much longer than the short sepals-cup, outer wings thin oblong-spathulate blunt, 6-nerved pubescent, 2·5 in. long, '3 in. wide, inner ones 2 in. long; nerves inconspicuous, all yellowish green. Hab. Very rare. A single tree in Tanglin, Singapore, near the Gardens.

The fruit closely resembles that of S. *dryobalanoides* Dyer, of Borneo, but the flowers and leaves are quite different.

(18) **S. bracteolata** Dyer, in *Hook. fil. F.B.I.* i. 305; *King, l.c.* 117.
A tree rising to 150 ft. tall and 15 to 20 ft. through. Branchlets minutely mealy puberulous. Leaves coriaceous, elliptic-oblong, shortly acuminate, base round or emarginate, above glabrous, beneath mealy-puberulous, becoming glabrous; nerves 12 to 16 pairs prominent, 4 to 6 in. long, 1·6 to 2·5 in. wide; petioles 45 to 6 in. long. Panicles axillary, 2·5 to 6 in. long, glabrous, numerous. Flowers 65 in. long, pedicelled with 2 elliptic blunt 3-nerved deciduous bracts 35 in. long. Sepals lanceolate blunt tomentose. Petals ovate-lanceolate blunt, half mealy, cream white, rose pink at base, withering yellow, fragrant. Stamens 15 in 2 rows; anthers yellow, twice as long as the filaments; awns very long, subulate. Fruit ovoid beaked, '6 in. long, free from calyx, glabrous; outer wings oblong obtuse, narrowed slightly at base, thinly coriaceous, red; nerves 10, 3·5 in. long, '6 in. wide, inner ones 2 in. long, '2 in. wide, linear. Hab. Forests. Malacca (Maingay); Selandor (Goodenough); Ayer Panas (Burkill). Pahang, Bentong, Bukit Gabing and Kwala Lipis (Foxworthy). Negri Sembilan, Tampin; Senawang (Burkill). Dindings. Penang, Waterfall (Curtis). Distrib. Sumatra. Native names: Chengah; Chengoh; Meranti Ketapak; Merant Pa’am; Langgang Pa’am; Langgang Batu; Pinang Baik; Semah; Temah.

A tree 40 to 50 ft. tall. Branchlets dark hoary pubescent. Leaves coriaceous lanceolate or oblong-lanceolate acuminate, base
cuneate, glabrous, minutely reticulate and whitish beneath; nerves 8 or 9 pairs ascending; nervules very numerous, close parallel, 3 to 3.5 in. long, 8 to 1.8 in. wide; petioles '75 to "9 in. long. Panicles numerous, many-flowered, hoary. Flowers nearly '5 in. long. Sepals ovate tomentose. Petals 3 times as long, narrow oblong, blunt, outside silky at base, hoary above. Stamens 30; awns with 3 to 5 cilia. Ovary ovoid tomentose-silky; style glabrous. Fruit ovoid, shortly beaked silky, '5 in. long, longer than sepal bases, outer wings 3 large, spatulate oblong, narrowed downwards, 7-nerved, 2 in. long, '3 in. wide at tip, inner ones '1 in. long, '1 in. wide, linear, all rather thin and strongly reticulate. 

Hab. Rare and local. Penang Hill at 2000 ft. altitude (Curtis).


Tree 100 ft. tall, 4 ft. through, glabrous except the inflorescence. Leaves lanceolate caudate-acuminate blunt, base shortly narrowed, coriaceous, very finely reticulate above; nerves and midrib sunk above, slender prominent beneath; nervules numerous parallel undulate, reticulations invisible below, 3-25 in. long, 1.5 in. wide; petioles '5 in. long. Panicles terminal and axillary, 2-5 in. long, white-mealy. Branches '5 in. long. Flowers very shortly pedicelled, white, '25 in. wide. Sepals ovate sub-acute, white-tomentose. Petals ovate blunt, woolly on both sides, slightly contort. Stamens about 30, inner whorl with short, broad filaments shorter than the oblong bifid anthers; awns longer densely ciliate. Ovary conic tomentose to the style base; style rather short, glabrous. Fruit unknown. 

Hab. Very rare. Penang, Batu Feringhi, near the Ice-works (Curtis).

(21) **S. barbata** Brandis, Journ. Linn. Soc. xxxi. 81.

A big tree 120 to 160 ft. tall. Branchlets dark grey transversely ringed. Leaves ovate-lanceolate acuminate, base round or very shortly cuneate, above glabrous minutely reticulate, beneath minutely pubescent; nerves 6 pairs fine, inconspicuous above, nervules beneath parallel, 3 to 3.5 in. long, 1.1 to 1.75 in. wide; petioles '5 in. long. Panicles elongate axillary and terminal, 4 to 6 in. long. Branches short distant, '5 in. long, stellate-hairy. Flowers sessile silky-tomentose, small. Sepals ovate obtuse. Petals tomentose outside. Stamens 20 to 30; anthers bearded at both ends; awns shorter than anthers, bearded. Pistil tomentose; style glabrous. Fruit globose beaked, '25 in. long; outer wings elliptic-oblong rounded, '1.2 in. long, '6 in. wide, inner wings '75 in. long. 

Hab. Malacca, Batang Malacca (Goodenough). Negri Sembilan (Burn-Murdoch); Pasoh and Bukit Panjang (Foxworthy). Pahang, Rumpin River (Henbrey). Native names: Resak; Resak Hitam. 

Use: The timber is highly valued.

(22) **S. utilis** King, l.c. 119.

A vast tree, glabrous except inflorescence. Branchlets dark coloured. Leaves coriaceous shining, ovate-lanceolate caudate-
acuminate or shortly acuminate, base slightly cuneate; nerves 7 pairs, prominent beneath or not, 2'5 to 3 in. long, 9 to 1'2 in. wide; petioles 4 in. long. Panicles axillary stellate-tomentose, 3 in. long. Branches distant, very short. Flowers sub-sessile, under 2 in. long. Sepals ovate-orbicular blunt, tomentose. Petals broadly oblong blunt, silky both sides. Stamens 20; filaments slightly dilate; awns of all anthers ciliate. Ovary tomentose. Fruit ovoid apiculate, silky; outer wings oblong, tip rounded, 5-nerved, 1'25 in. long and 4 in. broad, much reticulate, inner ones much smaller. Hab. Penang and Province Wellesley at 500 ft. altitude, Telok Bahang (Curtis). Native name: Dammar Laut no. satu (No. 1). One of the most valuable timbers in the Malay Peninsula.


A big tree with black branchlets. Leaves oblong, shortly cuspidate, base rounded; nerves 10 pairs elevated beneath, reticulations conspicuous, 5 in. long, 2 in. wide; petioles stout 1'25 in. long. Panicles lax, 3 in. long; rachis stellate-hairy. Flowers shortly pedicelled. Sepals orbicular-ovate, white-silky. Petals oblong-linear, blunt, 5 in. long, white-silky outside. Stamens 20, outer ones, filament broad oblong; anthers elliptic; awns with 2 or 3 cilia, inner ones base broad oblong, narrowed above into a filament as long as the anther, which has an awn ending in 2 cilia. Ovary silky; style short. Hab. Pahang on the east coast (Sanger-Davies). Native name: Balau bukit.

(24) S. costata King, l.c. 119.

A tree 60 to 100 ft. tall, 4 ft. through. Branchlets scurfy. Leaves coriaceous, oblong obtuse, base broad or sub-cuneate, glabrous; nerves 11 to 13 pairs, oblique distinct, transverse nervules distinct with reticulations between, 3 to 4'25 in. long, 1'2 to 1'5 in. wide; petioles 8 to 1 in. long. Panicles axillary and terminal, 1'5 to 2'5 in. long, scurfy-puberulous. Branches short, few-flowered. Sepals broad obvate, tomentose. Petals nearly ovate, white silky on both sides. Stamens 20; filaments dilated, longer than anthers, in the inner row awns short glabrous, in outer rows longer and ciliate. Ovary tomentose. Fruit ovoid apiculate, puberulous, 75 in. long; outer wings narrow oblong obtuse, narrowed to base, 7-nerved, 2'75 in. long, 4'5 in. wide, the inner ones 1'5 in. long, 2'5 in. wide. Hab. Penang. Government Hill (Curtis) and Batu Feringhi. Native name: Dammar Laut.

(25) S. crassifolia Ridl.

Tree. Leaves stiffly coriaceous, glabrous, broadly oblong, base broad round, tip sub-acute; nerves prominent both sides 17 pairs sub-horizontal, nervules transverse with very small reticulations conspicuous both sides, 4'5 to 5'25 in. long, 3 in. wide; petioles 75 in. long. Flowers unknown. Panicle in fruit puberulous. Branches few, 6 in. long. Fruit globose glabrous as long as the
sepal-cup, base narrowed, 1 in. long, ’75 in. through; sepal-bases broad round adnate to fruit, outer wings linear-oblong, 4 in. long, ’6 in. wide, not narrowed at the base, red; nerves 14, slender; nervules short, branching freely, inner wings narrow linear 3 in. long, ’25 in. wide. Hab. Pahang, Kwantan Kubang Baloh (Foxworthy). Native name: Meranti Terbak.

(26) **S. leavis** Ridl.

Big tree, nearly glabrous. Leaves pale or reddish beneath when young, adult leaves ovate-lanceolate acuminate, base round, thinly coriaceous, quite glabrous; nerves faint, hardly elevate, 8 to 10 pairs; nervules and reticulations invisible, surface beneath smooth, minutely dotted, 2’5 to 4 in. long, 1’1 to 1’25 in. wide; petioles ’5 in. long, rather slender. Flowers unknown. Fruit oblong-conic white silky, twice as long as the sepal-cup, ’5 in. long; sepals glabrous, outer wings sub-spathulate, base narrowed above the sepaline cup, above gradually dilate, tip rounded 1 in. long, nearly ’5 in. wide at the top, inner wings very short, linear blunt, ’3 in. long, narrow. Hab. Forests, Pahang, Sungei Luar, Bentong (Foxworthy). Negri Sembilan, Serting (Foxworthy, Burn-Murdoch). Native names: Kumus; Jarmang; Bohot. Use: Good timber, Dammar of inferior quality, yellowish white.

An account of the timber and Damar of the Kumus based on specimens sent from Senaling by Mr. Moorhouse was published by me in Agric. Bull. Straits, iv. 63. I identified the plant with *S. ciliata*, but noted certain differences; additional specimens make it clear, I think, that the species is distinct from *ciliata*, but no flowers have as yet been collected.

(27) **S. globifera** Ridl.

Branchlets scurfy-pubescent. Leaves thinly coriaceous, elliptic, shortly acute acuminate, base rounded or blunt, above smooth, beneath nerves elevate 14 pairs, midrib elevate, all with the numerous transverse nervules sprinkled with stellate hair tufts, 2 in. long, ’8 to 1 in. wide; petioles ’12 in. long, pubescent. Flowers unknown. Fruit globose not longer than the sepal-cup, ’2 in. long, glabrous; outer wings linear-oblong, blunt, 3 to 3’5 in. long, ’3 in. wide; nerves fine, 8 or 9, transverse nervules fine much-branched and reticulate, inner pair 1’5 in. long, ’25 in. wide. Hab. Pahang, Kwantan Kumus, Sungei Cheka and Bentong (Foxworthy). Native names: Meranti Pipit, Meranti Pasir, Meranti Lebah.

**Doubtful Species**


This is a seedling of one of the common species described above. It occurs as a low plant with thin leaves 6 in. long, conspicuous nerves and nervules and persistent ovate stipules, and is very
hairy, and usually infested with large galls. The flowering and fruiting specimens which have been referred to this from the Philippines and elsewhere (Brandis, etc.) have nothing to do with it. It is quite possible that it is the seedling of *Dipterocarpus crinitus*.

**S. longisperma** Roxb. Fl. Ind. ii. 618.

"Nut sub-cylindric. A native of Prince of Wales' Island." This is the whole of Roxburgh's description. It is not possible to guess what he referred to, but it was probably not a *Shorea*.


Trees with large coriaceous leaves drying brown. Panicles axillary and terminal, velvety. Flowers sessile; sepals and petals as in *Shorea*. Stamens 15 in 3 rows, inner row longer with no awns, 2 outer with awns. Ovary conical. Fruit ovoid, large, pericarp woody; sepals much thickened, woody, outer 3 forming linear-oblong wings about as long as the fruit or shorter (rarely fully developed as in *Shorea*). Species about 5, chiefly Bornean.

Usually referred to a section of *Shorea* and connected with it by *P. Ghysbertiana*. The closely allied *P. Beccariana* Dyer gives the important fat, Minyak Tengkawang.

Leaves quite glabrous, dry black . . . . (1) **P. Thiseltoni**

Leaves thick with stellate hairs on nerves . . . . (2) **P. Hemsleyana**

(1) **P. Thiseltoni** Ridl. *Shorea Thiseltoni* King, l.c. 122; *Ann. Bot. Gard. Calc.* v. (2), 155, pl. 188. (Fig. 22 e, p. 212.)

A tree 60 to 80 ft. tall. Leaves coriaceous, oblong acuminate to elliptic-oblong, base round sub-cordate, midrib sunk above, prominent beneath; nerves 8 to 12 pairs, hairy when young, glabrous when old, nervules faint numerous, transverse, reticulations minute, drying blackish, 6 to 8 in. long, 2.5 to 3.5 in. wide; petioles 7.5 in. long. Panicle terminal, 6 in. long, mealy of 5 or 6 branches, longest 6 in. long. Branchlets numerous, 7.5 in. long each bearing 10 sessile flowers. Sepals lanceolate ovate; hairy white. Petals oblong, the outer half in bud hairy 2.5 in. long. Stamens 15, outermost rows 2 short; filaments filiform or rather thick, inner row twice as long, filaments narrowed upwards from a broad base; anthers small, cells separate by connective which terminates in a very short subulate appendage. Ovary oblong, thickly hairy; style slender. Fruit ovoid apiculate tomentose. 17.5 in. long, 6 in. through; pericarp woody, outer wings linear-oblong 1 to 2 in. long, inner wings short, triangular acuminate 2.5. *Hab.* Forests, Pahang, Ulu Rumpin (Foxworthy). Perak, Kinta River and Thaiping Hills (Kunstler). *Distings*, Pengkalan Bharu (Foxworthy). Penang, Batu Feringhi (Curtis). *Distrib.* Sumatra. *Native names*: Tampaya mas; Bunga Merpak.
(2) **P. Hemsleyanus** Ridl. Balanocarpus Hemsleyanus King, l. c. 134; *Ann. Bot. Gard. Calcutta* v. (2), 160, pl. 193; Brandis, l.c. 109, pl. 3, fig. 27.

Tree 40 to 60 ft. tall. Branchlets stout, black rough. Leaves stiffly coriaceous, elliptic-oblong, slightly narrowed, rounded at base, glabrous above, scabrid beneath from stellate hairy tubercles, abundant on midrib and nerves 18 to 20 pairs, oblique, 7 to 12 in. long, 3'25 in. to 5 in. wide; petioles thick rugose 75 in. long. Panicles 3 to 7 in. long, densely stellate pubescent. Flowers 5 in. long, crowded, rich pink, outside silvery. Sepals sub-equal, broadly ovate acute, tomentose. Petals twice as long elliptic obtuse oblique, partly silky outside. Stamens 15; filaments dilate; awns longer than anthers. Fruit ovoid apiculate tomentose, 1'25 to 1'75 in. long, '75 in. to 1 in. through; sepals sub-equal, 1 to 1'25 in. long, forming a woody cup. *Hab.* Forests. Perak, Thaiṅping (Kunstler). Province Wellesley, Sungei daun; Tasek Gelugur (Curtis). Penang, Batu Feringhi. **Native name:** Meranti Balau. **Use:** Timber valuable.

7. **PARASHOREA,** Kurz.

Big trees with coriaceous leaves. Panicles numerous, many-flowered. Flowers small. Sepals on a broad receptacle almost valvate. Stamens 15; anthers linear; anther-cells unequal, 2 posterior beaked, connective prolonged. Ovary hairy. Fruit tomentose; wings 5 nearly equal not enclosing the fruit. Species 3, Burma, Malay islands.


Tree 100 to 150 ft. tall, 4 to 5 ft. through. Leaves ovate-lanceolate, base rounded glabrous; nerves 8 to 11 pairs, prominent beneath, 4 to 5'5 in. long, 1'75 to 2'25 in. wide; petioles 7 to 9 in. long. Panicles 4 to 6 in. long, very numerous, stellate pubescent. Flowers 25 in. across velvety pale yellow. Sepals ovate-oblong, tomentose. Petals broadly ovate blunt, pubescent outside. Stamens bimucronate, the connective also mucronate. Ovary tomentose; style short. Fruit ovoid apiculate; wings linear oblong much narrowed at the base and free from the fruit, 5-nerved, 4'5 in. long, 6 in. wide. *Hab.* Dense jungle. Perak, Gunong Pondok (Kunstler). **Distrib.** Burma.

8. **HOPEA,** Roxb.

Big or vast trees resinous, with transparent resin. Stipules small. Flowers small in panicled unilateral racemes. Sepals 2, external, 3 internal, imbricate. Petals silky or tomentose on the part exposed in bud only, contort, narrow, yellow, red or white.
Stamens 15, rarely 10; anthers ovate; cells equal, connective prolonged into a fine awn. Ovary 3-celled, cells 2-ovuled; style cylindric. Fruit surrounded by the 5 enlarged sepals, free to base, 2 outer wings long linear, 3 inner ones not longer than fruit, conuate in a cup at base, closely appressed to the small nut. Species about 35, Indo-Malaya.

The timber of Hopeas, known as Merawan, is light red and rather soft. The Dammar (Dammar Mata Kuching) is clear and transparent, as it is in Balanocarpus.

(i) **Eu-Hopea.** Leaf-nerves 8 to 18 pairs. Inflorescence usually silky.
Leaves large, stiff coriaceous, ovate; nerves 8 pairs; flowers glabrous.
Leaves small, thin; nerves 10 to 18 pairs distinct prominent; flowers where known white silky
Leaves 4 to 5 in. long; fruit-wings 4 in. long.
Leaves 3 in. long; fruit-wings 2·5 in. long obovate
Leaves thin, 3 in. long; fruit-wings linear-oblong.
Leaves stiff, ovate, 2·5 in. long; nerves 8 pairs, faint.
Leaves stiff ovate; nerves 10 pairs; fruit-wings elliptic broad, 1·5 by 2·5 in. long.
Leaves lanceolate, cuspitate; nerves 6 pairs.

(ii) **Dryobalanoides.** Leaves stiff; nerves faint very numerous, parallel. Inflorescence glabrous.
Leaves oblong-lanceolate, base shortly narrowed.
Leaves elliptic-lanceolate, base cuneate.
Leaves broad ovate, base round, very smooth and stiff.
Leaves small; branches, nerves on back, and inflorescence pubescent.

(1) **H. nutans** Ridl.
Branches moderately stout, black glabrous. Leaves ovate-elliptic stiffly coriaceous, glabrous base round broad, smooth above; nerves elevate beneath about 8 pairs ascending; nervules horizontal inconspicuous beneath, reticulations invisible, 5 in. long, 3·5 in. wide; petioles 5 in. long. Panicle of 2 or 3 branches, 2 in. long pubescent, fascicled in the axils. Flowers small, few, sessile, nodding, glabrous. Sepals 2 outer oblong coriaceous, 3 inner ovate, shorter and thinner. Petals oblong truncate, toothed at the tip with 1 long and 2 short teeth. Stamens 15, very short; awns longer than the anthers. Ovary conic, glabrous; style short. Fruit globose, glabrous, 25 in. long with a short point, outer wings oblong; nerves 10, 2·25 in. long, 5 in. wide, inner wings ovate, free to base, shorter than fruit. **Hab.** Forests, Pahang, Kwantan (E. J. Hanbury, flowers). Ulu Rumpin (Foxworthy, fruit). **Native names:** Giam (not the Giam of Sumatra); Bunga Merpak.

I have little doubt that the fruiting specimen belongs to the same species as the flowering one, as it agrees in foliage. The fruit very closely resembles
that of *H. globosa*, only known from Wray's specimens, but his foliage is
totally different.

(2) **H. nervosa** King, *l.c.* 124.

A tree 50 to 70 ft. tall, glabrous. Leaves coriaceous, oblong to
elliptic-oblong, shortly acuminate, base rounded or slightly cuneate;
nerves 16 to 18 pairs prominent beneath, 3'5 to 5 in. long, 1'5 to
2'25 in. wide; petioles 5 to 7'5 in. long. Flowers unknown.
Fruit ovoid-rounded, apiculate, glabrous black, 5 in. long; wings
oblong-lanceolate, narrowed to the base, obtuse sometimes spathulate,
base concave, thickened; nerves 10, 4 to 4'5 in. long, 6 to
7'5 in. wide, the 3 inner sepals ovate obtuse shorter than the fruit,
not adherent to it. *Hab.* Perak, Thaiping Hills 500 to 800 ft.
altitude (Kunstler).

155, *pl.* 187 b. (Fig. 22 a, p. 212.)

A tree 50 to 70 ft. tall. Young branches sub-glabrous. Leaves
coriaceous, ovate to ovate-oblong acuminate, blunt, base rounded
or sub-cuneate, glabrous on both sides; nerves 10 to 13 pairs,
stellate-pubescent to glabrous and prominent beneath, 3'5 to 4'5 in.
long, 1'75 to 2'5 in. wide; petioles pubescent when young 4 in.
long. Panicles axillary and terminal, few-flowered, puberulous.
Flowers 2 in. long. Sepals broad ovate blunt, tomentose outside,
inner 2 smaller and more glabrous. Petals oblong falcate, blunt,
partially tomentose outside. Stamens 10; awns longer than
anthers. Ovary ovate, puberulous at tip. Fruit ovoid apiculate,
3 in. long; outer wings narrow oblong, 5-nerved, reticulate, nar-
rowed slightly at base, base rounded, concave, 1'75 to 2'5 in. long,
35 to 6 in. wide, 3 inner wings as long as the fruit. *Hab.* Dense
forest. Perak, bank of Kinta River (Kunstler); Kwala Kangsa
(Foxworthy). Penang, Waterfall (Curtis). *Native name:* Chengal
Pasir.


A big tree glabrous except the young fruit. Leaves sub-
membranaceous, elliptic acuminate, base rounded; nerves 6 pairs,
inconspicuous above, elevate beneath, transverse nervules con-
spicuous beneath, 3'5 in. long, 1'5 in. wide; petioles 25 in. long.
Flowers unknown. Fruit globose, 25 in. long, outer wings not
enclosing fruit slightly imbricate linear-oblong, tip round, base
narrowed with 9 to 14 faintly marked nerves, base pubescent,
2 to 2'75 in. long, 6 in. wide, inner wings rounded 25 in. long.
*Hab.* Pahang, Bentong (Foxworthy). Perak at Gapis (Wray).
Selangor, Rantau Panjang (Ridley). *Native name:* Damar Mata
Kuching.

Suspiciously like *H. Lowii* Brandis, the type specimens (Wray's) are very
poor.

Leaves coriaceous ovate to elliptic acuminate, apex blunt
base round glabrous; nerves 8 pairs, very slender, almost invisible above, 2'75 to 3 in. long, 1'25 in. wide; petioles '4 in. long. Panicles axillary and terminal, 3 to 4 in. long. Flowers sub-secund, white, tomentose, shortly pedicelled. Sepals lanceolate-ovate obtuse. Petals '2 in. long not much longer than sepals, oblong broad blunt pubescent outside. Stamens 15; filament elongate, triangular; anthers elliptic; 'awns very fine, hair-like as long as the anthers. Ovary pubescent; style short. Hab. Pahang at Raub (Burn-Murdoch). Native name: Merawan.

(6) **H. Lowii** Brandis, Journ. Linn. Soc. xxxi. 63.
A big tree about 60 ft. tall, glabrous except the pubescent young shoots and inflorescence. Leaves thinly coriaceous, but rather stiff, ovate blunt acuminate; nerves 10 pairs elevate beneath, nervules transverse, parallel, 3'5 in. long, 2'25 in. wide; petioles '5 in. long, rather thick, scurfy. Panicles terminal and axillary, scurfy-tomentose, 3 in. long, with short branches, '5 in. long. Flowers small sessile, secund, '25 in. wide. Sepals tomentose, ovate blunt. Petals linear, half glabrous, '1 in. long, edge at tip crisped. Stamens 10; filaments shorter than anther, oblong; awn as long or longer. Ovary hairy; style glabrous. Fruit ovoid not apiculate, glabrous, '25 in. long; outer wings oblong, broadest in the middle, tip round, base narrowed; nerves 8, fine, 1'75 to 2 in. long, '5 in. wide; inner wings oblong rounded at tip half as long as fruit. Hab. Woods in the lowlands. Singapore, Chua Chu Kang. Muar (Curtis). Pahang, Lipis and Kumpin (Foxworthy). Negri Sembilan, Batang Benar (Foxworthy). Penang, Waterfall (Curtis). *Distrib.* Sumatra, Borneo.

A tree glabrous except the flowers. Leaves coriaceous, ovate-lanceolate with a long blunt cusp '5 in. long, base narrowed; nerves 5 pairs, 3 in. long, 1 in. wide; petioles '25 in. long. Panicles axillary, 1 in. long. Flowers small, 1 in. long in unilateral racemes, tomentose; pedicels short. Sepals ovate sub-acute. Petals linear pubescent. Stamens 15, base broad; awns 2 or 3 times as long as the anthers. Fruit unknown. Hab. Penang, Government Hill at 1000 ft. altitude (Curtis). *Distrib.* Sumatra.

(8) **H. micrantha** Hook. fil. Trans. Linn. Soc. xxiii. 160; King, l.c. 124.
A tree 60 to 80 ft. tall. Branchlets black, pubescent. Leaves coriaceous, oblong-lanceolate to ovate-lanceolate bluntly caudate-acuminata, base slightly cuneate or broad, glabrous except midrib, occasionally pubescent; nerves about 10, indistinct, secondaries nearly as prominent, 2'5 to 3 in. long, 1'5 to '75 in. wide; petioles '25 to '4 in. long. Panicles axillary and terminal, glabrous. Flowers '15 in. long. Sepals sub-equal, green, ovate round, black-resinous, glabrous. Petals twice as long crimson. Stamens 15;


A tree 60 to 80 or more ft. tall, 8 to 12 in. or more through, glabrous except a very slight puberulousness on the inflorescence. Leaves bluntly ovate cuspidate, base round or slightly cuneate, rather stiffly coriaceous; nerves about 10 pairs very fine, visible beneath and occasionally above, 2.5 in. long, 1.1 in. wide; petioles 2 to 2.5 in. long. Flowers very small in unilateral panicles, 1 in. long. Branches 2.5 to 5 in. long. Flowers secund, pendent, glabrous, 1.8 in. long. Sepals ovate, drying black. Petals silky outside, red. Stamens 15; awns twice as long as the anthers. Ovary glabrous or nearly so, as is stylopodium. Fruit ovoid-conic acuminate, 2 to 3 in. long; outer wings linear-oblong, blunt, narrowed to base; nerves slender 7 to 8, reticulations prominent, 1 in. long, 2.5 in. wide, base thickened, concave, inner wings much shorter than fruit, ovate. Hab. Forests. Singapore, Garden Jungle. Malacca, Sungei Hudang (Goodenough); Ayer Panas (Kinsey). Perak, Thai-ping Hills (Kunstler). Penang, Muka Head (Curtis). Distrib. Borneo, Cambodia. Native name: Jangkang.

I am quite unable to see any valid difference between H. Pierrei and H. intermedia King, though Brandis keeps them separate. The fruit in the Perak plant is very small and the wings very narrow, but Dipterocarps do differ in this point frequently. Brandis refers the Singapore plant and a plant collected by Curtis at Sungei Penang to H. Griffithii Kurz, and a variety of this var. pedicellata. This species has lanceolate leaves narrowed at both ends, instead of being round at the base. It is a native of Mergui. The Singapore plant is clearly H. Pierrei. The Sungei Penang plant collected by Curtis differs in having many more nerves to the leaf, the secondary nerves, invisible in Pierrei, are visible in this specimen and the leaves are more oblong, the panicle is stouter, the petals narrower and longer. It is not at all like H. Griffithii. It is just possible that it is a hybrid between H. Pierrei and H. micrantha. King refers it to H. micrantha, which is certainly near to it.


A big tree 60 to 100 ft. tall, 2 to 3 ft. through, glabrous except inflorescence. Leaves bluntly acuminate, ovate to ovate-lanceolate, 2.5 to 4 in. long, 2 in. broad or less; nerves very fine and numerous, almost invisible on the smooth upper surface, secondaries nearly as conspicuous; petioles 5 in. long. Flowers pendulous in paniced

(11) **H. pubescens** Ridley.

Tree. Branches, petioles and inflorescence thickly pubescent velvety. Leaves elliptic-ovate, caudate, tip blunt, base rounded or shortly cuneate, coriaceous glabrous above except the sunk midrib in young leaves fringed with hairs, midrib beneath pubescent; nerves hardly visible, numerous and close, 1 in. long, '5 in. wide; petioles '15 in. long pubescent. Panicles numerous axillary pubescent '5 in. long with 4 or 5 short branches. Flowers '05 in. long, pendent. Calyx glabrous. Sepals lanceolate. Petals little longer, oblong silky, especially on edge. Stamens minute; anthers globose with a very fine awn on the top. Ovary conic glabrous; style slender, no stylopodium. Hab. Pahang, Lubok Layang and Bukit Putus, Temerloh (Foxworthy); Sungai Benchah, Lipis (Foxworthy). Native name: Merawan or Pengerawang Bunga.


Trees. Leaves coriaceous with inarching nerves. Panicles axillary and terminal. Sepals tomentose sub-equal, lanceolate. Petals short. Stamens 15 in 2 unequal rows; filaments very short; anthers linear hairy, prolonged connective subulate or conic. Ovary hemispheric pilose. Style long, subulate. Fruit globose; outer wings 2, spatulate much narrowed at base, inner ones ovate acute not half as long, all free to base. Species 4 or 5, Malay Peninsula, Borneo and Siam.

Very near *Synaptea*, but the habit different, the leaves stiffly coriaceous oblong with fine close nerves.

(1) **C. flavum** Pierre, Fl. For. Cochinchine 16, t. 256a; Brandis, l.c. 115, pl. iii. figs. 22–24.

A big tree. Branchlets under side of leaves and petioles densely dotted with minute stellate hairs. Leaves stiffly coriaceous, elliptic-lanceolate acuminate, base rounded; nerves numerous, very indistinct inarching within the edge, 3 to 3.5 in. wide; petioles '25 in. long. Panicles terminal and axillary, grey tomentose. Sepals lanceolate acute. Petals little longer '5 in. long, glabrous; anthers linear hairy, connective-appendage short, filaments short. Ovary tomentose. Fruit globular tomentose, '25 in. long; outer wings 2, spatulate linear-oblong, base narrowed

10. SYNAPTEA, Griffith.

Medium to large trees. Leaves thin coriaceous with conspicuous nerves. Flowers small in axillary and terminal panicles, white or yellow. Sepals free to base. Petals not contort. Stamens 15 in 2 unequal series; anthers oblong, valves unequal, connective shortly prolonged to a cylindrical or conical point. Ovary 3-celled; style short. Fruit nut small; sepals free to base, 2 large linear oblong and 2 ovate as long as nut. Species about 12, Indo-Malaya.

Leaves large oblong; panicles short, dense, red furfuraceous; sepals in fruit very unequal.
Leaves 4 in. long; flowers '45 in. long; petioles long, slender, glabrous; branches glabrous.
Leaves 4 in. long; flowers '4 in. long; petioles short with branches tomentose.
Leaves 3 in. long; flowers '25 in. long.
Leaves 4 in. long; flowers '45 in. long in lax panicles, tomentose.
Leaves narrow oblong 9 to 10 in. long by 2 in. wide.
Leaves elliptic-lanceolate cuspidate; inner sepals long cuspidate.
Leaves 3 in. long; panicles lax mostly terminal.
Leaves lanceolate long-acuminate; wings of fruit 3 in. long.
Leaves elliptic, shortly acuminate; wings of fruit 2 in. oblong.
Leaves elliptic-lanceolate; wings 2 in. long, '75 in. wide, oblanceolate.
Leaves elliptic-lanceolate; panicles very lax.

(1) S. Maingayi
(2) S. Dyeri
(3) S. Lowii
(4) S. lancaviensis
(5) S. nitens
(6) S. cuspidata
(7) S. perakensis
(8) S. faginea
(9) S. cinerea
(10) S. reticulata

(1) S. Maingayi Ridl. Vatica Maingayi Dyer, F.B.I. i. 302; King, l.c. 104.

A big tree. Branchlets, inflorescence, flowers and young fruit thickly red-tomentose. Leaves thinly coriaceous, glabrous (drying red brown) oblong or oblong-obovate, shortly acute, base rounded or slightly narrowed; nerves slender, 9 to 12 pairs, curved upwards, slightly elevate, 3 to 4'5 in. long, 1 to 1'75 in. wide; petioles '6 to 1'5 in. long. Panicles dense, 1 to 1'25 in. long, numerous axillary. Flowers '45 in. long. Sepals lanceolate sub-acuminate. Petals linear-oblong. Ovary tomentose. Fruit globose, '25 in. through, free from the calyx, large wings linear-oblong, sub-acute, 5-nerved, 2 in. long, '35 to '5 in. wide, 3 small ones ovate sub-acuminate, '25 in. long. Hab. Forests. Johor, Pinerong (Cantley). Malacca (Maingay). Dindings, Gunong Melintang (Foxworthy). Native name: Maralang.


Tree 80 to 130 ft. tall, 2 to 3 ft. through. Young branches, panicles and calyx brown-tomentose, flocculent with stellate hairs.
Leaves membranous, broad elliptic or elliptic-oblong sub-acute, base rounded, glabrous; nerves 11 to 13 pairs, rather prominent, reticulate beneath, 3'5 to 7 in. long, 1'6 to 1'3 in. wide; petioles 3'5 to 5 in. long, tomentose. Panicles cymose, 1'5 to 3 in. long. Flowers 4 in. long. Sepals unequal 2 larger oblong-obtuse, 3 smaller lanceolate acuminate, velvety light brown. Petals broad elliptic obtuse, glabrous except edge, twice as long as sepals, bright yellow. Stamens blunt apiculate. Ovary pubescent. Fruit conic, 2 large wings oblongo-lanceolate oblong, 5-nerved, 1'25 in. long, 2'5 in. wide, 3 smaller sepals one-fourth of length lanceolate. Hab. Rare. Singapore (White). Perak; open jungle, Gunong Bubu range (Kunstler). Distri. Cambodia.


Tree 60 to 80 ft. tall, 18 to 24 in. through. Branchlets, petioles inflorescence, calyx rusty-tomentose. Leaves coriaceous oblong sub-acute, base rounded, glabrous except midrib above; nerves 13 to 15 pairs, 2'5 to 3'5 in. long, 1 to 1'5 in. wide; petioles 3 to 4 in. long. Panicles short, crowded, many-flowered, 75 to 1'5 in. long. Flowers 25 in. long, white or green. Sepals lanceolate acuminate, tomentose. Petals narrow oblong obtuse, glabrous. Stamens unequal-sided. Ovary tomentose. Fruit globose, 25 in. through, rufous-scurfy, free from calyx, large wings narrow oblong hardly narrowed at the base, 5-nerved, 2'75 in. to 3 in. long, 6 in. wide, 3 smaller wings lanceolate obtuse. Hab. Rocky hills, 800 to 1200 ft. altitude. Perak, Larut Hills (Kunstler). Dindings, Segari, Melintang (Foxworthy). Native name: Resak Hitam.


Tree. Leaves elliptic to elliptic-lanceolate blunt, base cuneate, coriaceous; nerves 8 pairs, prominent beneath, 3 to 5 in. long, 1'5 to 2 in. wide; petioles 5 in. long. Panicles axillary and terminal, 4 to 6 in. long stellate tomentose. Sepals ovate-triangular, blunt tomentose. Petals spirally twisted oblong blunt, half the back stellate-tomentose. Stamens 15, sub-sessile, connective a short blunt point longer than filament. Ovary hairy; stigma capitate. Hab. Lankawi, Kwah (Curtis).

I have not seen the fruit of this, so it may be a Vatica.


Tree 40 to 50 ft. tall. Branchlets and petioles scurfy-papillose. Leaves coriaceous, narrow oblong acuminate, narrowed at rounded base, above glabrous (drying brown), beneath scurfy on midrib and 18 to 20 pairs of nerves, prominent, finely reticulate, 9 to 10 in. long, 2 in. wide; petioles 5 in. long. Flowers unknown. Fruit globular with persistent style, reticulate, 5 in. through, adnate to

Fl.M.P., r.
calyx for half its length; large wings oblong, tip rounded, 5-nerved, glabrous, 3 in. long, '8 to '9 in. wide; 3 short wings ovate acuminated, strongly 5-nerved. Hab. Penang, Telok Bahang (Curtis).


Tree. Branches and petioles scurfy. Leaves elliptic-lanceolate, long-cuspidate blunt, base narrowed coriaceous, finely reticulate; nerves elevate beneath, 11 pairs, 5 in. long, 1'75 in. wide; petioles 1'5 in. long. Flowers unknown. Fruit ellipsoid, scurfy, '5 in. long, larger wings linear-oblong 3 in. long, '36 in. wide; nerves 5, free nearly to base, smaller ones '75 in. long, cuspidate. Hab. Dindings (Ridley's collector). *Native name:* Résak.

This is evidently allied closely to *S. perakensis*, but the petioles are very much longer and the smaller sepals in fruit have very long narrow points.


Tree 60 to 80 ft. tall, 15 to 20 in. through. Branchlets slender, scurfy stellate-pubescent. Leaves thinly coriaceous, oblong-lanceolate or oblanceolate acuminate to caudate-acuminate, base cuneate, glabrous, finely reticulate, midrib above puberulous; nerves 10 to 12 pairs prominent beneath, 2'5 to 5 in. long, '8 to 1'3 in. wide; petioles '25 to 1'5 in. long. Panicles axillary and extra-axillary, 1 to 2 in. long, slender, minutely tomentose. Flowers '4 in. long, pale yellow. Sepals lanceolate blunt, grey, tomentose. Petals twice as long, quite glabrous. Ovary minutely tomentose. Fruit '3 to '5 in. through, quite free, globose tomentose, 2 long wings oblong-lanceolate, narrow at base, 5-nerved, 2'5 in. long, 5 in. wide, small wings lanceolate acuminate. Hab. Forests. Perak, Thaiping Waterfall (Wray, Kunstler). Pangkor (Curtis). Common.


A tree 20 to 70 ft. tall, 1'5 to 2 ft. through. Young branches slender, ashy-tomentose. Leaves coriaceous, oblong or elliptic acuminate blunt, glabrous; nerves 9 to 13 pairs, finely reticulate on both sides, 3 to 5 in. long, 1 to 2 in. wide. Panicles 2'5 to 3 in. long, tomentose. Flowers '5 in. long, dark red. Sepals densely tomentose, connate half-way, lanceolate, slightly unequal, spreading. Petals oblong blunt, glabrous except edge. Pistil tomentose. Fruit globular adherent to calyx for half its length; 2 large wings narrow oblong blunt, 5-nerved, 2 to 2'5 in. long, '5 to '7 in. wide; the three smaller ones sub-spathulate unequal, less than '5 in. long. Hab. Hilly jungle, rather scarce. Selangor, Weld's Hill, Kwala Lumpur (Foxworthy). Perak, Larut (Kunstler). Dindings, Pangkor (Curtis). Penang (Wallich, *Shorea pinangiana*, *Hopea faginea* No. 963); Waterfall (Curtis). *Distrib.* Tenasserim, Cochin-China.

Small tree 30 to 40 ft. tall. Branchlets scurfy. Leaves thinly coriaceous ovate-oblong to ovate-lanceolate sub-acute, base rounded or sub-cuneate, finely reticulate, both sides glabrous; nerves 6 to 8, faint, 2·25 to 3·5 in. long, '75 to '5 in. wide; petioles '3 to '5 in. long. Panicles scurfy, r·25 to 2 in. long, few-flowered. Flowers '45 in. long. Sepals sub-equal lanceolate sub-acute, tomentose. Petals oblong-lanceolate half pubescent outside. Fruit globular, attached half-way to calyx; large wings red oblong-lanceolate rounded; nerves 5, 2 in. long, '5 in. wide, small wings lanceolate obtuse, '25 in. long. *Hab.* Lankawi island at Kwah (Curtis). Pulau Adang (Ridley).

(10) *S. reticulata* Ridl. Vatica reticulata *King, l.c. 106.

Tree 60 to 80 ft. tall, r·5 to 2 ft. through, glabrous except inflorescence. Leaves coriaceous elliptic-lanceolate to ovate-lanceolate acuminate at both ends blunt, base cuneate; nerves 8 to 9 pairs, conspicuously laxly finely reticulate both sides, 2·5 to 3·5 in. long, r to r·25 in. wide; petioles '4 in. long. Panicles lax, slender, 2 to 3 in. long, puberulous; pedicels 2·5 in. long. Sepals unequal lanceolate blunt, pubescent on both sides. Corolla dull dark blue (*fide Kunstler probably claret colour*). Ovary pubescent, hemispherical ridged. Young fruit, wings linear-oblong, smaller ones half as long. *Hab.* Dense jungles on hills 1500 to 2000 ft. altitude. Perak, Larut (Kunstler). Corolla, stamens and ripe fruit not seen.

**11. Vatica, Linn.**

Medium or tall but not vast trees. Leaves coriaceous, often rather small. Panicles axillary. Flowers as in Synaptea. Sepals equal or nearly so in fruit ovate or oblong, little or not longer than the sub-globose fruit. Species 10, Indo-Malaya. This genus differs only in the fruit from Synaptea.

Sepals in fruit ovate or oblong, covering fruit

Sepals usually much shorter than fruit, thin.

Fruit small crustaceous; sepals spreading little longer than fruit; leaves small

Fruit globose, corky; sepals much shorter; leaves large

Fruit unknown.

Panicles scurfy tomentose; stipules o

Panicles thin glabrous; stipules large ovate


Shrub 6 to 10 ft. tall to a tree of 30 ft. high. Leaves thinly coriaceous elliptic-oblong to oblong-lanceolate or oblongate, sub-acute to acuminate, base cuneate above glabrous; nerves pubescent beneath, glabrous, 7 to 9 pairs, prominent beneath, 2·25 to 4·5 in. long, r·25 to r·75 in. wide; petioles '25 to '4 in.
long. Racemes axillary i to 1·5 in. long, scurfy. Flowers 4 in. long, waxy yellow. Sepals very short ovate puberulous. Petals green, oblong-elliptic oblique blunt. Fruit globular with a long curved beak, 25 in. through; wings equal oblong-obtuse, thickly membranous, glabrous, 3-nerved, 1·3 in. long, 1·3 in. wide, covering the fruit. Hab. Low wet ground in open jungle. Perak, Larut (Kunstler); Tapa (Wray).

(2) V. pallida Dyer, in Hook. fil. F.B.I. i. 302. Retinodendron pallidum King, l.c. 128.

Small tree about 30 ft. tall. Branches long and slender, glabrous. Leaves thinly coriaceous, lanceolate acuminate caudate, base cuneate; nerves 8 to 9 pairs, thin, reticulations not conspicuous, 4·5 to 5·5 in. long, 1·5 to 2 in. wide; petioles 1·5 to 2·5 in. long, wrinkled. Panicles 3 to 6 in. long. Branches slender puberulous. Flowers yellowish white; pedicels 25 in. long. Sepals 1 in. long, lanceolate connate for a quarter of length, puberulous. Petals linear-oblong obtuse puberulous scurfy on the back much twisted in bud 4 in. long. Stamens, anthers ovate, connective-appendage very short; filaments very short. Ovary pubescent. Fruit spherical, 25 in. through. Sepals membranous linear-oblong, very much shorter. Hab. Stony jungle, Penang Hill. Common from the Waterfall to 800 ft. altitude (all collectors).


Medium to tall tree. Young branches red-pubescent. Leaves coriaceous oblong, tip sub-acute, base narrowed obtuse; nerves 14 to 18 pairs spreading, prominent beneath, 7 to 10 in. long, 2·6 to 3·2 in. wide; petioles 6 to 7·5 in. long. Panicles crowded at the tip, axillary stellate-rufous-tomentose. Flowers 6 in. long; pedicels 1 in. long. Sepals ovate acute, connate half-way, red-tomentose. Petals oblong obtuse, half woolly outside, much longer. Stamens elliptic 5 inner ones longer. Fruit globose rufous-scurfy, 65 in. long; wings ovate, coriaceous, stiff ribbed much shorter, not reflexed. Hab. Rare. River banks. Pahang, Tahan River (Ridley). Perak (Scortechini).


Tree? quite glabrous except the flowers. Branchlets slender. Leaves coriaceous lanceolate-acuminate, shortly narrowed at the

12. ISOPTERA, Scheffer.


(i) I. borneensis Scheff. Ann. Bot. Jard. Buitenz. vi. 222; King, l.c. 129. (Fig. 22 b, p. 212.)

A large tree, but often flowering quite small. Leaves thinly coriaceous, oblong sub-acute, base rounded, glabrous; nerves 8 or 9 pairs, 4 to 5 in. long, 1/75 to 2 in. wide; petioles 5 in. long. Panicles lax, few-flowered, 4 to 6 in. long, stellate-pubescent. Flowers pedicellate, 1/25 in. across, green. Sepals tomentose. Petals 5 in. long, tomentose. Stamens, filaments dilate at base. Ovary silky. Fruit '25 in. through. Calyx forming a cup with 4 spreading lobes, the outer ones '65 in. long and wide. Hab. In forests. Muar at Kepong (Curtis). Pahang, river, woods; Tenjai, Ulu Rumpin (Foxworthy). Distrib. Borneo, Banka. Native name: Senkawang or Tengkawang. Use: Yields the valued vegetable fat, Minyak Tengkawang.

13. BALANOCARPUS, Beddome.

Medium to vast trees. Leaves rather small. Flowers small, secund on paniced racemes. Sepals distinct or connate at base, 2 external to the others. Petals elliptic oblique. Stamens 15 attached to petal-bases in 3 rows or 10 in 2 rows; filaments dilate at base; anthers ovate, awned. Style short. Stigma entire. Fruit oblong or sub-globose; pericarp woody. Calyx forming a 5-lobed cup round the base, free from it, not developing into wings. Species about 12, South India, Malaya. Use: Timber highly valued, Chengai. Dammar, very clear and transparent or black.

Stamens 15.

Flowers very small, glabrous and dark coloured when dry.

Fruit small ellipsoid, base only covered by sepals; flowers silky . . . . . (i) B. penangianus
Fruit globose-ovoid, half covered by sepals; flowers glabrous.
Fruit unknown; leaves large ovate; flowers glabrous.

Flowers pubescent.
Flowers small silky, leaves glabrous.
Flowers small; petals long narrow, glabrescent; sepal cup with short ovate lobes; leaves large tomentose beneath.
Flowers moderately large; petals short, broad all silky.

Stamens 10.
Fruit conic, glabrous, cup half as long.
Flowers larger; petals long linear, contort; fruit elongate large.


Tree 40 to 70 ft. tall, 8 to 18 in. through, with pendulous branches almost glabrous except inflorescence. Leaves coriaceous, ovate lanceolate or ovate acuminate to caudate, base cuneate; nerves 7 to 8 pairs, inconspicuous above, very slender beneath, 1.75 to 4 in. long, 8 to 1.6 in. wide; petioles 25 to 4 in. long. Panicles hoary-pubescent. Flowers small, brownish yellow, secund 7 to 9 on each branch, pedicelled, 15 to 2 in. long. Sepals sub-equal, broad ovate acute, tomentose. Petals oblong obtuse, twisted. Stamens 15; awns curved, longer than anthers. Fruit ovoid or obovoid, shortly apiculate, striate, 6 in. long, 3 in. through, persistent calyx covering the lower third, glabrous, lobes deltoid acute. *Hab.* Forests, Malacca, Bukit Senggeh (Foxworthy). Penang, Government Hill 1000 to 2000 ft. altitude. Telok Bahang and Muka Head (all collectors). Perak, Thaiping district (Kunstler). *Native names:* Dammar hitam; Singga. *Use:* Produces a black Dammar.

Some specimens in young fruit only, received from Bukit Senggeh, Malacca, under the name of Singga, from Foxworthy, may be this species.

(2) **B. Curtisii** King, *l.c.* 131; *Ann. Bot. Gard. Calc.* v. (2), 158, *pl.* 191A. (Fig. 23 f, p. 213.)

Small tree 20 to 30 ft. tall, 4 to 6 in. through. Branches slender. Leaves membranous; lanceolate caudate obtuse, base shortly cuneate; nerves 8 to 10 pairs faint, secondaries nearly equal, 2 to 2.25 in. long, .75 to 1 in. wide; petioles 1 to 1.5 in. long. Panicles numerous, 5 in. long, glabrous. Flowers secund, short-pedicelled, 15 in. long. Sepals sub-equal, round-ovate blunt, glabrous, tips sometimes pubescent. Petals dark purple elliptic oblique, acuminate, pubescent outside. Stamens 15; filaments shorter than anthers; awns longer than stamens. Fruit globular apiculate, 25 in. long, more than half covered by the sepals, outer 2 smaller oblong, inner 3 much broader, obovate, truncate. *Hab.* Hill forests. Penang, Waterfall to 500 ft. altitude (Curtis). Perak, Thaiping (Kunstler). *Distrib.* Borneo.
(3) B. ovalifolius Ridl. Journ. F.M.S. Mus. x. 130.

Tree. Leaves thinly coriaceous, ovate cuspidate, base shortly cuneate; nerves numerous fine inconspicuous, reticulations minute, 3 in. long, 1'5 in. wide; petioles '5 in. long. Panicles lax, 2 in. long, glabrous, rather few-flowered. Sepals imbricate, sub-coriaceous, glabrous, ovate, blunted. Petals twice as long, oblong blunt, pubescent outside, '15 in. long. Stamens 15; awns hair-like longer than the rest of the stamens. Ovary with a glabrous cylindric stylopodium. Hab. Penang (Curtis 426); Ayer Hitam (Haniff). Native name: Pinang Baik.

Near B. Curtisii, but leaves broader and flowers larger; Brandis suggests it is the Bornean B. latifolius, but the venation is quite different, and it has a stylopodium.

(4) B. anomalus King, l.c. 132; Brandis, l.c. 109.

Tree nearly glabrous except inflorescence. Leaves coriaceous, ovate acuminate, base sub-cuneate; nerves 6 to 7 pairs, very fine. 2'25 to 2'5 in. long, 1 to 1'3 in. wide; petioles '6 to '7 in. long. Panicles numerous. Flowers pedicelled, '15 in. long; on branchlets '75 in. long of panicle 3 in. long, pubescent. Sepals ovate obtuse tomentose. Petals elliptic blunt, silky outside, twice as long as sepals, spreading. Stamens 15; filaments long, dilated; awns as long as anthers. Hab. Lankawi islands (Curtis). Native name: Malaut.

(5) B. pubescens Ridl.


(6) B. Heimii King, l.c. 133. B. Wrayii King, l.c. 134.

Tree 50 to 60 or more ft. tall. Leaves oblong-lanceolate acuminate, base rounded, coriaceous, glabrous above except the velvety midrib; nerves at base 9 to 10 pairs elevate beneath, velvety pubescent at base, 4 to 6 in. long, 1 to 1'75 in. wide; petioles velvety, '3 to '4 in. long. Panicles axillary and terminal, 4 in. long with about 8 branches, 1 in. long. Flowers sub-secund, '3 in. across, shortly pedicelled. Sepals short round, pubescent, edge ciliate. Petals short, glabrous, oblong, tips pubescent only,
blunt not contort. Stamens 15; filaments rather long slender, base broad triangular narrowing to the tip; anthers linear with a short point. Ovary glabrous with a long stylopodium; style long, filiform, long persistent. Fruit cylindric acute, 1.5 in. long, \( \frac{1}{5} \) in. wide; pericarp woody glabrous, dark yellow. Sepals forming a cup 6 in. deep. Hab. Forests. Pahang, Temerloh and Bentong (Foxworthy). Negri Sembilan, Bukit Pergai Triang (Foxworthy). Selangor, Klang at Bukit Cheraka (Foxworthy). Perak, Thaiping district (Kunstler); Kwala Kangsa (Foxworthy); Gapis (Wray). Native names: Chengal Penak; Penak Tembagah; Chengal Siput.

King's specimens of this and of B. Wrayi are only in fruit, but I have little doubt on carefully comparing the foliage that Foxworthy's flowering specimens belong to the same species. The only difference that I can see between B. Heimii and B. Wrayi is that in the latter the leaves are smaller and quite glabrous, whereas in B. Heimii the petiole and midrib usually are puberulous or pubescent. Wray's specimens are in unripe fruit, and the size of the leaves and amount of pubescence vary in B. Heimii.


Vast tree 100 ft. tall, glabrous except inflorescence. Leaves thinly coriaceous, oblong or elliptic-oblong sub-acute, base rounded; nerves 7 to 9 pairs, 5 to 7 in. long, 2 to 2.5 in. wide; petioles \( \frac{1}{5} \) to 6 in. long. Panicles tomentose, 6 in. long. Flowers sub-sessile \( \frac{6}{7} \) in. long, light yellow, calyx cream colour. Sepals ovate, outer 2 tomentose. Petals much longer, narrow oblong, tip erose, pubescent outside and on tip outside. Stamens 10; awn deflexed. Fruit cylindrical acute; pericarp woody, 1.75 to 2.25 in. long, 6 to 7 in. through. Sepals forming a toothed cup at base \( \frac{1}{5} \) in. long. Hab. Dense forests. Johor, Gunong Pulai. Pahang, Kwala Lipis at Sugei Benchah (Foxworthy). Perak, Batang Padang district (Kunstler). Native name: Chengal Penak. Use: Timber highly valuable for building boats and for sleepers. Dammar much valued, being quite transparent, for varnish, etc.

14. PACHYNOCARPUS, Hook. fil.

Small-sized to medium trees. Leaves coriaceous, rather thin elliptic or oblong, reticulate. Panicles terminal or axillary, lax. Calyx of 5 sepals, connate at base, small mealy. Petals much longer, often mealy on the back. Stamens 10 to 15 in 2 rows, very short; anthers elliptic; connective prolonged into a short point. Ovary often sunk in calyx-tube; style short, thick. Stigma oblong or sub-globose. Fruit corky brown, the persistent sepals forming short corky processes or lobes attached to the nut, and occasionally forming a cup almost covering the nut. Species about 10, Siam, Malay Peninsula and islands to New Guinea.

Calyx almost covering the nut in fruit.
Calyx cupular, not lobed.
Leaves oblong; nerves hardly elevate . . . (1) P. umbonatus
Leaves nearly obovate, very stiff; nerves very prominent.

Calyx cupular of 5 corky ribs grooved down the back.

Calyx-lobes much shorter than the oval fruit.

Calyx-lobes very short, corky, recurved; fruit long, conic.

(2) **P. Stapfianus**

Small tree 20 to 30 ft. tall. Leaves stiff, coriaceous elliptic to elliptic-lanceolate, smooth above, reticulate beneath; nerves 7 to 8 pairs, elevate beneath, 4 to 5 in. long, 1 to 2 in. wide; petioles 1'5 in. long. Panicle 4 in. long or more, mealy; pedicels slender. Calyx mealy, lobes lanceolate acute. Petals 4 in. long, linear-oblong, blunt, fleshy, white. Stamens 10; anthers broad, elliptic, apiculate. Ovary adnate to calyx-tube; style stout. Stigma large, globose. Fruit 1 in. long and as wide ovoid, entirely covered with the thick rough corky sepals adnate to the nut for more than three-quarters of its length, cup obscurely lobed at the top. 


(2) **P. Stapfianus** King, l.c. 136.

A tree 80 to 100 ft. tall. Branchlets stout. Leaves stiffly coriaceous, broadly elliptic or obovate-elliptic, beneath scurfy on the nerves; nerves 10 to 13 pairs, oblique prominent, 5 to 8 in. long, 2'75 to 4'5 in. wide; petioles 1'65 to 1 in. long. Flowers unknown. Fruit on a woody raceme 2 to 3 in. long, globular apiculate, 1'25 in. through almost completely covered with the 5-lobed woody rugose calyx, dark mouse colour speckled with dark brown. 

*Hab.* Pahang, K'luang Terbang (Barnes). Selangor, Bangi station (Foxworthy). Perak, Goping (Kunstler).

This is certainly closely allied to *P. umbonatus* Hook. fil, but the foliage is much thicker and the nerves much more prominent.


Tree. Branchlets rather stout scurfy. Leaves thin coriaceous, oblong, shortly blunt acuminate, base cuneate; nerves 10 or more pairs slightly elevate beneath, reticulations conspicuous both sides, 6'5 in. long, 2'5 in. wide; petioles 1'5 in. long. Panicles in upper axils and terminal, 2 in. long, scurfy. Sepals broadly triangular and connate less than half-way, as long as the style, scurfy. Petals 5 in. long, linear-oblong, glaucescent outside, but not mealy. Stamens 10; anthers elliptic. Ovary connate with the calyx-tube nearly to tip; style short thick. Stigma oblong. Fruit sub-globose, brown corky, 1'75 in. long and wide, the calyx covering the nut except the tip in the form of a 5-lobed cup, the lobes rounded on the back and at the tip, and grooved down the


A tree 80 ft. tall or more. Leaves ovate to oblong acuminate narrowed to the base, glabrous; nerves 6 pairs ascending elevate, reticulations conspicuous beneath, 4 to 5 in. long, 1-5 to 2 in. wide; petioles 25 in. long. Panicles 1-5 to 4 in. long, woody in fruit, puberulous and slender when young. Sepals lanceolate connate half-way mealy pubescent, as are pedicels. Petals 4 in. long yellow, linear-oblong blunt, backs scurfy-puberulous. Stamens 15 in 2 rows, outer ones with short, broad filaments; anthers longer, connective forming a short conic point, inner row with longer filaments. Ovary sunk, pubescent; style short, thick. Fruit conic 2 in. or more long, 1-5 in. through at base, dark brown corky and papilllose, the persistent sepals 5 short up-curved processes, 2 in. long. Hab. Forests. Singapore, Garden Jungle; Changi. Pahang, Minchali, Rumpin (Foxworthy). Province Wellesley, Nibong Tebal. Native name: Resak Larus.

Order XXI. Ancistrocladaceae.

Glabrous climbing shrubs. Branchlets hooked. Leaves in terminal tufts, coriaceous, entire, exstipulate. Flowers small in terminal or axillary panicles. Calyx-tube short, adnate to the base of the ovary in flower, larger and adnate to the fruit when ripe; lobes 5, developed into unequal wings in fruit. Petals 5,
Ancistrocladus. XXI. Ancistrocladaceæ. 251

red or purple. Stamens 5 or 10, sub-perigynous. Ovary 1-celled inferior, 1-ovuled; style sub-globose. Stigmas 3, truncate. Seed sub-globose, albuminous ruminate. Genus 1. Species about 10, tropical Asia, 1 West African. Formerly referred to Dipterocarpaceæ.

1. Ancistrocladus, Wall.


A climber forming a bush on the ground or ascending trees, with black branches. Leaves coriaceous elliptic-lanceolate decurrent to base, obtuse, 6 to 9 in. long, 2 to 3 in. wide. Panicles very slender, branching 5 to 6 in. long. Flowers 1 in. long, dark red. Fruit 25 in. long; wings very unequal, largest sub-spathulate, oblong obtuse, 2 in. long, 5 in. wide, brown. Hab. Very common on sandhills near the sea, more rarely inland. Singapore, Changi. Malacca. Pahang, Pekan. Dindings, Lumut. Perak, Thaiping. Penang (Porter in Herb. Wallich 1054); Bukit Penang

Fig. 25.—Ancistrocladus pinangianus.
XXI. ANCISTROCLADACEÆ.  

[Ancistrocladus.

at 1000 ft. altitude (Curtis). Lankawi isles; Setul, heath. *Distrib.* Siam, Cochin-China, Bangka, Sumatra. *Native names*: Lidah Sapi (Ox tongue); Akar Julong hitam (Black caterpillar creeper).

ORDER XXII. BIXACEÆ.


Bush; flowers pink or white; capsule bristly, seeds with a red covering 1. Bixa

Shrub; flowers yellow; capsule smooth, seeds woolly 2. Cochlospermum

1. Bixa, Linn.

(i) *B. Orellana*, L.

The Arnotto; Kasumbah of Malys is a bush with large pink flowers and a soft prickly capsule with small seeds covered with a red powdery aril. It is occasionally to be seen in native gardens and may establish itself outside. It is a native of S. America and the red aril is used as a colouring matter.

2. Cochlospermum, Kth.

Trees or shrubs. Leaves digitately divided. Flowers large, bisexual. Sepals 5, deciduous. Petals 5, large, contort in bud. Stamens indefinite on a disc; anther-cells with pores or short slits. Ovary globose, 3- to 5-celled; style simple; ovules many on 3- to 5-parietal placentas. Stigma toothed. Capsule 3- to 5-valved; endocarp membranous. Seeds cochleate, testa hard, woolly. Species 12, Africa, S. America, Australia. The genus is often put in an order by itself, *Cochlospermaceæ*, and is probably allied to *Malvaceæ*.


A soft-wooded shrub about 10 ft. tall. Leaves palmate 5-lobed, hairy on the back, lobes acuminate, crenulate, blades 6 in. across each way or more; petioles 6 in. long. Flowers large, yellow, 4 in. across. Sepals 7 in. long, silky. Petals rounded obovate. Pod pear-shaped brown, 4 in. long, 3 in. through. *Hab.* Malacca (Griffith); Penang in cultivated ground and in and round the town.

Certainly introduced from India, but more or less established in Penang and very conspicuous.
Order XXIII. Malvaceæ.

Herbs, shrubs or trees, often hairy or in Durioneæ in parts covered by umbrella-shaped scales. Leaves alternate, simple, lobed, or rarely compound (Bombaceæ). Stipules free. An epicalyx below the flower of 3 or more bracts free or connate. Flowers axillary or terminal solitary, fascicled or cymose, regular, often large and showy. Sepals 5. Petals 5, twisted-imbricate in bud. Stamens indefinite; filaments connate in a tube; anthers often reniform 1-celled. Ovary 2, many-celled of 2 to 5 or more carpels round a central axis; ovules 1 or more in each cell; styles connate at base or altogether. Fruit of separate cocci, or capsular loculicidal, often large and woody. Seed reniform or ovoid, sometimes woolly (Bombax), sometimes with pulpy aril (Durio). Genera 60. Species 700, whole world (King, Journ. As. Soc. Beng. ixii. 38).

Besides the plants described below, there are in cultivation Gossypium braziliense Macfad, a bush cotton with short-stapled wool which was formerly half wild in Muar and can occasionally be seen in native gardens (Native name: Kapas), and Eriodendron anfractuosum DC. The Kapok, a tall tree with horizontal spreading branches, often to be seen in villages. The origin is probably South India.

Staminal tube entire long, shortly divided at tip only.
Carpels ripe separating from axis, follicular dehiscing, low shrubs.
Styles as many as carpels.
Ovules solitary
Ovules 2 to more.
Seeds 2 in a carpel, separated by a partition
Seeds 2 or more, not separate
Stamens twice as many as carpels; follicles indehiscent
Fruit capsular; carpels connate; herbs, shrubs or trees; flowers large
Calyx toothed; stigmas spreading
Calyx truncate; stigmas united. Tree
Staminal tube short divided into bundles of stamens; fruit capsular. Trees.
Leaves digitate compound; seeds woolly
Leaves entire, scaly coriaceous; fruit woody muriicate; seeds arillate (Durioneæ).
Calyx campanulate; flowers large or medium.
Flowers large; leaves scaly; anthers reniform or oblong
Flowers small, scaly; anthers opening by a pore, globose
Flowers medium; calyx dilate at base, forming a cushion-shaped ring
Calyx 5-pouched at base; flowers very small
1. SIDA, Linn.

Herbs or undershrubs. Leaves entire or lobed. Bracteoles o. Sepals 5, connate at base. Petals 5, connate at base and adnate to stamen tube. Stamen-tube dividing into numerous filaments. Carpels 5 or more, whorled, with as many styles, when ripe separating from axis, convergent beaked or 2-awned. Seed 1. Species about 80, mostly weeds of cultivation and waste ground.

Leaves cordate-ovate, serrate 1½ to 2 in. long, thin
Leaves ovate-cordate serrate ½ to 1 in. long
Leaves ovate obscurely cordate crenate thick woolly . . . . . .
Leaves oblong-oblanceolate or rhomboid . . . . . .
Leaves linear lanceolate . . . . . .

(1) S. mysorensis W. and A. Prod. i. 59; Masters, in Hook. fil. F.B.I. i. 322.


(2) S. veronicaefolia Lam. Encyc. i. 5. S. humilis, Cav. Diss. v. 277; Masters, l.c. i. 322.

A slender trailing herb. Leaves ovate acute base cordate, serrate, sparsely hairy, ½ to 1 in. long, 1½ to 1½ in. wide; petioles ½ in. long. Flowers solitary axillary; pedicels slender articulate, 1½ in. long. Calyx 2 in. long, campanulate, with short acute lobes. Corolla yellow twice as long, 2½ in. wide. Carpels 5, bicuspidate hairy. Hab. Dry open spots in the north; Perlis, Juttra, Kanga (Ridley). Distrib. Tropical Africa, India and America.

(3) S. cordifolia Linn. Sp. Pl. 961; Masters, l.c. i. 324.


(4) S. rhombifolia Linn. Sp. Pl. 961; Masters, l.c. i. 323; King, l.c. 41.

Erect undershrub 2 to 3 ft. tall, glabrous to hoary, pubescent. Leaves oblong-oblanceolate to obovate or rhomboid, edges serrate to crenate, beneath white hoary, ½ to 2½ in. long, 2 to 1 in. wide;
petioles 1 to 2 in. long. Stipules setaceous, longer than petioles. Flowers 5 in. across, ochre yellow, axillary, solitary; peduncles slender, 5 to 75 in. long. Calyx-lobes ovate obtuse. Carpels smooth or pubescent, awnless or awned. Hab. A common and variable plant on seashores and in waste ground all over the tropics.


var. *reiusa* Linn. (sp.), more condensed and woody. Leaves 25 to 5 in. long, obovate cuneate coarsely toothed, more hoary than the preceding. Hab. Common on seashores. Native names: Poko Lidah Ular (Snake's tongue); Bunga Padang; Seliguri or Sendu Guri Padang.

(5) *S. carpinifolia* Linn. *f. Supp.* 307; Masters, l.c. i. 323; King, l.c. 40. *S. acuta* Cav. Diss. i. 15, t. 2, f. 3.


2. WISSADULA, Medik.

Undershrub with entire or palmate leaves. Inflorescence lax paniced. Bracteoles o. Calyx 5; sepals connate below. Petals 5, connate at base, adherent to stamens. Staminal tube divided into apex into numerous filaments. Styles as many as ovary-cells. Carpels 5, beaked, many-seeded, dehiscent. Seeds 1 to 3 in each cell. Species 5 or 6, tropical American, African, and 1 Asiatic.


Shrub 2 to 3 ft. tall. Leaves deltoid, long-acuminate, base entire or cordate, glabrous above, red-pubescent beneath, 2 to 3 in. long, 1 to 1.5 in. wide across base; petioles 5 to 1 in. long. Flowers small, 25 in. across, white, in a long lax panicle. Sepals ovate acute, green, pubescent. Petals shorter. Stamens about 17, tube short. Carpels 5, pubescent, 25 in. long, awned. Seeds 2 in each cell, pyriform, black-pubescent. Hab. Dry open places. Pahang, east coast Kwala Berar, Pahang River. Perlis, Juttra; Chupeng, common. Distrib. India and Siam, Ceylon, Java, Sumatra.

3. ABUTILON, Gaertn.

Herbs or undershrubs usually downy. Leaves angled or palmate-lobed. Inflorescence axillary or terminal. Calyx of 5
valvate sepals connate at base. Petals free above, connate at base, adnate to stamen-tube. Stamen-tube divided at the apex into filaments. Carpels 5 to 8. Styles as many. Ripe carpels separating from the axis, 1- or more-seeded. Seeds reniform. Species 70, all tropics.

(1) **A. indicum** Don, Gen. Syst. i. 504; Masters, in Hook. fil. F.B.I. i. 326; King, l.c. 42.

Shrub, annual or perennial, 1 to 4 ft. tall. Leaves broadly cordate, irregularly coarsely toothed, minutely pubescent on both sides, paler beneath, 1 to 3½ in. long and as wide; petioles 1 to 2 in. long. Flowers 1 in. across, axillary solitary. Peduncles 1½ in. long. Sepals ovate acute, silky-edged, hairy. 25 in. long. Carpels 15 to 20, truncate or shortly awned, rough hairy, forming a head 1 in. across, black. Seeds dark brown, hairy. **Hab.** Waste ground, common. Singapore, Pahang at Pekan, Malacca, Selangor, Penang. **Distrib.** Warm parts of Africa, Asia and Australia. **Native names:** Kambong lobo; Bunga Kisar; Malbar.

### 4. **URENA, L.**

Undershubs, more or less hairy. Leaves hairy with stellate hairs, angled or lobed. Flowers medium to large, pink. Epicalyx 5-lobed adnate to the 5-fid calyx, sometimes coherent at base. Petals 5, connate at base and adnate to stamen-tube. Stamen-tube truncate or minutely toothed; anthers nearly sessile. Ovary 5-celled, cells 1-ovuled; stigmatic branches 10; stigmas capitiate. Ripe carpels covered with hooked bristles or smooth, indehiscent separating from axis when ripe. Species 4 or 5, 1 cosmopolitan.

Carpels armed with hooked bristles . . . . . (1) **U. lobata**
Carpels smooth; flowers large . . . . . (2) **U. rigida**

(1) **U. lobata** Linn. Spec. 974; Masters, l.c. i. 329; King, l.c. 43.

Undershrub, 1 to 3 or 4 ft. tall, more or less hairy. Leaves, lower rounded to reniform, more or less cordate, apex acute, with 5 to 7 short broad lobes, 1 to 2 in. long, 1 to 2½ in. wide, upper leaves narrower or smaller, ovate to linear-lanceolate; petioles 5 to 2 in. long. Flowers solitary or several together on short pedicels, 5 to 1 in. across, pink, fugacious. Sepals lanceolate, 2 in. long. Carpels tomentose and covered with hooked spines. **Hab.** Waste ground and open spaces, roadsides, etc. Whole peninsula and all the tropics.

var. *[sinuata* Miq. Fl. Ind. Bat. i. (2), 149; King, l.c.

Leaves deeply 5-lobed, lobes narrowed at the base, serrate. It is common especially near the sea, but grows with the common form. **Native names:** Poko Kelulut; Perpulut; Pepulut; Pulut-Pulut. **Use:** Leaves dried as an adulterant of patchouli leaves.
var. tomentosa, U. tomentosa, Bl. Bijdr. 65.

A tall strict plant 8 ft. tall, very grey-tomentose. Leaves elliptic densely woolly with stellate hairs, thicker in texture, margins denticulate, apex rounded, base narrowed 1 to 2 in. long, 5 to 75 in. wide; nerves and reticulations strongly elevate beneath, inarching. Flowers numerous on the ends of the branches, sub-sessile. Hab. Setul heaths. Distrib. Java, Sumatra.


A shrub 1 to 2 ft. tall, branched, sprinkled with stellate hairs. Leaves ovate or orbicular blunt, base broad, serrate; nerves 8, 1 in. long and as wide; petioles slender, 1 in. long. Flowers numerous, nearly sessile in axils of reduced leaves at end of stem. Epicalyx campanulate, with 5 linear lobes. Sepals linear acuminate, hairy. Corolla 2 in. across, crimson; petals spathulate, apex rounded. Capsule 1 in. long, hairy. Hab. Rare; heaths, Setul. Malacca (Griffith). There are specimens of this beautiful plant in Herb. Kew, labelled “Malacca, white, Griffith,” probably wrongly localized. Distrib. Tenasserim, Siam, Cambodia, Borneo.

5. HIBISCUS, L.

Herbs, shrubs or trees. Leaves entire or palmately lobed. Inflorescence axillary. Epicalyx of 5 or more lobes, free or connate at the base. Calyx 5-toothed or 5-lobed, valvate. Petals 5, adnate at base to the staminal-tube. Staminal-tube truncate or 5-toothed; filaments numerous; anthers reniform 1-celled. Ovary 5-celled, cells 3- or more-ovuled. Styles 5, connate below. Stigmas capitate or spathulate. Capsule loculicidally 5-valved, sometimes with false partitions. Seeds glabrous, hairy or woolly. Species about 150, tropics of the whole world.

Cultivated species of Hibiscus are also H. esculentus Linn. Kachang Bendi or Kachang Lindir, also known as Lady’s Fingers. A tall herb with pale creamy yellow flowers and glabrous pods used as a vegetable.

H. rosa-sinensis Linn. The garden Hibiscus, Bunga Raya. Cultivated as a garden shrub, together with H. schizopetalus, Hook f., of Zanzibar, with contort petals and a long stamen tube. Many varieties and hybrids of these two are in cultivation. The leaves are used for blackening shoes, hence the popular name “Shoe-flower,” the flowers for colouring sweetmeats and preserves, and as a demulcent in venereal disease. The bark contains a good fibre.

H. mutabilis Linn., with white flowers turning pink, is also a common cultivated shrub from China and H. syriacus Linn. with violet flowers. Both species usually with double flowers.

Fl.M.P., i.
Herbaceous or shrubby plants.
Tall erect herb; flowers large; calyx spatheaceous, deciduous.
Scandent, thorny shrubby plant; flowers 2 in. wide; calyx persistent; epicalyx lobes distinct.

Trees with large entire leaves ovate cordate.
Bracteoles as long as calyx.
Leaves hairy, tomentose beneath; stalks rough, hairy.
Bracteoles cup shorter than calyx.
Leaves glabrous above, pubescent beneath.
Leaves glabrous, scabrid.

(1) **H. Abelmoschus** Linn. Sp. Pl. 980; *King, l.c. 44.*

(2) **H. surattensis** Linn. Sp. Pl. 979; *King, l.c. 45.*

A big tree 60 to 80 ft. tall. All parts covered with soft tomentum, the young branches, petioles, pedicels, bracteole and calyx bearing tufts of long yellow hairs. Leaves cordate- orbicular, apex abruptly acuminate, edges entire, 7- to 9-nerved palmately, 7 to 12 in. long and as wide; petioles 7 to 12 in. long. Flowers in terminal cymes; pedicels 1 to 2 in. long. Epicalyx lobes long, linear-lanceolate half as long as calyx. Sepals lanceolate, keeled 1 in. long. Corolla 4 in. across, yellow with a maroon central spot, withering purplish. Fruit hairy, shorter than the calyx. Seeds reniform, edges densely long red-hairy. *Hab.* In woods and borders of forests. Common. Malacca, Bukit Panchor; Pahang by the Pahang and Tahan rivers. Negri Sembilan, Kuala Pedas. Selangor, Sungei Buloh (Foxworthy). Province Wellesley, Tasek Gelugur. Perak, Ulu Kerling (Kunstler). *Distrib.* Siam, Cochin-China. *Native name:* Tutok. *Use:* A good fibre from the bast used for ropes.

In the Malay Peninsula form the epicalyx is shorter and the sepals broader, and both less hairy than in the Indian one.
(4) **H. tiliaceus** Linn. Sp. Pl. 976; Masters, l.c. i. 343. *Paritium tiliaceum* Juss. St. Hil. Fl. Bras. Med. i. 156; Wight, l.c. i. 7.

Usually a low stout spreading tree. Leaves sub-coriaceous, broadly cordate, ovate or orbicular cuspidate, glabrous above, grey-pubescent beneath, 3 to 5 in. long, 3 to 6 in. wide; nerves palmate, 7 to 9; petioles 1'5 to 2'5 in. long. Flowers solitary or in cymes, 2- to 3-flowered, axillary; peduncle 75 to 1 in. long. Epicalyx short, lobes short, ovate acute. Sepals lanceolate-triangular sub-acute, 5 in. long, keeled pubescent. Corolla 4 in. across, yellow, centre crimson purple. Fruit about as long as calyx, ovoid hairy. Seeds obovate-reniform. *Hab. Usually near the sea, on the sea beach very common, occasionally far up rivers, but inland frequently planted by natives to form a hedge. When grown in forest it attains a height of 60 ft. or more. Whole peninsula on both coasts. *Distrib. Tropical Asia, Africa and South America. Native names:* Baru; Waru (Javanese); Ambaru; Baru Laut; Dedap Laut. *Use:* The wood valued for gun-stocks, the bast as a fibre.

(5) **H. floccosus** Masters, l.c. i. 343; King, l.c. 46.

A big tree 60 to 80 ft. tall. Branchlets, petioles, peduncles, epicalyx and calyx covered with yellow pustules. Leaves sub-coriaceous, ovate, obscurely angled, slightly or not cordate; nerves 7 pairs, entire or sub-denticulate, sparsely stellate, pubescent, glabrescent when old, 3 to 6 in. long and as wide; petioles 1 to 2 in. long. Flowers few, in terminal racemes; peduncle stout, 75 to 1'5 in. long. Epicalyx a shortly lobed cup 2'5 in. long, lobes broad, ovate. Calyx 1'5 in. long, tubular, lobes 5 in. long. Corolla 4 in. long; petals stellate-hairy outside, slightly hairy within, spatulate, yellow, base maroon, withering purple. Staminal-tube pubescent, yellow. Stigma deep brown. Capsule obovoid truncate, shorter than calyx, stellate-pubescent, pustular. *Hab. Borders of woods, open country, less common than H. macrophyllus; Malacca, Mt. Ophir in the base woods. Pahang, Tahan woods. Temerloh (Foxworthy). Perak, Gunong Malacca; Batu Gajah (Kunstler); Grit; Kelantan, Kwala Aring (Yapp). *Native names:* Kapas-Kapas; Petutu; Unchang; Bebaru.


(1) **T. populnea** Corr. Ann. Mus. ix. 290; **Masters, in Hook. fil. F.B.I.** i. 345; **Wight, Jc. t. 8**; **King, l.c. 47**.

Tree 20 to 30 ft. tall. Leaves sub-coriaceous, glabrous, cordate acuminate, palmately 7-nerved, 4'5 to 6 in. long, 3 to 4 in. across; petioles 2'5 in. long. Young parts scaly. Flowers 3 to 4 in. across, solitary; peduncle thick 1 in. long. Calyx 5 in. long. Corolla yellow with a maroon spot at base, withering purplish. Capsule 1 to 1'5 in. long, sub-globose, scaly. Seeds 1 to 3 in each cell, reniform. **Hab.** Common on sea-coasts. Singapore, Johor, Malacca, Dindings. **Distrib.** Tropics generally. **Native names:** Buah Keras Laut; Barnu.

7. **BOMBAX**, Linn.

Trees often thorny. Leaves digitate, deciduous; peduncles axillary or terminal, 1-flowered. Flowers appearing before the leaves. Epicalyx 0. Calyx coriaceous, cup-shaped truncate or lobed. Petals obovate or oblong, red or yellow, large. Stamens in 5 bundles; filaments numerous; anthers reniform, 1-celled. Ovary 5-celled; style clavate. Stigmas 5. Capsule long, loculicidally 5-valved, valves coriaceous, woody. Seeds silky or woolly. Species 10, tropics generally, chiefly S. American.

Big tree.

Petals 3 in. long, linear oblong, tomentose . . . (1) **B. larutensis**

Smaller tree.

Petals 2 in. oblong acute, slightly tomentose inside . . . . . . (2) **B. insularis**

(1) **B. larutensis** Ridl. **B. insigne, var. larutensis Prain, MSS.** A big tree, thorny, about 80 ft. tall. Leaves 5- to 7-foliate; leaflets lanceolate acuminate, base much narrowed, 4 to 12 in. long, 1'5 to 3'5 in. wide; nerves about 12 pairs; petioles 4 to 24 in. long; petiolules winged to the base in young trees, not winged 5 in. long in adult. Flowers yellow or pale green. Calyx thickly coriaceous, 1'1 in. long, 1'25 in. wide, lobes rounded, short. Petals 3 in. long, 2'5 in. wide, linear-oblong, woolly tomentose on both sides. Stamens numerous 2 in. long. Ovary glabrous. Capsule 6 in. long. Seeds ovoid-globose 2 in. long, wool dense white. **Hab.** Forests up to 1000 ft. altitude. Rare. Negri Sembilan, Tampin Hill. Selangor, near Ulu Gombak. Perak, Kamuning; near Jor; Relau Tujor (Wray).

(2) **B. insularis** Ridl.

Small tree 20 to 30 ft. tall. Leaflets elliptic lanceolate acuminate shortly at tip, long narrowed to base, 4'5 in. long, 1'5 in. wide; petioles 5 in. long. Calyx cup-shaped, coriaceous, 1'5 in. long, lobes broad rounded, glabrous. Petals broad, oblong acute 2 in. long, 1'75 in. wide, densely tomentose outside, less so within except at the base, where it is densely long-silky. Stamens 3 in. long,

8. DURIO, Linn.

Trees, often large. Leaves entire coriaceous, scaly beneath (except in D. Oxleyanus); the scales occurring also on young parts and inflorescence are peltate, umbrella-shaped. Flowers in cymes on the trunk or thick branches. Bracts 2, connate at the base, large. Calyx campanulate, coriaceous, scaly; sepals usually distinct or connate at base. Petals longer, red or white, 5 or 4 spathulate oblong. Staminial tube of 5 or 4 phalanges opposite petals, these broken up above into filaments bearing one (D. Oxleyanus) or several 1-celled sinuous anthers in a head. Ovary scaly, 4- to 5-celled; styles connate tomentose. Stigmas capitate; ovules many 2-seriate in each cell. Fruit very large, coriaceous sub-globose or oblong, loculicidally dehiscent, spiny, green or brown. Seeds large, testa thin, aril creamy white or pink covering the seed. Species about 12, Malayan.

Flowers white.
Leaves elliptic; nerves fine; flowers 2 in. long, fruit covered with acute cones.
Leaves elliptic; nerves fine; flowers 3 in. long; fruit with spines.
Leaves oblong, small; flowers 2 in. long.
Leaves oblong 2'25 by 1 in., coriaceous; flowers 2 in. long.
Leaves oblong 12 by 3 in., coriaceous; nerves conspicuous; flowers 3 in. long.
Leaves elliptic-oblong, strongly nerved pubescent beneath, not scaly.
Leaves very large, over 12 by 5 in. with very large scales; flowers large.

Flowers pink.
Leaves narrow, lanceolate, 3 by 8 in., acuminate; flowers 2 in. long; fruit spiny.
Leaves elliptic, long cuspidate, 7 by 2'5 in.; flowers 1'5 in. long.

(1) D. zibethinus Linn. Syst. Nat. ed. xiii. 581; Masters, in Hook. fil. F.B.I. i. 351; Beccari, Malesia, iii. 330, t. xii. f. 1-5; xxxvi. f. 1-12.

The Durian is not indigenous to the peninsula, but is cultivated everywhere. It attains a height of 100 ft. The leaves elliptic-oblung, abruptly acuminate, base rounded, 4'5 to 6 in. long, 1'5 to 1'8 in. wide. Flowers 2 in. long, cream-colour, in rather long cymes from the lower side of boughs, in old leaf axils. Stamen bundles united at base only. Fruit 8 to 12 in. long, light brown or green, with stout conical thorns. Seeds 1'5 in. long, buff colour, covered with white pulpy arillus. Only known in cultivation. It varies very little. I have seen trees of which all the flowers
appeared to be male, the female parts abortive. A very small fruited variety with only one carpel and one seed occurs, and a large form with an increase of carpellary whorls, the fruit being open at the top and containing a second abortive fruit surrounded by the normal seeds of the outer carpels, "Durian Gajah" of the Malays. The species occurs also on the Malay islands, but whence its origin is doubtful.

(2) **D. malaccensis** Planch. in Hook. fil. F.B.I. i. 351; Becc. Malesia, iii. 237, t. xii. figs. 6 to 8; King, l.c. 51; Masters, Journ. Linn. Soc. xiv. 501, t. xiv. figs. 17 to 20.

A big tree. Leaves elliptic-lanceolate acuminate, acute, base sub-acute or rounded; nerves 20 pairs, slender, visible on both surfaces, thinly coriaceous, above smooth, beneath covered with peltate scales, 5'5 to 7 in. long, 1'5 to 1'8 in. wide; petioles thick, 5 in. long, scaly. Peduncles 5 to 1 in. long, angled bearing 2 to 3 flowers on 1 in. pedicels. Flowers white, 2'5 in. long. Bracts 2, ovate, 1 in. long, acute. Sepals 5, ovate-oblong, scaly, 1 in. long. Petals linear-oblong, 2'5 in. long, 5 in. wide, pubescent with scattered scales outside. Stamens forming a tube, branching into 5 phalanges of several compound filaments free above and bearing a cluster of anthers, shorter than the petals. Style densely woolly. Fruit green with numerous processes. *Hab.* Forests. Malacca, Batu Tiga (Derry, Griffith). Negri Sembilan, Triang Forest.
(Foxworthy). Perak, Larut (Barnard); Kwala Kangsar (Foxworthy). Native name: Durian Api.

(3) D. Lowianus Scort. King, l.c. 51.

A tree 50 to 60 ft. tall. Young branches, petioles, and lower side of midrib covered with rather large scales, under-side of leaf with smaller ones. Leaf narrow oblong-elliptic, shortly acuminate, base rounded, thinly coriaceous, glabrous above; nerves 14 to 18 pairs, faint, horizontal, upper surface finely reticulate, 4'5 to 5'5 in. long, 1'5 to 2 in. wide; petioles '5 in. long. Inflorescence on branches of short-branched cymes, 3 in. long and as much across. Pedicels '5 to '75 in. long, scaly. Flowers 2 in. across. Bracts 2 or 3'5 in. across, ovate connate. Calyx campanulate, '75 in. long, teeth 3, broad blunt shallow, covered with large scales. Petals 5, oblanceolate pubescent outside, glabrous inside, 1'25 in. long. Stamens in 5 phalanges dividing near the base into 8, sub-dividing at the tip into several short filaments with a single anther. Ovary ovoid, scaly; style pubescent. Hab. Perak (Scortechini). Kedah, Yan (Haniff).


Branches rather slender. Leaves oblong to lanceolate acute, base rounded, coriaceous; midrib depressed above, very prominent beneath; nerves invisible; scales rather large, 3'5 in. long, 1 in. wide; petioles '25 to '3 in. long. Flowers in short clusters on the branches, the scales on bracts and flower-buds large; pedicels often branched, thick, 1 in. long. Flowers small, 2 in. long. Stamens tubular only at base. Hab. Hill forests. Selangor, Sempang, mines, Semangkok Pass.

The tree was only in bud when I found it, but it closely resembles D. lanceolatus Mast., of Borneo, though the nervation is more inconspicuous than in the type.


Large tree. Leaves oblong obtuse or sub-acute, base blunt, rounded, coriaceous glabrous above; midrib channelled, beneath scaly, raw sienna colour; nerves very numerous, very inconspicuous above and not very distinct beneath, 7 to 9 in. long, 2'5 to 3 in. wide; petioles '25 in. long thick, angled. Flowers in clusters of 2 or 3 on the trunk; peduncles short; pedicels '5 in. long 4-angled with 2 lanceolate bracts at base, all scaly. Bracts (floral), large ovate acute, 1 in. long and as wide. Sepals oblong, 2 in. long, acute, scaly cinnamon colour. Petals linear-oblong, 1'5 in. long, outside scaly with fringed scales, cinnamon outside, within pubescent, white. Stamens and pistil as in malaccensis. Fruit globose spiny green. Hab. Forests in the south, Singapore, Bukit Timah; Selitar. Johor, town and Mt. Austen.


Tree. Branchlets, petioles, midrib and inflorescence only scaly.
Leaves elliptic-oblong rounded at both ends, glabrous above, pubescent beneath; nerves 15 to 18 pairs, prominent beneath, 3.5 to 5 in. long, 1.5 to 2 in. wide; petioles '5 in. long. Flowers 1 in. across, crowded in cymes on the branches. Bracts 2, ovate pubescent. Calyx cup-shaped, mouth with 4 shallow blunt teeth, scaly outside. Petals 4, oblanceolate or spatulate, '5 in. long. Stamens 20, 5 free, alternating with 5 phalanges of 3 each; anthers solitary shorter than the petals. Ovary hairy, not scaly. Hab. Malacca (Griffith); Merlimau. Selangor, Sungei Buloh (Foxworthy). Native names: Durian daun; Kuripal.

(7) D. macrophyllus Ridl. D. testudinarum var. macrophylla King, l.c. 53.

Tree 50 to 60 ft. tall, 15 to 24 in. through. Leaves oblong shortly acuminate, base rounded, 13 to 15 in. long, 4.5 to 5.5 in. wide, above smooth, beneath densely covered with large fimbriate scales; petioles 1 in. long. Flowers on the trunk in cymes about 3 in. long of 4 or 5 flowers; pedicels and peduncles angled. Floral bracts 2, ovate acute, 1.25 in. long. Sepals wide and saccate at base, 1.5 in. long, outside covered with large scales fimbriate at edges. Petals waxy white. Petals 2.5 in. long, 1.4 in. wide, outside covered with stellate hairs and a few peltate scales with fimbriate edges along the centre, inside glabrous. Staminal column stout, 3 in. long; anthers several in a head on the compound filaments. Hab. Forests. Malacca, Hulu Belakan (Goodenough). Perak, Gunong Pondok (Kunstler). Maxwell's Hill. Dindings, Lumut (Curtis). Native name: Durian Tana.

(8) D. pinangianus Ridl. D. testudinarum var. pinangiana Becc. Malesia, iii. 246; King, l.c. 55.

Tree of large size. Leaves lanceolate, long acuminate, base rounded; nerves numerous very inconspicuous, smooth above, covered with small scales beneath, 5 to 6 in. long, 1.5 to 1.75 in. across; petioles '5 in. long. Flowers crowded in cymes on the trunk. Bracts ovate-lanceolate obtuse, covered with large scales 1.25 in. long. Sepals 1.5 in. long, broad lanceolate. Petals pink or pinkish white, backs darker, oblong pointed, 2.25 in. long, inside glabrous, outside covered with stellate hairs and a few fimbriate scales. Stamens as long. Style crimson, tomentose. Fruit globose large, with numerous close set long cylindric processes. Aril of seed pink, tasteless. Hab. Forests. Penang, West Hill at 2000 ft. altitude. Perak, Gunong Keledang. Native name: Durian Burong.

(9) D. Wrayi King, l.c. 53.

A large tree. Young branches scaly. Leaves elliptic caudate, base rounded, glabrous above covered with thin scales beneath; nerves 10 to 12 pairs, 5.5 to 8.5 in. long, 2 to 2.5 in. wide; petioles '75 in. long. Flowers on the branches 2 in. long, rose pink; pedicels 1 in. long. Bracts 3 ovate connate. Calyx cup-shaped, teeth 5, rather deep, sub-acute, outside covered with large scales. Petals
Trees. Leaves entire scaly beneath. Flowers small, axillary. Calyx deeply 4- to 5-cleft. Petals linear-ligulate. Stamens many, some free, some coherent, outer ones abortive; anthers globose opening by a terminal pore. Ovary 3- to 5-celled; ovules 1 or more in each cell. Fruit 3- to 5-valved, muricate. Seeds few ovoid, arils half covering them. Species 4 or 5, Malayan.

B. Griffithii Masters, in Hook. fl. F.B.I. i. 352; Journ. Linn. Soc. xiv. pl. xv. figs. 29 to 30; King, l.c. 55.

A slender tree 30 to 60 ft. tall. Leaves oblong or elliptic, shortly abruptly acuminate, base round; nerves 8 to 11 pairs, beneath grey 5 to 6 in. long, 1'5 to 2'25 in. wide; petioles '4 to '6 in. long. Flowers '75 in. across, solitary or in 2- to 3-flowered cymes axillary, yellowish white. Bracts 2, ovate scaly blunt. Sepals 4, ovate pubescent, scaly outside. Petals 4 to 8, twice as long, linear or spatulate. Ovary ovoid scaly. Capsule oblong fusiform, scarlet, covered with short spines 1'75 in. long. Seeds 3 to 6, black, '5 in. to 1 in. long, aril half-way. Hab. Forests whole peninsula, from Singapore to Kedah. Common. Distrib. Sumatra. Native names: Durian-Durian, hence Dendurian and Daun Durian; Durian Hadji; Dada Ruan.

10. NEESIA, Bl.

Trees. Leaves entire, not scaly; stipules leafy; cymes from the axils of fallen leaves scaly. Bracteoles 3, connate into a cup, covered with scales. Calyx ventricose conical above, opening by a circular orifice at the top, finally dilating and cushion-shaped. Petals 5, free, imbricate. Stamens numerous; filaments more or less united; anthers 2-celled. Ovary oblong, 5-celled. Style short; ovules numerous, biseriate. Fruit large, ovoid woody, muricate, dehiscing part way loculicidally. Seed small; aril small waxy. Species 7, Malayan.

(i) N. synandra Masters, in Hook. fl. F.B.I. i. 352; King, l.c. 56.

A tall straight tree 60 to 70 ft. or more tall. Branches stout. Leaves at the ends of branches, coriaceous, oblong-elliptic to obovate-elliptic, tip rounded emarginate, base sub-cordate, above glabrous, beneath pubescent; nerves 13 to 22 pairs, elevated beneath, 7 to 16 in. long, 3'5 to 8 in. wide; petioles 1'5 to 3 in. long. Cymes 1'5 long, 8- to 12-flowered on the main branches
below the leaves; pedicels short scaly. Flowers 6 in. long, creamy white. Calyx pubescent within, scaly outside, eventually forming a cushion 5 in. across. Petals ovate-lanceolate, glabrous. Ovary pilose. Fruit 6 to 8 in. long, 4 to 5 in. through, ovoid-conic, 5-angled, blue grey, covered with pyramidal spines, dehiscing for about two-thirds of its length, lined internally with pungent yellow hair. Seed 5 in. long, ovoid-oblong, flattened, shining brown or black; aril small, waxy orange-colour, tasteless. Hab. Forests, not rare. Singapore, Bukit Timah; Kranji. Pahang, Tahan woods. Malacca (Griffith). Perak, Goping (Kunstler). Penang, Penara Bukit; Penang Hill, half-way up (Maingay).

11. CŒLOSTEGIA, Benth.


(i) C. Griffithii Benth. and Hook. fil. Gen. Plant. i. 213; Masters, in Hook. fil. F.B.I. i. 353; Journ. Linn. Soc. xiv. 505, t. xvi. figs. 43 to 50; King, l.c. 57.


Order XXIV. STERCULIACEÆ.

Trees, shrubs (or herbs). Young parts usually stellate-tomentose. Leaves alternate, simple, often lobed. Inflorescence axillary, rarely terminal, cymose or panicked. Flowers regular, unisexual. Sepals 5, often connate. Petals 5 or 0. Stamens in a column or
tube many, or rarely few free; anthers in heads, or a single ring on the top of the column, or along the edge of a cup or tube; anther-cells 2. Ovaries 2 to 5, free, rarely 1; ovules many or few attached to inner angles of ovaries; styles as many as ovaries, free or nearly so. Fruit capsular or dry indehiscent. Tropics and subtropics generally. Species 500 or more.

i. Sterculiæ. Trees often large; flowers unisexual; petals none; stamen-column with anthers on the apex, clustered or in a ring.

Calyx small, lobes tailed; follicles coriaceous, red; seeds 2 or more, black pendulous on edges.

Calyx small, lobes lanceolate; follicles very large membranous, green, 1 seed at base of each.

Calyx campanulate; follicles membranous, opening before ripe; seeds 2 in each.

Calyx long tubular; follicles membranous.

Fruit of thick samaras with falcate wings.

Fruit woody, indehiscent, keeled.

1. Sterculia

2. Scaphium

3. Pterocymbium

4. Erythropsis

5. Tarrietia

6. Heritiera

ii. Helicteræ. Shrubs or medium trees; flowers bisexual; petals deciduous; stamen column bearing a cup edged with anthers and staminodes, 5 to 15.

Shrub; flowers pink, capsule membranous inflated.

Shrub; flowers purple or white; capsule woody not inflated; seed not winged.

Trees; flowers large, white; capsule woody; large; seed winged.

Fruit of thick samaras with falcate wings.

Fruit woody, indehiscent, keeled.

7. Kleinhovia

8. Helicteres

9. Pterospermum

iii. Dombeæ. Flowers bisexual; petals persistent; anthers 10 to 20 on the tip of a cup on the column.

Herb; petals red.

10. Pentapetes

iv. Hermannæ. Flowers bisexual; stamens 5; staminodes 0.

Shrubby herb or shrub; capsule 5-celled; flowers pinkish.

Shrubby; flowers yellow; capsule 1-celled, 1-seeded.

11. Melochia

12. Waltheria

v. Byttneræ. Petals clawed; filaments in a tube with anthers at top.

Stamens 1 row in groups between staminodes; petals clawed; shrub; capsule large bristly.

Stamens in 1 row, solitary between staminodes; petals clawed with 2 lateral lobes and a long appendage; climbers.

13. Abroma

14. Byttneria

vi. Leptonychiæ. Petals not clawed.

Petals linear, simple; stamens 5; staminodes 5; tree; capsule bristly.

Stamens in several series; capsule not bristly; tree.

Stamens in 1 circle, 6, connate in a cup at base.

Stamens in a funnel-shaped tube; anthers 5.

15. Commersonia

16. Leptonychia

17. Leptonychopis

18. Peniculifera

1. Sterculia, Linn.

Trees or shrubs. Leaves entire or lobed or digitate-compound. Inflorescence panicled or racemose, axillary. Flowers male with few bisexual or female. Calyx tubular, lobes acuminate or tailored,
pink or green, small 4- to 5-lobed. Petals 0. Staminal column with a head of sessile anthers at the top. Carpels 5, distinct on a gynophore, when ripe follicular coriaceous spreading, dehiscing, on one side, scarlet. Seeds oblong pendent from edge, black. Species about 200, all tropics.

(1) **S. foetida** Linn. Sp. Pl. 1008; Wight, Ic. t. 181, 364; Masters, in Hook. fil. F.B.I. i. 354.


A large tree about 60 to 120 ft. tall. Young branches thick,
Sterculia.] XXIV. STERCULIACEAE. 269

hairy. Leaves coriaceous, ovate or ovate-round entire, base cordate, above minutely pubescent, beneath sub-tomentose, midrib and 6 to 8 pairs of nerves rufous-villous, transverse; nervules distinct, 8 to 16 in. long, 6 to 12 in. wide; petioles 3-6 to 6 in. long softly hairy. Panicles 6 to 8 in. long, axillary much-branched; branches slender pubescent. Calyx 15 in. across, campanulate, stellate-hairy, 5-lobed; lobes triangular, shorter than the tube. Follicles 3 to 5, leathery-woody, 2-25 in. long and wide, shortly stalked, pink to crimson, pubescent outside. Seeds oblong black, '75 in. long. Hab. A common tree in forests at low altitudes. Singapore, Johor, Pahang, Malacca, Selangor, Perak and Penang. Distrib. Java. Native name: Milian.

(3) S. lavis Wall. Cat. 1138; Masters, l.c. i. 357; Pierre, Fl. For. Cochinchine, i. 192, figs. 1 to 7; King, l.c. 63. S. coccinea Jack, Mal. Misc. i. 286 (not of Roxburgh).

A shrub about 6 ft. tall. Leaves membranous obovate-oblong or obovate, shortly bluntly acuminate, base acute, glabrous; nerves 6 to 9 pairs, 4.5 to 9 in. long, 2 to 3 in. wide; petioles 1-1 to 2.5 in. long. Panicles short, few-flowered axillary pendulous pubescent. Calyx 5 in. long, green or whitish yellow, tips of lobes green, pubescent, tube urceolate, lobes longer linear-oblong sub-acute. Male flowers, staminal column short, glabrous, brown; anthers 10, sessile at the top, pollen brilliant orange colour. Hermaphrodite flowers, gynophore short. Ovaries 5 pubescent, boat-shaped, with 10 sessile anthers outside at the base. Stigmas 5, cylindric recurved. Follicles 3 to 5 coriaceous narrow oblong, puberulous, 2 in. long, 1-5 in. wide, scarlet. Seeds 3 or 4 on each side, blue black. Very common over the whole peninsula from Singapore to Penang, Kelantan and Pulau Adang isles, in forests, at low levels. There are two forms, (a) latifolia with broad leaves about 3 in. across and (b) angustifolia with narrow long leaves 2 in. across. Distrib. Tenasserim, Borneo. Native name: Chempaka Janggi.

(4) S. hyposticta Miq. Fl. Ind. Bat. Supp. 399; King, l.c. 64.

A shrub 3 to 6 ft. tall, glabrous except the inflorescence. Leaves membranous, oblong, or oblong-lanceolate abruptly caudate acuminate, base rounded, often emarginate; nerves 3 to 5 pairs, inarching from margin, prominent beneath, 3-5 in. long, 1-5 to 2-25 in. wide; petioles 1 to 1-5 in. long. Racemes solitary axillary, 6 in. long pubescent and hairy. Calyx-tube campanulate, '25 in. long, densely pubescent outside, lobes shorter than tube, linear glandular-pilose within, white. Male flowers; column short; anthers sessile. Female flowers, gynophore short; ovaries 4 ovoid tomentose; anthers sessile. Style simple, villous. Stigma large, lobes 4 oblong ovoid. Carpels 2 or 3 leathery red narrow oblong 2 to 2-25 in. long, '65 in. wide pubescent outside. Seeds 4, oblong pointed, black. Hab. In dense forests. Pahang. Kwantan (Durnford). Perak, Gunong Batu Putih (Wray); Larut Hills (Kunstler),
Chankat Mentri (Kloss); Gunong Bintang (Kloss). Tringganu, Bundi (Rostado). Distrib. Cochin-China, Nicobars, Sumatra.


Shrub about 10 ft. tall. Leaves oblong-linear acuminate obtuse, margins often undulate, glabrous sub-coriaceous, 6 to 12 in. long, 2 in. wide; nerves distinct beneath 18 to 26, meeting in loops far from the margin; petioles 5 to 1.5 in. long. Raceme 6 in. long, rachis hairy. Flowers about 14; pedicels 5 in. long. Calyx pubescent, tube campanulate 2 in. long, lobes linear hairy connivent 3 in. long. Staminal-column shorter than the tube; anthers 8. Follicles 5, elliptic-ovate cuspidate 2 in. long, 1 in. wide, red, pubescent outside. Seeds 4 in each carpel, sub-globose. Hab. In forests, local. Singapore, Bukit Timah, etc. Malacca, Bukit Kanding (Cantley).

(6) **S. parvifolia** Wall. *Cat.* 1123; *Masters*, l.c. i. 356; *King*, l.c. 64.

A tree 20 to 30 ft. tall, glabrous. Leaves membranous, oblong-lanceolate acuminate blunt, base acute or rounded; nerves 6 to 8 pairs, prominent beneath, 4 to 6.5 in. long, 1 to 1.75 in. wide; petioles 1 to 1.75 in. long; racemes axillary solitary, 2 in. long, few-flowered, glabrous. Calyx less than 5 in. long, glabrous outside, puberulous inside pink, lobes greyish, tube broad cylindric, lobes linear-lanceolate as long. Male flowers, staminal column short; anthers 12. Female, ovaries 5 ovate pubescent; styles united recurved, white-hairy. Stigmas clavate. Follicles 3 to 5 oblong, 1 to 1.25 in. long, 0.6 in. wide. Seeds 2, ovoid, black. Hab. Hill woods. Selangor, Weld's Hill; Kwala Lumpur (Foxworthy). Perak, Thaiiping Waterfall (Wray). Penang, Government Hill (Curtis, Wallich). *Native name*: Unting-Unting.


Small tree, deciduous. Leaves grey when dry, obovate, tip rounded, glabrous; nerves 5 pairs, 3.5 in. long, 1.5 in. wide; petioles 25 to 5 in. long. Panicles lax, much-branched, 1 to 1.5 in. long, pubescent, produced after the fall of the leaves. Male flowers campanulate, 12 in. long, lobes lanceolate-linear blunt, edges hairy. Stamens 6, column as long as tube. Female flowers campanulate 2 in. long, lobes ovate, very short, scabrid pubescent inside with 12 raised veins; anthers 5. Lankawi Islands, Kwah and Terutau (Curtis).

Really allied to *S. bicolor*, but glabrous.

(8) **S. Kunstleri** *King*, l.c. 65.

Glabrous tree 30 to 50 ft. tall, 1.5 to 2 ft. through. Leaves thinly coriaceous, bright green mottled yellow, broadly ovate to oblong or narrowly elliptic, tip rounded, blunt or shortly abruptly acuminate, base rounded or blunt; nerves 7 to 9 pairs, 4 to 9 in. long, 2 to 4.5 in. wide; petioles 75 to 2.75 in. long, slender.
Panicles solitary axillary 3 in. long, flocculent tomentose, base nude, lateral branches numerous, short. Calyx '3 to '35 in. long, urceolate, tube stellate tomentose outside, creamy white, base tinged light red, lobes shorter than tube, linear-lanceolate, villous inside, tomentose outside. Male flowers, stamen-column short with 5 anthers. Female flowers, ovaries 3, villous with a ring of yellow at base. Stigmas fleshy, clavate bent on themselves. Follicles 2 or 3, woody, peach-coloured to carmine, oblong, base rounded, tip acute, tomentose outside, 3 to 3'5 in. long, 1'25 to 1'5 in. wide. Seeds narrow, ovoid nearly 1 in. long. Hab. In dense jungle; Perak, Goping (Kunstler). Distrib. Sumatra.

(9) S. parviflora Roxb. Hort. Beng. 50; King, l.c. 66. S. Maingayi Masters, l.c. i. 359; Pierre, Fl. For. Cochinchine, t. 188.

A big tree 50 to 60 ft. tall and 18 in. through. Leaves membranous, ovate or obovate-oblong, shortly bluntly acuminate, base rounded and slightly cordate, glabrous, midrib and 7 or 8 pairs of nerves prominent, stellate-pubescent when young, 4 to 10 in. long, 2 to 5'5 in. wide; petioles tomentose, 1 to 4 in. long. Panicles red-tomentose, slender, 5 to 6 in. long. Branches distant, short, '5 in. long. Calyx '2 in. long, tube urceolate, lobes linear-lanceolate, nearly as long, pink, tomentose outside, glabrous within. Male flowers, staminal column with 10 sessile ovate anthers. Female flowers, ovaries 5, scaly with a ring of anthers at base. Stigmas united into a 5-lobed disc of 5 recurved stigmas. Follicles 1 to 5, thickly coriaceous bright red to orange, pubescent or glabrescent, oblong, short-beaked, 2'5 to 3'5 in. long, 1'25 to 1'5 in. wide. Seeds black '6 in. long. Hab. Common in woods in the low country, Singapore, Pahang, Malacca, Perak and Panang. Distrib. Burma, Sylhet, Cochín-China. Native names: Kadampang; Rongga Jantan.

(10) S. Scortechinii King, l.c. 67.

A tall tree. Leaves thinly coriaceous, oblong, slightly obovate, tip rounded, abruptly short acuminate blunt, base narrowed rounded minutely cordate, above glabrous, beneath minutely gland-dotted; midrib and nerves 4 or 5 pairs, stellate pubescent, 2 nerves rising straight from he base, 2 to 5 to 3'5 in. long, 1'25 to 1'65 in. wide; petioles '65 to 1 in. long, pulverulent. Panicles raceme-like, axillary solitary, tomentose, 2 in. long. Calyx campanulate, divided nearly to base into 5 ovate lobes, pubescent tomentose on both sides. Male flowers with 10 anthers on the column. Females, ovary 3-celled obliquely ovoid, pubescent, scaly; ovules 3 to 4 in each cell; styles connate, pubescent. Stigmas 3, ovoid. Fruit unknown. Hab. Perak, locality unknown (Scortechini).

A tree about 20 to 30 ft. tall. Leaves membranous, obovate-oblong, shortly abruptly acuminate, base narrowed acute, rounded or cordate above glabrous, beneath stellate-pubescent; midrib and 7 to 10 pairs elevated nerves more hairy, 4½ to 7½ rarely to 12 in. long, 2 to 3, rarely 6 in. across; petioles 3 to 1½ in. long, rufous-tomentose. Panicles solitary, axillary pendent 3 to 6 in. long, rufous-tomentose. Male flowers yellow with pink hairs and 5 dark red blotches at the base inside, widely campanulate, lobes linear-lanceolate. Staminal column longer than the tube; anthers 10, yellow. Female flowers on different sprays of the same tree, lobes of calyx lanceolate, free nearly to the base, hairy with pink and white hairs, except at the base where are 5 pink spots. Gynophore short with 10 anthers at base of pistil. Ovary villous; styles united. Stigmas 3 or 5, all greenish white. Follicles 5, coriaceous, oblong, shortly beaked, 2 in. long, 1 in. wide, pubescent outside, crimson scarlet. Seed ellipsoid, blue black. *Hab.* Common in woods in open country, whole peninsula from Singapore.
to Penang. Distrib. Cochin-China, Burma, Java and Sumatra. Native names: Dudanak; Saburu; Sakelat; Unting-Uting Besar.

var. ensifolia Ridl. S. ensifolia Masters, in Hook. fil. F.B.I. i. 359; King, i.e. 70.

A shrub 8 to 12 ft. tall, or even shorter. Leaves narrow lanceolate, or oblanceolate acuminate, 6 to 10 in. long, 1'5 in. to 2'5 in. wide. Flowers '75 in. long in simple pendulous racemes, 1 ft. or more long. Hab. In dense forests, usually at some altitude up to 3000 ft. Dindings, Gunong Tungul. Perak; Thaiping Hills. Province Wellesley, Kubang Ulu (Curtis). Penang, near the Waterfall and Moniot's Road.


A small tree about 20 ft. tall. Leaves obovate-oblong, acute with a short cusp, base rounded; nerves 12 pairs, elevate beneath, 8 in. long, 3 in. wide, dull green above, glabrous with a few hairs on midrib and nerves, beneath yellowish; nerves hairy; petioles 2 in. long, hairy. Panicle 6 in. long. Branches few short hairy. Male flowers 1 in. long red, lobes lanceolate not tailed, tips connate, tube campanulate very short; anthers 5. Follicles 4, elongate-lanceolate acuminate stalked 4 in. long with a long terete curved beak as long, 2 in. across. Seeds 6 in a follicle, '5 in. long. Hab. Pahang at Telom, on the river-bank, rare (Ridley).


Tree 50 to 60 ft. tall, 8 to 12 in. through. Leaves elliptic or obovate-elliptic, abruptly acuminate, chartaceous, base rounded or shortly cuneate glabrous except nerves beneath; nerves 9 pairs elevate beneath, as are the conspicuous reticulations, all sprinkled with stellate hairs; midrib prominent, red-stellate-hairy, 6 to 11 in. long, 3 to 5'5 in. wide; petioles 1'5 to 2 in. long, red-hairy. Racemes 3 to 3'5 in. long, slender densely red-hairy. Flowers remote; pedicels '25 in. long. Sepals '2 in. long, broad lanceolate acuminate blunt, densely hairy. Stamen-column half as long and as wide. Seed oblong. Hab. Hill forests at 3000 ft. altitude. Selangor. Sempang mines (Ridley). Perak, Batang Padang district (Kunstler).


Shoots roughly red-hairy. Leaves elliptic or oblong, base broad, truncate, shortly cordate, tip cuspidate, membranous above covered with scattered pale hairs, with stellate tufts on nerves and reticulations, beneath more thickly covered with stellate hairs and long rough hairs; midrib densely tomentose with stellate hairs and long hairs mixed; nerves 7 to 10 pairs, 4 to 6 in. long, 2 to 3 in. wide. Panicles numerous crowded at the ends of the branches, 6 to 8 in. long, densely rough-hairy. Branches 1 in. long. Male flowers, '3 in. long, tube campanulate, lobes as long, linear, ciliate. Staminal column as long as tube; anthers 8. Female flowers and fruit unknown. Hab. Rare, Selangor, at Ulu
Gombak (Burn-Murdoch) and in Cantley's herbarium with no locality.

(15) **S. angustifolia** Roxb. Hort. Beng. 50; Pierre, Fl. For. Cochinchine, t. 190; King, l.c. 68. S. Balanghas var. mollis, Masters, l.c. i. 358.

A tree 30 to 40 ft. tall. Branchlets velvety rusty-tomentose. Leaves membranous oblong rarely obovate-lanceolate acuminate or acute, narrowed to the rounded base, above glabrous, beneath densely red-tomentose, 4 to 7 in. long, 1'25 to 2'25 in. wide; petioles 6 to 1'1 in. long, red-tomentose. Panicles crowded at the ends of the branches, solitary axillary lax, drooping red-tomentose, 2 to 6 in. long. Calyx 2 in. wide, hairy except the inside of the tube, dark red, lobes linear-lanceolate, longer than tube. Male flowers, staminal column as long as tube with 10 sessile anthers. Female with 5 ovaries and 10 sessile anthers at base. Style short. Stigmas longer recurved. Follicles 4 to 5, ovate-oblong, beak short curved, 2'75 in. long, 1'35 in. wide, velvety tomentose outside. **Hab.** High up on limestone rocks, rare. Perak at Gunong Pondok (Künstler). **Distrib.** Burma.


A large tree. Leaves elliptic-oblong or ovate, shortly acuminate blunt, base rounded peltate, coriaceous, above glabrous, beneath tomentose-hairy; nerves 9 pairs, 5 to 6 in. long, 2'25 to 2'75 in. wide; petioles Rufous-hairy, 1 in. long. Panicles lax with short branches, 6 in. long. Branches 1 in. long or less slender, tomentose. Flowers numerous small, 1 in. long on short pedicels. Calyx-tube very short, lobes 5, lanceolate blunt red-tomentose outside, white-tomentose inside. Staminal-column very small as long as the tube; anthers minute. Female flowers much larger, 2 in. long, campanulate hairy outside, glabrous within, lobes lanceolate sub-acute. Carpels pyriform, quite glabrous, 2 in. long, shortly cuspitate. **Hab.** Not common, Johor Road to Gunong Pulai. Malacca (Maingay). Penang, Waterfall (Curtis). Lankawi, Terutau (Curtis). **Distrib.** Java and Sumatra.

The panicles are often entirely male, but in female panicles there are usually a small number of male flowers intermixed.

(17) **S. bicolor** Masters, l.c. i. 359; King, l.c. 67.

Tree 40 to 60 ft. tall. Leaves on branch-ends membranous obovate-oblong acute, narrowed to the rounded base, above glabrous, beneath whitish, densely minutely tomentose; midrib and 16 to 18 pairs nerves tomentose, 2'5 to 3 in. long, 1'2 to 1'4 in. wide. Panicles 2 to 3 in. long slender tomentose. Branches 5 in. long. Calyx tube ovoid-oblong, widely campanulate, 3 in. long, lobes as long as tube linear. Staminal column with 12 anthers. Female flowers and follicles unknown. **Hab.** Rare, Malacca (Maingay). Perak at Thaiping (Wray).
2. SCAPHIUM, Endl.

Large trees with coriaceous leaves and panicles of small unisexual flowers, usually tomentose. Calyx tubular, often very short. Staminial column stalk short or long; anthers in a globose head 10 to 30, narrow. Female flowers, ovaries 3 to 5; style short. Carpels very large, thin, membranous, green boat-shaped, with a single ellipsoid seed at the base. Species 4, Martaban, Malay Peninsula and Borneo.

Leaves broad, ovate-cordate . . . . (1) S. linearicarpum
Leaves oblong, base entire.
Panicles densely tomentose; stamen-head sub-sessile glabrous . . . . . . (2) S. affine
Panicle sub-glabrous; stamen-head stalked woolly . . . . . . (3) S. longiflorum

Sterculia linearicarpa Masters, in Hook. fil. F.B.I. i. 360; King, l.c. 740.

Tree 60 to 80 ft. tall, with large leaf-scars on the branches. Leaves coriaceous ovate-orbicular cordate, obtuse or rounded at tip; nerves 7 pairs strongly elevate, pubescent beneath, reticulations conspicuous, 6 to 14 in. long, 5 to 14 in. wide; petioles 6 in. long or less. Panicles rather lax, ferruginous, 7 to 8 in. long. Bracts oblong, red-tomentose. Flowers very small on tomentose pedicels 1 in. long. Calyx tube 1 in. long, lobes a little longer, ovate acute, tomentose outside. Stamen-column shorter than calyx-tube, glabrous; anthers 10, cuneate 2-celled. Ovaries 3 free. Follicles 2, boat-shaped acuminate, densely yellow-woolly, 3-2 in. long, acuminate, on yellow woolly pedicels 5 in. long. Seed 1. Hab. Malacca (Maingay); Perak (Scortechini, Kunstler).

Sterculia affinis Masters, l.c. i. 361. S. scaphigera King, Journ. As. Soc. Beng. l.c. 75 (partly) not of Wallich.

Tree 60 to 80 ft. tall. Leaves coriaceous glabrous, oblong or oblong-ovate obtuse shortly acuminate, base rounded (lobed when young); nerves elevate beneath, 6 pairs, reticulations conspicuous, 5 to 7 in. long, 2-2 to 3-2 in. wide; petioles 3 to 3-5 in. long, thickened at apex. Panicles axillary 6 to 7 in. long, red-tomentose. Branches numerous 2-5 in. long. Flowers numerous, green, very small. Bracts ovate, woolly. Calyx 1 in. long, tube very short, lobes 4, ovate, minutely scurfy, as long as the tube. Anther head nearly sessile, with a very short glabrous stalk; anthers 12, minute, glabrous. Follicles 1 to 5 on pubescent stalks 5 in. long, green membranous 6 to 8 in. long, glabrous. Seed 1, ovoid brown, 5 to 1 in. long. Hab. Not rare in the forests in south of the peninsula. Singapore, Garden Jungle. Malacca (Griffith). Sungei Hudang and Merlimau. Pahang, Kota Glanggi (Ridley). Native names: Kembang Semangkok (lit. Fill Cup); S'ilayer. Use:
The seed, immersed in water for a night, exudes a gum, containing Bassorin, to such an extent as to fill a small cup. This, mixed with sugar-candy, is eaten as a stomachic, and is very pleasant and wholesome.


Tree. Leaves coriaceous, elliptic-rounded, shortly acuminate blunt, beneath sometimes glaucous; nerves strongly elevate, 7 pairs, reticulations large, distinct beneath, 4·5 to 6 in. long, 2·8 to 3 in. wide; petioles 2 to 2·1 in. long. Panicles 6 in. long, sparingly red-tomentose compact, much-branched. Flowers numerous, glabrous; pedicels 1 in. long. Calyx 3 in. long, tube cylindric 2 in. long, lobes ovate. Stamen-column longer densely woolly, stamens 8, backs woolly. Fruit unknown. *Hab.* Forests. Perak (Scortechini); Waterfall Hill (Wray); Gunong Bubu (Kunstler).

Differs from *S. affine* Masters in the less woolly panicle, much longer flowers and long woolly stalk to the head of stamens; the leaves are smaller and more coriaceous.

### 3. PTEROCYMBIUM, Benn.

Trees. Leaves entire or lobed. Flowers unisexual. Calyx campanulate. Male, staminal column tall with 8 or 10 sessile anthers in a ring. Female, with abortive anthers, otherwise as in male, and 5, rarely 6 pistils on the tip of a column, sessile, distinct. Styles as many, slightly cohering. Stigmas recurved. Carpels 4 to 6 foliaceous, boat-shaped, unequally bilobed, opening before they are ripe, on short pedicels on a gynophore as long as the enlarged persistent calyx. Seed at base 1. Species 2, Burma, Nicobars, Malaya.

Leaves ovate acuminate sometimes lobed, cordate.

- Calyx campanulate
- Leaves oblong-elliptic, base round not cordate.
- Calyx tubular

(1) **P. javanicum**

(2) **P. tubulatum**


Tree 50 to 70 ft. tall, 15 to 20 in. through, leafless in flower. Leaves ovate or oblong-ovate acute or acuminate, glabrous above pubescent or hairy on the nerves beneath or quite glabrous, base cordate or rounded, 4 to 7 in. long, 4 in. wide; petioles 1·5 to 4·2 in. long. Panicles 1 to 3 in. long in flower, enlarging very much in fruit. Calyx 5 in. long, glabrous, campanulate, lobes broad lanceolate, 2 in. long, 1 in. wide, tube as long, coriaceous green, edges velvety. Stamen-column as long as the sepals; anthers linear curved. Follicles membranous 3 to 6 on a gynophore as long as the enlarged sepals, with pedicels pubescent, 5 in. long, boat-shaped, 2 to 3 in. long, with 2 lobes, the lower broad, rounded, the upper
one linear obtuse, 4 in. wide, glabrous. Seed 4 in. long, ellipsoid. 

**Hab.** Open forests by creeks or open woodland. Perak, Gunong Bubu (Kunstler). Perlis, near Kanga. **Distrib.** Burma, Nicobars, Java, Philippines. Native names: Kluet; Kulunot.

(2) **P. tubulatum** Ridl. Sterculia tubulata Masters, in Hook fil. F.B.I. i. 362; King, l.c. 76.

A tree. Leaves thinly coriaceous, elliptic-oblong apiculate, base rounded or truncate, glabrous except midrib and nerves 5 to 7 pairs, minutely rusty-tomentose, 4 in. long, 1.75 in. wide; petioles 1.25 in. long. Panicles terminal 6 in. long, glabrous, many-flowered. Calyx 5 in. long glabrous, tube cylindric 0.25 in. long, mouth expanded, lobes 5, ovate-lanceolate. Stamen-column pilose; anthers in a ring. Ovaries 5. Follicles 5, 2 to 3 in. long, 1 in. wide, on tomentose stalks much resembling those of *P. javanicum*. 

**Hab.** Very rare in forests, Malacca (Maingay).


Trees, deciduous when in flower. Leaves shallowly or deeply lobed. Flowers showy, red-orange in racemes or panicles. Calyx funnel-shaped about 1 in. or more long, shortly 5-toothed. Petals 0. Staminal-tube as long as calyx or longer; anthers about 20, sessile 1-celled. Ovaries 5, flask-shaped. Follicles membranous, stipitate, 2-seeded. Species 2, India and Malay Peninsula.

(1) **E. fulgens** Ridl. Sterculia fulgens Wall. Cat. 1135; Masters, l.c. i. 360; King, l.c. 72.

A tree 30 to 70 ft. tall. Leaves caducous, thinly coriaceous, cordate round with 5 acuminate lobes, glabrous above, stellate-pubescent beneath, palmately 7-nerved; nerves prominent beneath, 15 to 18 in. long and wide; petioles 15 to 20 in. long, puberulous. Flowers produced when the tree is leafless in racemes or panicles 3 to 4 in. long. Calyx 1.25 in. long, funnel-shaped with 5 triangular teeth, orange scurfy, inside puberulous. Staminal-tube longer, tomentose; anthers sessile, 20, oblong, 1-celled, surrounding 5 flask-shaped ovaries. **Hab.** In forests; Perak, Temengo. Selangor, Kwala Lumpur. Penang Hill; abundant and very conspicuous when in flower.

5. **TARRIETIA**, Bl.

Tall or gigantic trees. Leaves coriaceous, simple or digitate. Flowers small, unisexual, panicled. Calyx tubular, small, 5-toothed. Petals 0. Staminal-column short, with a ring of 10 to 15 densely clustered anthers; cells parallel. Ovary of 3 to 5 carpels opposite the sepals; styles short, filiform; cells 1-ovuled. Fruit of large spreading samaras; wings long falcate. Seeds oblong. Species 5 to 6, Malaya, Cochin-China and Australia.
Leaves compound digitate.
  Under-surface stellate tomentose . . . (1) T. perakensis
  Under-surface deciduously simple hairy . . . (2) T. Curtisii
Leaves simple, ovate-oblong, large stiff coriaceous.
  Fruit glabrous; leaves ovate . . . . . . . . . . . . (3) T. simplificifolia
  Fruit tomentose; leaves oblong . . . . . . . . . . . . (4) T. Kunstleri
Leaves unifoliolate, oblong; petiolule jointed on petiole, small rather thin, coriaceous . . . (5) T. unifoliolata

(1) T. perakensis King, Journ. As. Soc. Beng. l.c. 77.
  Tree 30 to 60 ft. tall, 1.5 to 2 ft. through. Young parts, petioles, petiolules, under-surface of leaves when young and in florescence covered with a rusty tomentum. Leaves digitate, of 5 or 6 leaflets obovate to elliptic, shortly abruptly acuminate, base narrowed; nerves 10 to 14 pairs, prominent beneath; middle leaflet 4.5 to 5.5 in. long, 2 to 3 in. wide, lower ones 2 to 3.5 in. long, 1.25 to 1.5 in. wide; petiolules 0.5 to 1 in. long; petioles 3 to 4.5 in. long. Panicles cymose axillary, crowded at the tips of the branches, red-tomentose. Flowers 1.5 in. long; pedicels slender, dark red. Calyx-tube tomentose outside, dark red-pubescent inside. Staminal column less than half as long. Female rather larger with no stamens, 5 ovoid glabrous ovaries. Fruit ovoid compressed, 1.25 to 1.5 in. long, 1.15 in. through, glabrous; wing falcate, 2 in. long, 5 in. wide, glabrous. Hab. Rocky woods, Perak, Thaiping Hills (Kunstler).

(2) T. Curtisii King, l.c. 77.
  Tree 20 to 30 ft. tall. Young parts, petiolules, petioles and under-side of leaves covered with rusty stellate tomentum. Leaves digitate; leaflets 5 to 6; middle leaflets obovate to elliptic, apex sub-acute, base narrowed, 3.5 to 4.5 in. long, 2.25 to 2.5 in. wide, lower ones 1.5 to 1.25 in. long, 0.8 to 1.5 in. wide; nerves in leaflets 9 to 10 pairs, prominent beneath; petiolules 0.5 to 0.75 in. long; petioles 2 to 2.5 in. long. Panicles dense, very floriferous, densely tomentose, 4 to 4.5 in. long. Flowers 0.12 in. long, dark red; pedicels as long. Calyx campanulate, lobes acute. Fruit obovoid, compressed, 1 in. long, 0.75 in. through, glabrous; wing narrow falcate ribbed, 1.3 in. long, 0.2 in. wide. Hab. Forests. Penang, Government Hill; Moniots Road; Muka head (Curtis).

(3) T. simplicifolia Masters, in Hook. fil. F.B.I. i. 302; King, l.c. 78.
  A gigantic buttressed tree over 100 ft. tall. Leaves simple, glabrous coriaceous, elliptic or obovate, apex truncate or shortly cuspidate, base narrowed, beneath puberulous; nerves strongly elevate, 16 to 20 pairs, 4.5 to 7 in. long, 3 to 4.5 in. wide; petioles 2 to 3 in. long, thickened at tip. Panicles axillary, many-flowered, 1.5 to 3 in. long. Flowers 0.1 in. long; pedicels shorter. Calyx-tube campanulate, minutely tomentose outside, puberulous within. Staminal-column short. Fruit glabrous. Hab. Singapore, Dalvey Road. Malacca (Griffith, Maingay). Negri Sembilan, Kopis (Kinsey).
(4) **T. Kunstleri** King, l.c. 79.
Tree 70 to 100 ft. tall, 2 to 3 ft. through. Young parts, petioles and peduncles minutely stellate-pubescent. Leaves elliptic to obovate-oblong blunt mucronate, base rounded, slightly narrowed, above smooth shining, below pale stellate-puberulous on midrib and 7 to 10 pairs of nerves. Fruits 1 or 2, on a stout stellate hairy peduncle, ovoid, 1 in. long with an oblique spatulate wing, 1 in. long, '6 in. wide, puberulous. Hab. Dense forests, rare. Perak, Gunong Bubu, 500 to 800 ft. altitude (Kunstler).

Tall tree. Leaves unifoliate; petioles slender, 1 in. long; petiolule jointed on the swollen top of the petiole, '25 in. long; blade elliptic sub-acute, base blunt, slightly narrowed, often inequilateral; nerves slender faint, about 18, 2:25 to 3:5 in. long, 1 to 1:5 in. wide, glabrous, coriaceous. Panicle about 4 in. long, pubescent. Flowers numerous, '08 in. long. Calyx-tube longer than 5 short ovate lobes, pubescent. Staminal-column very short, head globose. Carpels 5. Hab. Malacca (Derry). Native name: Kamuning hutan. **Use**: For timber and medicine.

This is very near *T. javanica* Bl., but that has the leaves always trifoliolate and larger, while all the leaves on this one specimen are solitary and jointed on the petiole.

### 6. HERITIERA, Aiton.

Trees short and stout or vast. Leaves coriaceous, simple, scaly beneath. Flowers small, pinkish, in axillary panicles. Calyx 5 (rarely 4- to 6-toothed). Petals 0. Anthers in a ring at the top of the column; cells 2 parallel. Ovaries 5 or 6, nearly free; style short. Stigmas thick. Carpels large, woody, keeled (or winged). Species 6 or 7, tropics of Old World to Australia.

- Short low-branched tidal tree.
- Fruit ovoid keeled
- Tall straight forest tree branched at top only.
- Fruit obovoid, winged

(1) **H. littoralis** Dryand. DC. Prodr. i. 484; Masters, l.c. i. 363; King, l.c. 79.
A low much-branched stout tree. Bark flaking. Leaves oblong or elliptic, tip rounded or acute, base rounded, dark green above, silvery beneath; nerves 7 to 9 pairs, slightly prominent beneath, 5 to 7 in. long, 2 to 3:5 in. across; petioles stout '5 in. long. Stipules lanceolate. Panicles 3 in. long, lax axillary, scurfy. Flowers '2 in. long. Calyx campanulate, 5-toothed scurfy pink as long as the pedicel. Fruit 1:5 in. long woody, compressed, ovoid, keeled, glabrous, shining. Hab. Common in mangroves all over the peninsula. **Distrib.** Tropics of Old World. **Native names**: Dun-gun; Peler Kambing; Atun Laut; Bayur Laut; **Use**: The
wood is very hard and compact, but rarely tall enough for beams. Used for firewood.


Gigantic tree 100 ft. tall, 2 ft. through, with large buttresses and grey flaky bark. Leaves elliptic obtuse, base rounded or truncate, 4 in. long, 2'75 in. wide, coppery scaly beneath; nerves 5 pairs, elevate above, inconspicuous beneath; petioles '25 to '5 in. long. Panicles in axils of fallen leaves, 4 to 5 in. long, densely stellate-hairy. Flowers pink. Calyx campanulate, shortly 5-lobed, '5 in. long, stellate, hairy. Staminal column slender, much shorter; anthers 5. Fruit on short woody peduncles, obovate, brown with a sub-triangular blunt wing 1'5 in. long; wing '5 in. long. Seed oblong. *Hab.* Forests. Singapore, Botanic Gardens Jungle.

7. **KLEINHOVIA**, Linn.

A medium to small tree. Leaves ovate, often cordate. Panicle lax, terminal. Bracts small. Sepals 5, much longer than the petals, linear-lanceolate, deciduous. Petals 5, unequal, upper ovate saccate, middle pair concave obliquely oblanceolate, lower flat with convolute edges. Stamens 20, in 5 fascicles of 3 each, 5 solitary free, often reduced to filaments between the fascicles; filaments all joined below into a hairy cylindric tube; anthers 4-celled. Ovary on a long gynophore, 5-lobed, 5-celled. Capsule turbinate-pyriform, membranous, inflated. Seeds 1 or 2 in each cell, tubercled. Species 1, Old World tropics.


A shrub or small tree 20 or more ft. tall. Leaves ovate-round acuminate 2'5 to 5 in. long; petioles 1'5 to 2'5 in. long. Panicle 6 to 12 in. long. Flowers '4 in. long, pink. *Hab.* Banks of streams and open country, local, not common. Singapore (Wallich, Kunstler). Johor, Pulau Aor (Feilding). Malacca (Griffith). Perak, Kwala Dipang (Curtis); Kwala Kangsa; Chenderiango (Kunstler).

8. **HELICTERES**, Linn.

Shrubs, rarely trees, more or less stellate-pubescent. Leaves simple. Flowers pink or white, solitary or fascicled, axillary. Calyx tubular, 5-fld often irregular. Petals 5, clawed, unequal or equal, claws often auriculate. Staminal-column 5-lobed or toothed; anthers 2-celled; staminodes below the top of the column 5. Ovary on the gynophore at the top of the column, 5-lobed, 5-celled; styles subulate, thickened at tips; ovules many. Follicles woody, spirally twisted or straight. Seeds tubercled. Species about 30, tropics of both worlds.
(1) **H. Isora** Linn. *Sp. Pl.* 1366; Masters, *l.c.* i. 365; *Pierre, Fl. For. Cochinchine*, t. 208, figs. 12 to 25; *King, l.c.* 81.

A shrub or treelet. Leaves ovate-round oblique, abruptly acuminate rounded, edges serrate, dentate, sometimes lobed, base cordate or rounded, rarely acute, 5- to 7-nerved, above glabrous minutely hispid, beneath pubescent or tomentose, 2 to 4 in. long, 1'25 to 3 in. wide; petioles '3 in. long, tomentose. Stipules linear '3 in. long. Flowers red solitary, or in few-flowered cymes, 1'25 in. long. Calyx narrow, campanulate 2-lipped, 5-toothed, tomentose. Petals reflexed, lower 2 shorter and broader than upper. Staminal-column longer, curved with 10 to 12 long ovate anthers and within 5 bifid staminodes. Ovary grooved, tomentose, ovoid. Fruit cylindric, twisted, 1'5 in. long, '4 in. through, terminated by the styles, pubescent. *Hab.* Rare in open country. Pahang, Rumpin River (Evans). Perak, Larut (Kunstler). Province Wellesley near the coast (Curtis); Penang, highlands (Curtis). *Use:* The fruit sold as a drug in the shops under the name of Chabei Pintal.

(2) **H. hirsuta** *Lour. Fl. Cochinchine*, 648; *Bl. Bijdr.* 80; *King, l.c.* 191; *Pierre, l.c.* t. 208, figs. i to 11.

A velvety tomentose shrub 4 to 8 ft. tall. Leaves ovate or rhomboid, sub-oblique acuminate serrate, base rounded, above scabrid-pubescent, midribs and nerves and undersurface tomentose; nerves 4 or 5 pairs, 3'5 to 6 in. long, 1'75 to 2'5 in. wide; petioles '4 in. long, tomentose. Cymes scorpoid, few-flowered, '1 in. long. Flowers '75 in. long, purple or dull pink. Calyx campanulate-cylindric, stellate-tomentose, 5-toothed. Petals linear sub-spathulate, 2 rather broader than the others with small horn-like appendages about the middle. Staminal-column as long. Fruit cylindric acuminate, not twisted, densely covered with long villous, stellate-pilose soft prickles, 1'2 in. long, '35 in. wide. *Hab.* Open country, common. Malacca, Malaka Pindah. Selangor, Kwala Kubu. Perak, Ipoh; Temengo, Penang (Porter, *Wall. Cat.* 1183), Kedah Yan. Lankawi, Perlis, and Pulau Rawai. (A wiry form with smaller leaves.) *Distrib.* India; Malaya; China.

(3) **H. viscosa** *Bl. Bijdr.* 79; *Pierre, l.c.* 209, fig. A.

A bush up to 6 ft. tall, pubescent. Leaves ovate base cordate, apex long-cuspidate, margin sub-lobed with long acute teeth 3'5 in. long, 2'5 in. wide; nerves 3 from base with 2 pairs on the midrib, sparsely hairy above, more so on the nerves and very hairy beneath; petioles '1 in. long or less. Cymes axillary, usually short. Calyx densely stellate-woolly, with 5 narrow acuminate teeth, 1 in. long. Petals glabrous '5 in. long, spathulate rounded with short or long

Easily recognised by the strongly toothed, almost tri-lobed, nearly sessile leaves.

(4) **H. angustifolia** Linn. *Sp. Pl.* 963; *King* {l.c.} 82.

A shrub 2 ft. or more tall, pubescent, except the upper side of the leaves quite glabrous. Leaves pale beneath, lanceolate or oblong-lanceolate obtuse or oblong-truncate mucronulate entire, base narrow, 3-nerved; lateral nerves 5 or 6 pairs, 1·5 to 2·5 in. long, 4 to 5 in. wide; petioles 2 in. long. Cymes axillary few-flowered about 3 in. long. Flowers 4 to 5 in. long, violet pink or white. Calyx densely tomentose 2-lipped, mouth expanded, teeth 5 triangular acute. Petals linear-sub-spathulate with 2 or 3 horned appendages. Staminal column shorter. Ovary tomentose. Fruit ovoid-cylindric, straight 75 in. long, 4 in. wide, densely stellate-villos. *Hab.* Open country, sandy or rocky spots. Johor, Minyak Buku, Kwala Pahat. Adang group. Pulau Rawei. Setul heaths (flowers white). *Distrib.* Malay islands, China and India. var. *obtusa* King, {l.c.} is a form with broader truncate leaves. It occurs in Pulau Rawei and on Setul Heath.

**9. PTEROSPERMUM**, Schreb.

Trees (or shrubs) scaly or stellate-tomentose. Leaves coriaceous oblique, simple or lobed. Inflorescence axillary or terminal. Bracts entire or lacinate. Calyx of 5 valvate coriaceous more or less connate sepals. Petals 5, imbricate, white. Staminal-column short with 3 apiculate anthers, and 5 ligulate staminodes. Ovary within the top of the column, 3- or 4-celled; ovules many in each cell; style entire. Stigma furrowed. Capsule woody or coriaceous, terete or angled, 5-valved. Seeds winged above in 2 rows. Species about 18, Asiatic.

Big tree; flowers 6 in. long ... ... ... (1) **P. diversifolium**

Slender tall trees; flowers 2 in. long.

Sepals pubescent inside; capsule 3 to 4 in. long ... (2) **P. Blumeanum**

Sepals silky inside; capsule 1·5 in. long ... ... (3) **P. Jackianum**

(1) **P. diversifolium** Bl. Bijdr. 88; Masters, *in Hook. fl.* F.B.I. i. 367; Pierre, *Fl. For.* Cochinchine, t. 179; *King*, {l.c.} 84.

A tree 60 to 100 ft. tall, 15 to 24 in. through. Young branches, petioles, under-side of leaves, sepals and the fruit covered with a minute tawny tomentum, with many stellate hairs. Leaves coriaceous, peltate and lobed on young shoots, ovate-oblong to rounded-elliptic, tip broad blunt, with an abrupt triangular point, edges sinuous, base cordate, above shining; nerves 8 to 10 pairs, 6 to 9 in. long, 3·5 to 6 in. wide; petioles 1 to 1·25 or 2 in. long.

(2) P. Blumeanum Korth. Ned. Kruidk. Arch. ii. 311; King, l.c. 84.

A tall but not stout tree 40 to 50 ft. high. Branches covered with red hairs, eventually blackish. Leaves thinly coriaceous, inequilateral, oblong-ovate or lanceolate-oblong acuminate, base broad unequally cordate, above light green, shining beneath tawny-tomentose, with stellate hairs inter-mixed; nerves 7 to 9 pairs, 3 to 5'5 in. long, r35 to 2 in. wide; petioles '15 in. long. Stipules subulate-lanceolate. Flowers 2 in. long, solitary or in 2- or 3-flowered cymes, axillary or pseudoterminal; pedicels '5 in. long. Sepals coriaceous linear acute, stellate-pubescent outside, pubescent inside. Petals obliquely oblong-lanceolate or sub-spathulate, shorter, white. Staminal-tube '5 in. long; anthers 10; staminodes 5. Ovary ovoid, villous; style shorter than tube. Capsule oblong woody, 5-angular, narrowed at base, glabrous when ripe, 3 to 4 in. long, r'5 in. through. Seeds r'5 in. long. Hab. Common in forests. Singapore, Bukit Timah, etc. Johor, Sungei Biku (Down). Selangor, Sungei Buluh (Burkill). Perak, Larut Hills. Penang, Balik Pulau. Lankawi at Kwah. Distrib. Burma, Assam, Java, Sumatra, Borneo. Native name: Bayur.

(3) P. Jackianum Wall. Cat. 1164; Masters, l.c. i. 367.

A tree. Branches covered with white tomentum, with rufous stellate hairs. Leaves sub-coriaceous, oblong or elliptic-oblong, slightly inequilateral, edge entire or sinuate towards the tip, base sub-acute or truncate, minutely cordate, not auricled, glabrous above except midrib and nerves, below pale buff minutely tomentose with rusty stellate hairs; nerves 10 to 12 pairs, 4 to 5'5 in. long, r'5 to 2'2 in. wide; petioles '25 in. long. Flower 2 in. long, solitary axillary; pedicels '1 in. long, tomentose. Sepals linear-lanceolate, tomentose outside. Petals shorter, white, oblanceolate, scaly puberulous outside. Staminal-tube '25 in. long; anthers 12; staminodes 5. Ovary fusiform; style longer than the stamens. Capsule shortly stalked, ovoid terete, acute, r'5 in. long, 1 in. through, covered with flat, scaly hairs. Hab. Hill forests. Penang, Bukit Erskine (Curtis, Phillips). Distrib. Tenasserim, S. Siam.
10. PENTAPETES, L.

Herb. Leaves hastate-lanceolate. Flowers axillary. Bracts 3, subulate. Sepals 5, lanceolate, connate at base. Petals 5, bright red. Stamens 20, connate at base, 15 fertile in 5 groups of 3, alternating with 5 staminodes, nearly as long as the petals; anthers 2-celled, extrorse. Ovary sessile, 5-celled; cells many, ovuled; style entire, twisted and thickened upwards, 5 minute stigmas. Capsule 5-valved. Seeds 8 to 12 bi-seriate in each cell; not winged. Species 1, tropical Asia.


An annual 2 to 4 ft. tall sparsely hairy or glabrescent. Leaves 3 to 5 in. long, narrow, '25 to 5 in. wide, serrate acuminate, base truncate or hastate; nerves 20 pairs; petioles '25 to '5 in. long; pedicels '25 in. long, bristly hairy as is the calyx, '3 in. long, lobes lanceolate acute. Petals obovate rounded '5 in. long. Staminodes sub-spathulate. Ovary bristly. Capsule oblong truncate, '5 in. long, bristly, shorter than the enlarged sepals. Hab. Perlis, fields at Kanga, certainly wild. Distrib. India, China, Java, Philippines.

Often cultivated for its beautiful but fugacious flowers, and occasionally occurring as an escape elsewhere. For one or two years it thus established itself by the Tanglin post office in Singapore.

11. MELOCHIA, L.

Herbs or shrubs, more or less tomentose. Leaves simple. Flowers in clusters or panicles. Sepals 5, connate below. Petals 5, obovate clawed. Stamens 5, opposite the petals, connate below in a tube. Ovary sessile, 5-celled, cells 2-ovuled; styles 5, free or connate at base. Capsule loculicidally 5-valved. Species about 50, tropics generally.

Wiry herb; flowers in terminal and axillary heads . (1) M. corchorifolia
Shrub or treelet; cymes large, lax panicled . . (2) M. velutina

(1) M. corchorifolia Linn. Sp. Pl. 675; Masters, l.c. i. 374; King, l.c. 87.

A slender pubescent shrubby plant about 2 ft. tall with tough bark. Leaves membranous ovate to lanceolate or oblong acute, serrate or lobed, base rounded, truncate or sub-hastate, 5-nerved, 1.5 to 2.5 in. long, '5 to 1 in. wide; petioles '4 to '1 in. long. Flowers '2 in. across, in dense terminal heads with many villous bracts intermixed. Sepals lanceolate acuminate. Petals obovate, pink with a yellow base. Stamens opposite the petals, connate below in a tube. Ovary villous; styles glabrous. Capsule globose, brown, pubescent, longer than the calyx. Hab. Common in waste ground all over the peninsula. Distrib. Tropics generally. Native name: Lumah Ketam.
(2) M. velutina Bedd. Fl. Sylvat. t. 5; Masters, l.c. i. 374; King, l.c. 88.


12. WALTHERIA, Linn.


Erect, twiggy; leaves oblong 2 by '75 in. long . . . (1) W. indica
Prostrate; leaves ovate-oblong '5 in. long . . . (2) W. arenaria


(2) W. arenaria Ridl. Journ. F.M.S. Mus. x. 130.


13. ABROMA, Jacq.

Petals 5, dark brownish purple, base concave, limb spoon-shaped, rounded. Staminal-cup of 5 fertile filaments opposite the petals, 2-antheriferous; anthers bilobed, lobes divergent. Staminodes longer, obtuse. Ovary sessile, pyramidal 5-lobed; styles 5; cells many-ovuled. Capsule membranous, large 5-angled, 5-winged, truncate above septicidally 5-valved; valves villous on edges. Seeds numerous. Species 2 or 3, tropical Asia.

(1) *A. augusta* Linn. fil. Supp. 341; Masters, l.c. 375; King, l.c. i. 89.
Shrub about 6 ft. tall. Leaves herbaceous, 5- to 7-nerved, 3'5 to 6 in. long, 3 to 5 in. wide; petioles 1'75 to 2'5 in. long, upper leaves smaller. Stipules linear. Flowers pendulous, 2 in. long; peduncles 1'5 in. long, nodding. Sepals 1 in. long, lanceolate, light green. Petals longer, 5 in. long, '25 in. wide. Capsule 1'5 to 2 in. wide. *Hab.* Thickets, often near limestone rocks in open ground, Pahang, on Pahang river. Selangor, Bukit Kutu; Batu caves. Perak, Ulu Temengo (Ridley). *Distrib.* India, China, Malay islands, Australia.

14. **BYTTNERIA**, Linn.

(2) Climbing shrubs (or herbs). Leaves various. Flowers small, in axillary much-branched cymes. Sepals 5, slightly connate near the base. Petals 5, clawed concave inflexed, with 2 small side lobes, and a long terminal linear or lanceolate appendage. Staminal-tube with 5 broad truncate or emarginate teeth, and between them 5 2-celled extrorse anthers. Ovary sessile, 5-celled; cells bi-ovulate; style 5-fid. Capsule globose, spiny, septicidally 5-valved; cells 1-seeded. About 50 species, mostly tropical American, a few Asiatic and African.

Leaves not cordate.

Plant glabrous.

Leaves coriaceous, elliptic, 7 to 8 in. long, 3 in. wide, 3-nerved . . . . . (1) *B. Maingayi*

Leaves thinly coriaceous, elliptic, 4 to 5 in. long, 2 in. wide, not 3-nerved . . . (2) *B. brevipes*

Leaves thin, lanceolate-acuminate, not 3-nerved . . . (3) *B. Curtisii*

Stems and leaves pubescent or velvety.

Leaves ovate-elliptic, with stellate hairs both sides . . . . . (4) *B. Jackiana*

Leaves elliptic, base broad, glabrous above except midrib, hairy (not stellate on nerves beneath) . . . . . (5) *B. elliptica*

Leaves ovate cordate thin . . . . . (6) *B. elegans*

*Excluded.* *B. Ucinata* Masters, in Hook. fil. F.B.I. i. 377; *King, l.c. 91*, which is a species of *Mallotus (Euphorbiaceae).*

(1) *B. Maingayi* Masters, l.c. 377; *King, l.c. 91.*

Stout, woody climber, glabrous. Leaves sub-coriaceous elliptic to oblong, shortly blunt-acuminate, base rounded; 3 bold and 2 smaller nerves; lateral nerves 2 or 3 pairs, 7 to 8 in. long, 3 to 3'5 in. wide; petioles 1'2 in. long. Umbels in panicles of 6 to 8, peduncles 1 in. long; pedicels '25 in. long. Sepals '25 in. long,


A glabrous woody climber. Leaves coriaceous, elliptic obtuse, base narrowed truncate; nerves 5 pairs, conspicuous on both surfaces, inarching, reticulations conspicuous, 4.5 in. long, 2 in. wide; petioles 2 in. long. Cymes numerous, slender, 1 in. long; pedicels very slender, minutely pubescent. Sepals lanceolate acuminate, 3 in. long. Petals about as long, base obtuse with two short points at the upper angles, apex caudate. Staminal-tube broad, cylindric; anthers small oblong. Ovary small conic, glabrous, bluntly 5-angled, scabrid. \textit{Hab.} Edges of forests, rare. Dindings at Simpil (Ridley).

(3) \textbf{B. Curtisii} Oliv. \textit{Hook. Ic. Pl. t.} 1761; \textit{King}, l.c. 90.

A slender woody climber, 10 to 15 ft. long. Young parts puberulous. Leaves linear-lanceolate or oblanceolate-oblong rarely ovate-oblong acuminate, narrowed to the minutely cordate base, 5-nerved, lateral nerves numerous, glabrous except for tufts of stellate hairs in the axils of the nerves, 2.5 to 7 in. long, 5 to 2 in. wide; petioles 25 in. long, pubescent. Cymes 2 to 4 in axillary fascicles. Flowers 3 to 7; peduncles 1 in. long; pedicels 25 in. long. Flowers 4.5 in. across. Sepals ovate-lanceolate acuminate. Petals strap-shaped, lateral lobes 2, broad, inflexed, sub-terminal appendage long cylindric, curved. Capsule global, 1 in. through, pubescent with numerous straight bristles. Penang, West Hill, Telok Bahang (Curtis). Perak, Ayer Larut (Wray). \textit{Native name}: Penedu.

(4) \textbf{B. Jackiana} Wall. Roxb. \textit{Fl. Ind. (ed. Carey)} ii. 386; \textit{Masters, l.c.} 376; \textit{King, l.c.} 92.

Stout woody climber. Young branches minutely rusty, tomentose. Leaves elliptic acuminate; base 3-nerved, rounded, sometimes cordate, upper surface sparsely hispid, beneath rufous hispid-tomentose; lateral nerves 3 or 4 pairs, 3.5 to 6 in. long, 2 to 3.75 in. wide; petioles 4 to 1 in. long, tomentose. Umbels solitary or 3 or 4 together, few-flowered; peduncles 25 to 1 in. long; pedicels 35 in. long. Sepals linear-subulate, hispid, 4 in. long. Petals white, sub-rotund, lobed, terminal appendage cylindric as long as petals. Capsule globose, 1 in. through, black spiny. \textit{Hab.} In woods. Negri Sembilan, Gunong Angsi. Selangor, Batu Tiga. Perak, Goping (Kunstler); Dindings, Lumut. Province Wellesley, Sungai Daun; Penang (Jack, Wallich); Government Hill (Curtis).
The leaves vary very much in size, shape and length of petioles in different specimens; those specimens taken from ends of branches are much smaller in these parts than on the lower part of stem.

(5) **B. elliptica** Masters, l.c. 377; King, l.c. 91.

Softly hairy climbing shrub. Leaves sub-membranous, oblong shortly blunt-acuminate, base blunt truncate, broad, 3-nerved; lateral nerves 3 pairs with numerous smaller parallel ones all inarching within margin, reticulations elevate conspicuous, above sparsely (midrib densely) hairy, edges and nerves beneath hairy, 4'5 to 5'5 in. long, 2'5 in. wide; petioles densely hairy, 1'5 in. long. Cymes umbrellate numerous, pubescent, 1 in. long; pedicels '3 in. long. Flowers '12 in. across. Bracts small, linear. Sepals lanceolate, hairy. Petals shorter. **Hab.** Malacca (Maingay); very rare.

A very distinct plant with thin 3-nerved broad-based leaves.


Long slender climber. Young parts pubescent. Leaves ovatecordate bluntly acuminate, above glabrous, beneath hairy on the nerves, 4 in. long, 3 in. wide or less; petioles pubescent, 4 in. long. Panicles solitary or in pairs; peduncles slender, '5 to 1 in. long. Flowers small numerous, pubescent, 1 in. long; pedicels '3 in. long. Flowers '12 in. across. Bracts lanceolate pubescent. Sepals lanceolate acute, pubescent on both sides. Petals shorter, linear, tip 3-lobed, lateral lobes incurved rounded, midlobe rounded with 4 small teeth; appendage linear obtuse, curved. Capsule globose, '75 in. through, spines '5 in. long. **Hab.** Climbing on bushes in islands and on banks of rivers. Pahang, Kwala Tembeling; Perak, Kwala Kenering and Temengo (Ridley).

**15. COMMERSONIA,** Forsk.


Tree about 20 ft. tall. Branchlets tomentose. Leaves membranous, ovate acuminate dentate-serrate, base cordate, above stellate hairy, beneath softly hoary tomentose, 5 to 8 in. long, 3 to 4'5 in. wide; petioles '2 to '3 in. long. Stipules scarious
lobed. Cymes corymbose, tomentose 2 in. long and wide. Flowers white, '2 to '35 in. across. Calyx pubescent, lobes free nearly to base, ovate-lanceolate. Petals as long, narrower, base concave, appendages narrow oblong. Capsule glabrous, '4 to '5 in. across, densely covered with grey soft bristles. *Hab.* Common in secondary jungle from Singapore to Penang. *Distrib.* Siam (Trang) and Malay islands to the Philippines. *Native names:* Durian Tupai (Squirrel's Durian); Chenara; Angkot-Angkot Besili.


(1) **L. glabra** Turcz. in Mosc. Bull. 1858, p. 222; Masters, in Hook. fil. F.B.I. i. 379; King, l.c. 94.

A shrub or small tree about 20 ft. tall, glabrous except the flowers. Leaves dark green thin, ovate-oblong to oblong-lanceolate, abruptly acuminate, base narrowed or rounded, 3-nerved; nerves lateral, 4 to 7 pairs, 4 to 8 in. long, 1-6 to 3 in. wide; petioles 4 to '5 in. wide. Flowers green, '25 in. wide. Sepals ovate-lanceolate, pubescent both sides. Petals one-fourth as large, broad truncate, villous. Stamens 10 in 5 fascicles of 2 each, nearly as long as sepals. Staminodes 10 to 20, outer 5 to 15 filiform as long as stamens or shorter, inner 5 short, subulate. Ovary obovate, 4-celled, hairy at tip. Capsule coriaceous, '5 in. long, black when dry. Seed 1, oblong, black with an orange-coloured thin aril. *Hab.* Common in hill woods about 500 to 4200 ft. altitude; Johor, Gunong Pulai. Pahang River. Malacca, Selander. Selangor, KwaI Lumpur. Dindings, Pangkor. Perak: Waterfall Hill; Hermitage Hill. Province Wellesley, Permatang Bertam, Penang Hill. Kedah, Kedah Peak at 3000 ft. altitude. *Distrib.* Burma, Malay islands. *Native names:* Tingao; Cherimai Burong.

var. **Mastersiana** King, l.c. 204. **L. acuminata** Masters, l.c. 379.

Young branches, midribs and petioles puberulous. Flowers '5 in. wide, buds acute. Sepals 3-veined; outer staminodes 5 to 15, often pubescent. Ovary oblong-ovoid, villous, 3-celled; style glabrous. *Hab.* This variety seems to be commonest at higher altitudes; Selangor, Semangkob Pass; Batu Caves; Menuang Gasing (Kloss); Perak, Larut (Kunstler); Gunong Kerbau (Robinson); Gunong Batu putih (Wray). *Distrib.* Burma, Sumatra, Borneo.
17. LEPTONYCHIOPSIS, Ridl.


Leaves oblong-elliptic cuspidate, base round or blunt; nerves elevate beneath, slightly puberulous, 4 to 6-7 in. long, 2 to 3 in. wide; petioles puberulous, 2 in. long. Raceme 1 in. long, hairy. Flowers ~25 in. long. Sepals puberulous outside, linear-oblong, blunt. Stamens as long. Hab. Very rare in forests; Johor, Gunong Pulai (Ridley).

18. PENICULIFERA, Ridl.

Tree. Leaves alternate distant, oblong-lanceolate. Flowers in short axillary fascicles. Sepals 5, free to base, oblong pubescent. Petals 5, as long, linear-patulate, hairy on inner surface. Stamens in a funnel-shaped hairy tube; anthers at top 5, very small alternating with slender cylindric processes, anthers at base of tube 5, much larger, sessile. Species 1.

(1) P. penangensis Ridl. l.c. 173.

Apparently a tree. Leaves glabrous chartaceous, cuspidate acuminate, base round; nerves slender 8 pairs, 4 to 6 in. long, 1-5 in. wide; petioles 12 in. long. Flowers about 12 in a fascicle; peduncle 05 in. long; pedicels shorter, all pubescent. Sepals 1 in. long, imbricate, pubescent. Petals as long, spathulate, tip round, long-hairy on inner face, rather thick. Staminal tube as long, hairy. Hab. Penang, Government Hill at 1200 ft. altitude (Curtis).

Order XXV. TILIACEÆ.

Trees, shrubs or herbs. Leaves alternate, rarely opposite, simple or lobed. Stipules free, usually caducous. Flowers cymose, or panicled, or racemose, regular, bisexual. Sepals 3 to 5, valvate. Petals as many. Stamens numerous, on a torus free or 5-adelphous; filaments filiform; anthers 2-celled. Ovary free, 2- to 10-celled; styles columnar or divided. Stigmas distinct, rarely confluent. Ovules attached to the inner angle of the ovary-cell, if few pendulous from the apex or ascending from base, if many in 2 ranks. Fruit dehiscent or indehiscent, sometimes 1-celled by abortion. Seed 1 to many, no aril, testa leathery, coriaceous or pilose; albumen fleshy or rarely wanting. About 400 species, chiefly tropical.
Petals entire; anthers globose or oblong.

Sepals combined into a cup.

Staminodes 5; carpels 2-valved
Staminodes 5; carpels indehiscent, combined, winged.
Staminodes 0.

Calyx lobes accrescent, coloured.
Calyx lobes not accrescent.
Fruit 3-valved winged

Sepals distinct, free.

Trees or shrubs; fruit drupaceous.
Wiry herbs or small shrubs; fruit dry, of 3 to 5 cocci, prickly.

Herbs or undershrubs; fruit a 3- to 5-celled capsule.

Trees; capsule 3-winged of 3 to 5 cocci.

Tree; capsule large; seed with marginal hairs

Petals 4 entire.

Anthers linear; fruit 4-valved, spiny; tree.
Petals fimbriate (rarely entire); anthers linear opening by a terminal pore, often with an apical awn or hair tuft; trees.

1. **Brownlowia**, Roxb.

Trees or shrubs with stellate or scaly pubescence. Leaves entire, 3- to 5-nerved. Flowers numerous, small, in large terminal or axillary panicles. Calyx bell-shaped, irregularly 3- to 5-fid. Petals 5, englandular, usually pink. Stamens free on a raised torus; staminodes 5, petaloid or linear opposite petals. Ovaries 5, 2-ovuled; styles subulate, coherent. Carpels free, 2-ovuled, 1-seeded. Species 9, tropical Asia.

Leaves not peltate, lanceolate, base narrow round
Leaves not peltate broad elliptic, base broad cordate
Leaves peltate hairy beneath
Leaves sub-peltate, glabrous very large; panicles large
Leaves scaly beneath, ovate-cordate

(1) **B. lanceolata**

2. **Pentace**

3. **Schoutenia**

4. **Berrya**

5. **Grewia**

6. **Triumfetta**

7. **Corchorus**

8. **Columbia**

9. **Trichospermum**

10. **Sloanea**

11. **Elæocarpus**


A shrub 4 to 6 ft. tall. Young parts scaly. Leaves coriaceous lanceolate or oblong-lanceolate acuminate, base blunt, above glabrous, dark green, beneath minutely yellowish white-scaly; nerves 6 to 8 pairs, not prominent, 4'/5 to 6 in. long, 1'/5 to 1'/75 in. wide; petioles '25 to '4 in. long. Panicles axillary or terminal, 1 to 3 in. long, few-flowered. Calyx '2 in. long, scaly, lobes lanceolate. Petals longer, oblong blunt, base shortly clawed, pink. Ovary 3- to 5-lobed, pubescent. Fruit carpels distinct, globose, compressed on inner surface, scaly and pubescent, '5 in. across. Seed 1. **Hab.** Common in tidal rivers often in dense masses; Singapore, Gelang. Johor, Tebrau River. Malacca (Griffith);

(2) **B. kleiniovioidea** King, l.c. 97.

Tree 40 to 50 ft. tall, 18 to 24 in. through. Branchlets hairy. Leaves coriaceous, elliptic to elliptic-rounded, tip blunt, base more or less cordate, above sparsely scaly, beneath minutely hairy; nerves basal 4 to 6, lateral 3 pairs; transverse nervules distinct, 5 to 7 in. long, 3'5 to 4'5 in. wide; petioles 2'5 to 3 in. long, pubescent. Panicles terminal, rarely axillary, 9 to 15 in. long, few-branched. Flowers clustered, '25 in. long; pedicels half the length. Calyx widely bell-shaped, teeth 5 acute triangular, tomentose outside. Petals longer oblong blunt pink, narrowed to the long claw. Ovaries 3 to 5, sub-globose, pubescent; styles subulate coherent. *Hab.* Rare, dense rocky jungle, Perak, Gunong Bubu, 600 to 1000 ft. altitude (Kunstler).

(3) **B. Scortechinii** King, l.c. 98.

A small slender tree with stout branches. Leaves ovate-elliptic rounded peltate, tips sub-acute, edges sub-undulate, base round or sub-emarginate, above glabrous, beneath minutely hairy; nerves 9 radiating from the petiole attached to leaf, 2'5 to 3 in. from edge, laterals from midrib 4 pairs, prominent beneath as are transverse nervules, 10 to 15 in. long, 5'5 to 7 in. wide; petioles 7 to 9 in. long thickened at both ends. Panicle terminal, 6 to 12 in. long and 6 in. across, or smaller clustered panicles 6 to 10 together; branches puberulous. Flowers 6 in. long, crowded. Calyx narrow bell-shaped, teeth half as long, lanceolate tomentose scaly. Petals longer, narrow obovate, much narrowed to the claw. Staminodes linear. Ovaries 5, ovoid, stellate-pubescent; styles subulate, tips bent. *Hab.* Perak; no locality (Scortechini).

(4) **B. macrophylla** King, l.c. 99.

Tree 30 to 40 ft. tall. Stout branched. Young parts red-pubescent. Leaves very coriaceous, round, or in older branches elliptic, tip rounded or shortly apiculate, edges sub-undulate, base emarginate, all glabrous; nerves 7 to 9, basal, 2 pairs lateral, prominent on both surfaces; nervules transverse, much elevated; round leaves 11 to 17 in. long, 10 to 14 in. wide; elliptic leaves 6 to 10 in. long, 3'5 to 5'5 in. wide; petioles 2'25 to 4'5 in. long. Panicle large, terminal as long or longer than leaves; branches stout, scurfy rusty. Bracts linear nearly 1 in. long persistent. Flowers '65 in. long, apple-blossom pink; peduncles short. Calyx wide cylindric-campanulate, teeth acute, half as long tomentose, scurfy. Petals oblong blunt narrowed to base hardly clawed. Ovaries 3 to 5, narrow ovoid ridged, scaly; styles conjoined. Fruit sub-globose, minutely hairy, '75 in. through. *Hab.* Perak, Larut (Kunstler); Batu Togoli (Wray).

Tree. Leaves coriaceous ovate acute, base emarginate or cordate shortly peltate, above glabrous, beneath densely scaly, tip blunt; nerves about 5 pairs, slender elevate beneath; nervules very fine, 4'5 to 9 in. long, 2'8 to 6 in. wide; petioles slender, 1'9 to 2'5 in. long. Panicle terminal shorter than leaves, lax few-flowered, scurfy, 5 to 10 in. long. Flowers 2 in. long; pedicels scaly, 2 in. long. Calyx wide campanulate, scaly, lobes nearly half as long, acute. Petals pink, oblong blunt, slightly narrowed at base, not clawed. Styles subulate longer than the stamens. Hab. Tidal swamps in the south; Singapore, Kranji. Pahang, Pianggu, Endau (Evans). Pulau Tiuman (Burkill). Distrib. Moluccas, Wetter Island, New Guinea.

The leaves of the Singapore plant are much smaller than those of the Moluccan plant.

2. PENTACE, Hassk.


Leaves pinnate-nerved; ovary 3-ridged; fruit 3-winged.*

Leaves trinerved, i.e. 2 lowest nerves rising from base.
Nerves from midrib 6 to 7 pairs.
Nerves from midrib 2 pairs.
Leaves pubescent, small.
Leaves glabrous oblun.
Leaves sub-obtuse; ovary not ridged.
Leaves elliptic; ovary 10 ridged.
Leaves elliptic or ovate, abrupt acuminate.
Leaves glabrous ovate.
Flowers very small.
Flowers '25 '25 in. wide.
Leaves glabrous, oblong to lanceolate; side nerves from midrib faint or invisible.
Leaves 3 in. long, ovate; ovary 5-ridged.
Leaves 9 in. long, oblong; petioles '15 in. long; ovary 10-ridged.
Leaves 8 in. long, lanceolate; petiole '75 in.
long; shrub.
Leaves 5-nerved from base, 7 to 14 in. long.

(1) P. triptera

Leaves ovate to round-ovate or ovate-oblong, sub-acute, sub-coriaceous, base rounded, above glabrous, beneath scaly; nerves basal, 1 to 2 pairs lateral, 5 to 7 pairs, 4 to 5 in. long, 2 to 2'75 in. wide; petioles '6 to 1'2 in. long, pubescent. Panicles terminal and
axillary 6 to 8 in. long, much-branched, softly stellate-tomentose. Flowers nearly 2 in. long, white; pedicels short. Calyx longer, teeth 5, lanceolate, tomentose. Petals spathulate-oblong obtuse. Stamens pentadelphous; staminodes subulate shorter than stamens. Ovary 3-winged, tomentose; style filiform, glabrous, bent at tip. Fruit oblong, 6 in. long with 3 membranous wings, 5.in. broad,

Fig. 28.—Pentace triptera.

pink. Hab. Forests; rarely flowering. Singapore; common. Bukit Timah; Selitar, etc. Johor, Pengerang. Malacca (Griffith); Negrí Sembilan, Bukit Tampin. Perak, Larut (Kunstler). Native names: Medang Serai; Sepa Petri; Kabal Ayam; Balong Ayam.

(2) P. Hookeriana King, l.c. 101.

A tree 30 to 40 ft. tall, 12 in. through. Branchlets glabrous. Leaves elliptic-oblong sub-ovate acute, base narrowed, unequal,
glabrous; nerves 6 pairs, prominent beneath, 5 to 7 in. long, 2 to 2.75 in. wide; petioles 25 in. long. Panicles terminal and axillary, 2.5 to 5 in. long, scurfy-tomentose. Flowers crowded 2 in. long, yellow; pedicels short. Calyx bell-shaped, cut half-way down into 3 or 4 triangular sub-acute teeth, scaly-tomentose. Petals narrowly obovate. Stamens 15 in 5 bundles, shorter; staminodes thick, orbicular. Ovary depressed-globose, obscurely 5-lobed, 5-celled, densely pubescent. *Hab.* Perak, banks of Kinta River (Kunstler).

(3) P. hirtula Ridl.

Tree. Branchlets, petiole and midrib hairy. Leaves obovate or oblong, tip blunt or shortly apiculate, margin minutely undulate, coriaceous, 3-5 to 4 in. long, 1.6 to 2 in. wide; nerves basal, 1 pair, lateral 2 pairs, elevate; nervules very slender; petioles 1 in. long. Panicle lax, thickly stellate-hairy, terminal, 3 to 4 in. long, 1.5 to 2 in. wide. Flowers 1 in. long, on pedicels nearly as long. Calyx campanulate with 5 triangular teeth half the length, tomentose. Petals narrow oblongate obtuse with a long narrow claw. Stamens in 5 bundles of about 10 each, oblongate; staminodes linear. Ovary globose, silky, obscurely 5-lobed; style glabrous. Fruit 5 in. long and as wide, rounded-oblong, wings 10 semi-elliptic 2 in. long. *Hab.* Penang, Penara Bukit (Curtis).

(4) P. floribunda King, *l.c.* 102.

Tree 40 to 50 ft. tall, 5 to 20 in. through. Branchlets stellate, pubescent. Leaves elliptic-oblong, sometimes rounded, tip bluntly apiculate, base rounded, slightly narrowed, coriaceous, dull green, glabrous above, ashy beneath, basal nerves 1 to 2 pairs, laterals 2 to 3 pairs, prominent beneath, 5 to 6.5 in. long, 2.5 to 3.75 in. wide; petioles 1 to 2 in. long. Panicles axillary and terminal stellate-pubescent, many-branched. Flowers very numerous, 1 in. long, pale yellowish white. Calyx rotate, cut half-way into triangular acute teeth, tomentose. Petals broad oblongate, blunt, base narrowed. Stamens 5-adelphous. Ovary globose, tomentose not ridged, 5-celled. *Hab.* Rocky jungle, 500 to 1000 ft. altitude. Perak, Gunong Pondok; Gunong Bubu base (Kunstler).

(5) P. perakensis King, *l.c.* 101.

Tree 30 to 40 ft. tall. Leaves ovate elliptic bluntly acuminate, base rounded or sub-cuneate, above glabrous; nerves 5 pairs, 5 to 6 in. long, 2.5 to 3 in. wide; petioles 7.5 to 1 in. long, stout. Panicle terminal 4 to 5 in. long, less than 2 in. wide, few-flowered. Flowers 1 in. long. Calyx rotate scaly, teeth triangular spreading. Petals ovate, narrowed to a short claw. Stamens 30, 5-delphous; staminodes lanceolate as long as filaments. Ovary globose ridged, hairy, 5-celled; style as long. *Hab.* Forests, below 500 ft. altitude. Perak, Larut (Kunstler).

(6) P. eximia King, *l.c.* 103.

A tree 50 to 70 ft. tall. Branchlets glabrous. Leaves ovate-
elliptic to ovate-rounded, abruptly blunt acuminate, base rounded or shortly narrowed, coriaceous, pale beneath; basal nerves 1 pair, laterals 1 pair, elevate beneath, 4 to 5.5 in. long, 2 to 4 in. wide; petioles '75 to 1'1 in. long. Panicles terminal, 3'-5 to 5 in. long, tomentose much-branched. Flowers numerous '1 in. long. Calyx scaly, teeth triangular. Petals cuneate blunt, narrowed to a broad claw. Stamens 25, in groups of 5; staminodes lanceolate. Ovary sub-globular, tomentose, 5-celled with 5 false partitions; styles 10, shorter than stamens. Fruit 5 in. long with 8 semi-elliptic wings, '1 to '15 in. wide, scaly. Hab. Hill forests. Negri Sembilan, Bukit Tumiang (Cantley); Perak, Larut 500 to 800 ft. altitude (Kunstler). Native name: Medang Lusa.

(7) P. Kunstleri King, l.c. 101.
Tree 30 to 40 ft. tall, 5 to 7 in. through. Branchlets glabrous. Leaves broadly ovate shortly broad acuminate, base rounded, above glabrous, beneath silvery grey; nerves 3 to 4 pairs, 4'-5 to 6 in. long, 2'-5 to 3'5 in. wide; petioles '75 to 1 in. long, stout, tip thickened. Panicles terminal, 3'5 to 6 in. long, puberulous, much-branched. Flowers numerous, '15 in. long, white. Calyx tubular bell-shaped, minutely stellate, hairy and scaly, teeth triangular acute. Petals spatulate long-clawed. Stamens in 5 bundles; staminodes linear-lanceolate as long as filaments. Ovary depressed-globose, bluntly 5-angled, scaly-pubescent, 5-celled; style glabrous. Hab. Perak, Larut Hills (Kunstler).

(8) P. Curtisii King, l.c. 103.

(9) P. strychnoidea King, l.c. 105.
Tree 60 to 80 ft. tall, 1'5 to 2 ft. through. Branchlets slender, glabrous. Leaves ovate-elliptic or ovate-oblong acuminate, base rounded or narrowed, above glabrous, pale beneath, strongly 3-nerved, 3 to 4 in. long, 1'75 to 2'25 in. wide; petioles '75 in. long. Panicles terminal 3 to 6 in. long, minutely scaly-puberulous. Flowers '2 in. long, white with a reddish tinge. Calyx cup-shaped tomentose, teeth triangular acute, 5, half as long. Petals oblanceolate, yellow, narrowed to base. Stamens of 5 bundles of about 20 each; staminodes linear-lanceolate. Ovary ovoid-globose,
5-ridged, tomentose. *Hab.* Open jungle, rocky hills, 500 to 1000 ft. altitude. Perak, Larut (Kunstler).

(10) **P. Scortechinii** King, *l.c.* 104.

Tree. Branchlets glabrous. Leaves elliptic-oblong caudate-acuminate, base cuneate, glabrous concolorous coriaceous, basal nerves 1 pair, strongly elevate, laterals 1 to 2 pairs, inconspicuous, 7 to 9 in. long, 2'75 to 3'5 in. wide; petioles thick, '5 in. long. Panicles terminal and axillary slender, 3'5 to 4 in. long; branches short. Calyx widely tubular-campanulate, scurfy-tomentose, teeth 5, small triangular. Petals obovate obtuse, much narrowed to the base. Stamens in 5 bundles of 15 each; staminodes lanceolate, half as long. Ovary ovoid, 5-ridged, scaly. *Hab.* Perak (Scortechini). No locality given.

(11) **P. acuta** Ridl.

Straggling shrub. Leaves lanceolate-acuminate, base narrowed, blunt, thinly coriaceous; basal nerves 1 pair, laterals 2 to 3 pairs; nervules horizontal, above glabrous, beneath sparingly scurfy and scaly, 7 to 8 in. long, 2'8 to 3'4 in. wide; petiole 1 in. long, stout. Panicle terminal scurfy, 3'5 in. long; branches short. Flowers rather numerous, crowded, buds conic, acute. Calyx scurfy-tomentose, campanulate, lobes acuminate, narrow, half the length. Petals oblong obtuse, narrowed to the base, '2 in. long. Stamens in 5 bundles of about 20 each; staminodes linear obtuse as long as the filaments. Ovary globose, silky-hairy, hardly lobed; style taller than stamens. Fruit oblong, '7 in. long, '4 in. across, with 10 low scaly wings, '15 in. long. *Hab.* Dindings. Pangkor, Telok Sera (Curtis 1626).

(12) **P. macrophylla** King, *l.c.* 102.

Tree 20 to 30 ft. tall. Branchlets glabrous. Leaves ovate elliptic to round, shortly blunt-acuminate, base rounded above, glabrous; basal nerves 2 pairs, laterals 3 or 4 pairs, prominent beneath, 7 to 14 in. long, 5 to 12 in. wide; petioles 2'5 to 3 in. long. Panicles terminal and axillary, pubescent-scurfy. Flowers '15 in. long and '2 in. wide. Calyx rotate, teeth lanceolate acute two-thirds its length. Petals oblanceolate obtuse. Staminodes linear. Stamens in 5 bundles of 15 each. Ovary ovoid, scaly-pubescent, 5-angled. Fruit '75 in. long with 10 semi-elliptic wings, scaly, '4 in. wide. *Hab.* Forests at bases of hills, Perak, Waterfall Hill, Thaiping (Wray, Kunstler, Scortechini).


Trees with alternate, simple leaves. Flowers axillary solitary or in terminal panicles. Calyx bell-shaped, 5-lobed, lobes accrescent, coloured. Petals linear or o. Stamens membranous, free, sometimes on a short gynophore. Ovary sessile or stalked, 3- or 5-celled, cells 2-ovuled from base of axile placentas; style filiform. Stigmas 3 to 5. Capsule crustaceous, dehiscing irregularly,
r-celled, 1- to 2-seeded. Seeds globose, testa leathery, albumen o. Five species, Malay and Cambodian.

Flowers panicled or solitary.

Calyx very accrescent, deeply lobed. . . . . (1) S. Mastersii
Calyx slightly accrescent not deeply lobed . . . . (2) S. Kunstleri
Flowers in axillary clusters . . . . . . (3) S. glomerata

(1) S. Mastersii King, l.c. 106. Chartacalyx accrescens Masters, l.c. i. 382.

A tree 50 to 80 ft. tall, 8 to 10 in. through. Leaves thinly coriaceous above glabrous, glossy green, beneath light brown tomentose, ovate-lanceolate acuminate, base rounded; nerves prominent beneath, 5 pairs, ’75 to 3’25 in. long, ’4 to 1’1 in. wide; petioles less than ’1 in. long. Flowers solitary axillary or in terminal leafy panicles; pedicels ’35 to ’75 in. long, lengthening with age, tomentose. Calyx membranous, pink-veined, widely campanulate, ’35 in. wide with 5 teeth; in fruit rotate flat, 5-angled, ’5 to 2 in. across, pubescent outside, glabrous within. Petals 0; filaments slender. Ovary globose, silky-tomentose. Hab. Jungle; Malacca (Maingay). Negri Sembilan. Bukit Tumiang (Cantley). Perak, Larut Hills (Kunstler). Penang, Government Hill (Curtis). Distrib. Borneo. Native name: Banitan merah.

(2) S. Kunstleri King, l.c. 107.

Tree 60 to 70 ft. tall. Stem deeply corrugated, 18 to 24 in. through. Leaves thinly coriaceous, obovate-oblong or oblanceolate acute, edge waved, slightly narrowed to the round base, above shining, bright green, beneath greyish silver; basal nerves 3 to 5, laterals 5 pairs; nervules elevated, 6 in. long, 2’75 in. wide; petioles ’25 in. long. Flowers pale yellow dotted all over rusty colour. Calyx campanulate, membranous yellow (when adult brown) hairy ’5 to ’75 in. long, cut to the base in 4 ovate lobes. Petals 0. Ovary sub-globose, tomentose; style longer than stamens. Hab. Dense jungle. Pahang, Sungai Cheka, KwaI Lipis (Foxworthy); Perak, Larut Hills 300 to 800 ft. altitude (Kunstler); Ulu Tupai (Wray). Native name: Chenral Ayer.

(3) S. glomerata King, l.c. 107.

A tree 40 to 60 ft. tall. Branchlets pubescent. Leaves membranous glabrous, elliptic-oblong acute or acuminate, edges waved, base rounded; nerves 3, radiating from base; nervules elevated, parallel, inarching within margin, 10 to 15 in. long, 3’5 to 5’5 in. wide; petioles ’25 in. long. Flowers ’25 in. long, in round dense cymes, 1 to 1’5 in. across, axillary; pedicels tomentose. Calyx campanulate rufous-tomentose, teeth broadly triangular. Petals 0. Ovary ovoid-globose. Fruit depressed-globose, ’75 in. diameter, stellate-tomentose, covered at the base only by the calyx. Hab. Johore, Gunong Pantai (Kunstler). Distrib. Tongkah; S. Siam.
4. BERRYA, Roxb.

Trees. Leaves alternate ovate acuminate cordate 5- to 7-nerved. Panicles large many-flowered, axillary and terminal. Calyx campanulate, 3- to 5-lobed. Petals 5, spatulate, white. Stamens many on a torus. Ovary 3- or 4-lobed. Fruit 3- or 4-valved, each valve with a large wing. Seed hairy. Species 4, Indo-Malayan.

(i) B. Ammonilla Roxb. Hort. Beng. 42; Masters, in Hook. fil. F.B.I. i. 383; Wight Ill. t. 34.

Tree 25 to 30 ft. tall. Bark rough. Leaves glabrous 5 to 6 in. long, 4'5 in. wide; petioles 1 in. long. Panicle 4 to 6 in. long. Flowers 5 in. across. Calyx and pedicel tomentose. Petals 5, spatulate, white. Stamens many on a torus. Ovary 3- or 4-lobed. Fruit wings 1'75 in. long, 5 in. wide, oblong, rounded at tip, pubescent villous at base. Hab. Lankawi Isles, Telok Sinn (Haniff). Distrib. India; Ceylon.

5. GREWIA, Linn.

Trees or shrubs, one climbing, more or less stellate pubescent. Leaves entire often tri-nerved, generally pubescent or hairy, subcoriaceous. Flowers small to medium, panicled or few, axillary, greenish white with conspicuous bracts. Sepals distinct. Petals 5, shorter than the sepals (occasionally absent). Stamens many on a torus; no staminodes. Ovary 2- to 4-celled, 2- to many-ovuled; style subulate. Stigma lobed. Drupe fleshy or pulpy, ovoid or pear-shaped, often yellow or red when pulpy. Pyrenes 1 to 4, 1- or 2-seeded. Species about 100, tropical Africa and Asia.

Climber; flowers axillary and terminal; drupe green
Trees; flowers in terminal panicles; drupe fleshy green
Trees; flowers terminal or axillary; drupe pulpy red or orange.
Leaves hairy on back.
Leaves large, oblong round, rigid; flowers tomentose
Leaves large but thin; flowers hairy
Leaves oblong-lanceolate acuminate thin; flowers velvety
Leaves long lanceolate 10 by 4 in.; bracts conspicuous
Leaves glabrous or scurfy on back rigid; globose, scurfy
Leaves glabrous.
Basal nerves not more conspicuous than the others.
Flowers velvety leaves 6 in. long
Flowers tomentose; leaves much smaller
Basal nerves very strongly developed

(1) G. umbellata
(2) G. paniculata
(3) G. latifolia
(4) G. fibrocarpa
(5) G. omphacarpa
(6) G. erythrocarpa
(7) G. globulifera
(8) G. antidesmaefolia
(9) G. Miqueliana
(10) G. florida

A climbing shrub 50 or more feet long all stellate-puberulous. Leaves oblong-ovate or elliptic, serrate, bluntly acuminate, base rounded, above glabrous, beneath pale; nerves 4 pairs, 3 to 4'5 in. long, 1'5 to 2 in. wide; petioles 2'5 in. long. Umbels panicked, axillary or terminal 6- to 8-flowered. Flowers '75 in. long, yellowish white. Sepals ribbed tomentose, linear-oblong, reflexed in flower. Petals as long or shorter, oblong from the back of an orbicular hairy concave claw. Stamens connate at base in a silky tube. Torus long, tomentose. Fruit globular, green; pyrene 2- to 4-celled; cells 1-seeded; endocarp bony. **Hab.** Common in secondary growth, from Singapore, Malacca, Pahang, Perak, Penang. **Distrib.** Siam, Borneo. **Native names:** Akar Chenderai; Akar Sekapu; Akar Kapialu; Akar Sempelas Lida Kuching.

(2) **G. paniculata** Roxb. Fl. Ind. ii. 591; Masters, l.c. i. 393; King, l.c. 110.

A bushy tree 20 to 40 ft. tall, 2 ft. through. Branchlets tomentose. Leaves coriaceous, cuneate-obovate to elliptic, blunt acuminate, edges serrate dentate, base rounded; nerves from base 5 or 6 pairs, above sparsely pubescent, midrib and nerves tomentose, beneath stellate-tomentose; nerves horizontal, elevate beneath, 3 to 6 in. long, 1'5 to 2'75 in. wide; petioles 2'5 in. long, tomentose. Stipules glabrous lanceolate. Panicles 2'25 to 3'5 in. long, terminal or axillary tomentose; bracteoles linear. Flowers '25 in. long. Sepals obovate, base rounded, tomentose outside, pilose inside. Petals shorter, yellowish white, oblong blunt, claw concave, hirsute outside. Torus cup-shaped, edge tomentose. Ovary ovoid, stellate-tomentose 4-celled. Fruit obovoid, green hard, minutely pubescent; pyrene 1-celled, 1-seeded; endocarp stony. **Hab.** Open country, common, but absent from Singapore. Malacca. Selangor, Rantau Panjang; Kwala Lumpur. Perak, Plus River (Wray). Pahang, Sungei Jelai (Machado); Penang. **Distrib.** India and Indo-China. **Native name:** Chenderai Hutan.

(3) **G. latifolia** Masters, l.c. i. 392; King, l.c. 112.

A shrubby tree 20 to 40 ft. tall. Branchlets tomentose. Leaves coriaceous, broad, elliptic shortly acuminate, base narrowed, blunt, above glabrous except midrib, beneath stellate-pubescent; nerves 6 to 9 pairs, strongly elevate, as are the transverse nerves, 6 to 9 in. long, 3'5 to 4'5 in. wide; petioles 5' to 7'5 in. long, tomentose. Panicles terminal or axillary tomentose, 1'5 to 4 in. long, few-flowered; bracteoles ovate-lanceolate. Flowers '25 in. long; pedicels shorter. Sepals obovate, tomentose both sides. Petals shorter, oblong acute, claw hirsute, longer than the limb. Torus cup-shaped, edge hairy. Ovary depressed-globose. Drupe obovoid '75 in. long and '5 in. wide; pericarp sparsely pubescent, yellow, at length glabrous; mesocarp fibrous and pulpy; pyrene single,

(4) *G. fibrocarpa* Masters, l.c. i. 391.
Tree 40 to 50 ft. tall, 8 or 12 in. through. Branches velvety. Leaves chartaceous, above glabrous, beneath hairy or tomentose, oblong to lanceolate-oblong, shortly acuminate, base blunt; nerves 6 or 7 pairs, elevate beneath hairy; nervules elevate, 6 to 9 in. long, 3 in. wide; petioles thick velvety '15 in. long. Panicle axillary, terminal, velvety, 1 to 2 in. long. Bracts and sepals velvety. Bracts lanceolate-acuminate '16 in. long. Sepals linear-oblong. Petals half as long. Fruit pear-shaped, deep yellow velvety '75 in. long, '5 in. through. *Hab.* Forests, Johor. Pulau Tiuman and Pulau Tinggi (Burkill). Malacca, Ayer Panas (Maingay). Selangor, Weld's Hill (Cubitt). Perak, Thaiing. Waterfall (Wray, Kunstler). Goping; a very hairy form (Kunstler); Penang Hill 1200 ft. altitude (Curtis).

(5) *G. omphacarpa* Miq. Fl. Ind. Bat. i. (2), 204.

I believe this to be the plant intended by Korthals as his *Omphacarpus hirsutus*, but his figure in the *Kruiddund*, t. 42, is rather poor and the leaves are shown rounder than in our plant.

Small tree 12 to 14 ft. tall. Branches hairy. Leaves lanceolate acuminate or acute, base round, sometimes obscurely cordate, inequilateral, hairy beneath; nerves 10 pairs, basal pair long; nervules transverse, conspicuous, 8 to 10 in. long, 2'1 to 4 in. wide; petioles '25 in. long, densely hairy. Panicles 3 to 5 in. long, pendent from uppermost axis densely hairy. Bracts lanceolate acuminate, 2 in. long. Sepals linear-oblong, white, tomentose. Petals white, reflexed. Disc lobed, yellow. Ovary tomentose. Fruit pear-shaped scarlet, about 1 in. long, pulpy. *Hab.* Mountain forests; Selangor, Sempang mines. Perak, Thaiing Waterfall (Wray).
(7) G. globulifera Masters, l.c. i. 391.

(8) G. antidesmaefolia King, l.c. 113.
A tree 12 to 40 ft. tall or more, 6 to 8 in. through. Branchlets glabrous. Leaves membranous, when adult glabrous, elliptic-oblong acutely acuminate, entire, base cuneate or rounded; nerves 6 to 7 pairs, prominent beneath 4.5 to 8 in. long, 1.5 to 2.75 in. wide; petioles '4 to '6 in. long. Panicles pedunculate, axillary and terminal, 2 to 4 in. long; branches short, ashy-tomentose. Flowers '25 in. long. Sepals elliptic-ovate, tomentose outside, pubescent yellow inside. Petals much shorter, oblong, blunt, claw broad, thickened pilose. Torus cylindric, yellow, glabrous with hairy mouth. Ovary ovoid-globose, pilose, later glabrescent. Fruit pyriform, 3-angled narrowed to a pseudo-stalk orange red, '75 in. long, about '35 in. through; pericarp glabrous; pyrenes 3; endocarp bony, 1-seeded.


It is possible that var. b is a distinct species.

(9) G. Miqueliana Kurz, Flora 1872, p. 398; King, l.c. 113.
Tree 30 to 40 ft. tall, 8 to 15 in. through. Branchlets at first scaly. Leaves thinly coriaceous, glabrous, ovate-lanceolate to lanceolate shortly acuminate, entire, base cuneate; nerves 5 pairs slender, 2 to 5 in. long, 1 to 1.75 in. wide; petioles '2 to '3 in. long, tomentose. Panicles axillary and terminal lax, few-flowered, sparsely scaly and puberulous, 1 to 2 in. long. Flowers '3 in. long. Sepals oblanceolate acute, minutely tomentose. Petals shorter, linear acute, with a thickened tomentose claw. Torus cylindric, edges villous. Ovary globose-ovoid, tomentose. Drupe pyriform '75 in. long and '5 in. across, glabrous; mesocarp fibrous; pyrenes 2, each 1-celled. Hab. Johor, Ulu Kahang, Bukit Murdom (Lake and Kelsall). Malacca, Merlimau. Perak, Larut Hills; Waterfall (Kunstler). Dindings (Curtis) at Lumut. Native names: Poko Malamu; Chenderai Paya.
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A tree 20 to 30 ft. tall. Leaves thinly coriaceous, glabrous, oblong-lanceolate to lanceolate-acuminate or acute, base rounded, trinerved from base with 1 pair of nerves alternate from midrib above, reticulations invisible 4 to 6 in. long, 1½ to 2½ in. wide; petioles 5 to 7 in. long. Panicles terminal and axillary, 1½ to 4 in. long, lax puberulous, few-flowered. Flowers '2 in. long. Sepals ovate concave, tomentose on both sides. Petals shorter, oblong (sometimes absent). Torus cup-shaped, rim hairy. Ovary globose, sub-glabrous, 4-celled; style thick. Drupe ovoid 5 in. long, glabrous, fleshy. Pyrene 1- to 3-celled, usually 1-seeded. Hab. Open hilly jungle. Pahang Kwantu, Malacca (Griffith, Maingay); Bukit Panchur (Derry); Merlimau (Cantley). Perak, Gunong Bubu Range (Kunstler). Penang Hill, Balik Pulau; the Spout; Pondok Durian (Curtis). Distrib. Sumatra. Native names: Medang Salusul; Jejuwai; Damak Damak Ayer.

6. TRIUMFETTA, Linn.

Slender shrublets or herbs, more or less stellate-hairy. Leaves serrate or dentate, simple or lobed. Flowers in dense axillary cymes, bright yellow small. Sepals 5, oblong concave. Petals 5. Stamens 5 to 35, on a fleshy-lobed glandular torus. Ovary 2- to 5-celled; cells 2-ovuled; style filiform. Stigma 5-toothed. Fruit globose or oblong, spiny or bristly, indehiscent or 3- to 6-valved. Seed 1 or 2 in each cell, albuminous. Species about 10, tropics generally.

Erect tall shrublets.

Glabrescent; fruit very small indehiscent, spines short

Stem villous; leaves hairy; fruit larger, dehiscent, spines long-bristly, hooked

Steam and leaf backs velvety hairy; fruit tomentose, spines straight, bristly

Prostrate, leaves lobed or simple, toothed.

Petals '2 in. long; fruit '2 in. through

Petals '4 in. long; fruit '5 in. through

(1) T. rhomboidea
(2) T. pilosa
(3) T. pseudo-cana
(4) T. grandidens
(5) T. subpalmata

(1) T. rhomboidea Jacq. Enum. Pl. Carib. 22; DC. Prod. i. 507; Masters, l.c. i. 395; Wight Ic. t. 320; King, l.c. 116.

A shrubby annual, glabrous or pubescent, erect, branched with long internodes. Leaves very variable, often lobed, usually rhomboid, lanceolate or obovate, glabrous above or pubescent, sometimes tomentose beneath, often trilobed, serrate or dentate, 1 to 3 in. long, 2½ to 1½ in. wide. Flowers 4 to 6 axillary on short peduncles. Sepals apiculate. Petals bright yellow, oblong. Fruit '2 in. across, globose, tomentose, with short hooked glabrous or
hispid spines, indeliscent. Hab. Common weed on waste ground, from Singapore to Setul. Distrib. India, Malay islands, China, Africa, etc. Native name: Champadang.

(2) **T. pilosa** Roth, Nov. Sp. 233; King, l.c. 116.

Erect shrubby annual about 3 or 4 ft. tall, branched, villous. Leaves hairy, ovate or ovate-lanceolate acuminate, coarsely serrate, 2 to 4.5 in. long, 1 to 1.75 in. wide; petioles .5 to 1 in. long. Stipules lanceolate subulate. Peduncles many-flowered, short. Calyx .25 in. long, hairy. Petals spatulate-oblong nearly as long, bright yellow. Fruit globose, dehiscent .25 in. through, villous and densely spinous with long .3 in. hooked bristly spines, glabrous at the tip. Hab. Open sandy spots, not common. Pahang near Pekan. Perak, Ulu Bubong, open bamboo jungle (Kunstler); Temengo. Distrib. India, Ceylon, Burma.

(3) **T. pseudo-cana** Sprague and Craib, Kew Bulletin, 1911, p. 23. T. cana Masters, l.c. i. 396, not of B'ume.

Erect shrublet, little branched, 2 or 3 ft. tall. Stems and back of leaves velvety hairy. Leaves ovate to lanceolate above, lower ones often rhomboid lobed, serrate above sparsely hairy, .15 to .25 in. long, .1 to .15 in. wide, terminal ones much smaller and narrower; petioles .7 in. long, tomentose. Flowers crowded, yellow, .2 in. long. Calyx velvety, lobes narrow. Petals as long. Fruit globose tomentose, .5 in. across; spines straight, bristly. Hab. Waste ground, not common. Singapore (Thomson); Pahang, Pekan. Perak, Sungei Ryah; Goping and Kota Bharu (Kunstler). Ipoh. Distrib. India.


Prostrate shrublet. Young parts sparsely hairy. Leaves subcoriaceous, oblanceolate, simple or trifoliate, coarsely toothed; nerves elevate beneath, sparsely hairy, .6 in. long, .2 in. wide, trifoliate .4 in. across; petioles .1 in. long or shorter. Flowers in pairs or threes, sessile on a short peduncle, yellow. Calyx scurfy-pubescent. Petals oblong .2 in. long. Fruit globose, spiny, .2 in. through, spines nearly .1 in. long, straight. Hab. On sandy shores of the east coast. Pahang, Kwalal Pahang; Rumpin River. Singora (Gwynne Vaughan). Tringganu, Bundi (Rostado). Distrib. Cochin-China.


Woody prostrate shrub, sparsely tufted with stellate hairs. Leaves subcoriaceous stiff, deeply 3- to 5-lobed, rounded toothed, .7 in. long, .5 in. wide, scabrid above, hairy beneath; petioles .3 in. long, hairy. Flowers 2 or 3 in axillary and terminal cymes or racemes. Pedicels .2 in. long, hairy. Sepals linear, sparsely hairy. Petals little longer .4 in. long, yellow. Fruit globose, .5 in. through, stiffly spiny, glabrous. Hab. Seashores in sand. Johor, Pulau Tiuman (Burkill). Kelantan, Kwala Kelantan.
(Ridley). Distrib. Cochin-China, Java, Borneo, Cocos, Philippines and islands off Queensland.

**Excluded Species**

**T. annua** Linn. Mant. p. 73, is given as a weed from Perak by King, l.c. 117. The only specimens of King’s I have seen so labelled were *T. pilosa*.

**7. CORCHORUS**, Linn.

Herbs or shrublets more or less stellate-pubescent. Peduncles axillary 1- to 2-flowered. Flowers small, yellow. Sepals 4 or 5. Petals 4 or 5. Stamens free, indefinite or twice as many as petals on a short torus. Ovary 2- to 6-celled; style short. Stigma cup-shaped. Capsule elongate-cylindric angled, or sub-globose, 2- to 5-valved. Seeds numerous, albuminous. Species 35, tropics generally.

- Capsule globose
- cylindric, smooth
- cylindric, 10-ridged
- cylindric, 6-winged

(1) **C. capsularis** Linn. Sp. Pl. 746; Wight Ic. t. 311; Masters, in Hook. Fl. F.B.I. i. 397; King, l.c. 117.

Annual, shrubby, erect little branched 2 to 4 ft. tall, glabrous. Leaves lanceolate acuminate, coarsely serrate, base rounded with 2 subulate appendages, 2 to 4 in. long, ’75 to 1’5 in. wide; petioles ’5 in. long. Stipules linear-subulate. Flowers in small axillary clusters, yellow, ’1 in. long. Capsule globose truncate, ridged and wrinkled, ’5 in. long, ’3 in. wide, on short stout ’1-in. peduncles, 5-celled. *Hab.* Weed in waste ground, never cultivated, as King suggests. Perak, Ulu Bubong in open bamboo jungle (Kunstler); Perlis at Kanga. Distrib. India.

(2) **C. tridens** Linn. Mant. 366; Masters, l.c. i. 398.

Shrubby herb, little branched about 2 ft. tall, nearly glabrous. Leaves glabrous, oblong-lanceolate sub-acuminate, base rounded, blunter serrate, with 2 setaceous processes at base; nerves 6 slender, ’5 to 4’5 in. long, ’5 to 1 in. across; petioles slender ’4 in. long. Flowers ’1 in. long, yellow. Capsule cylindric, ’7 in. long, less than ’1 in. thick, with 3 short recurved points at tip, no ridges or wings. *Hab.* Rocks by the sea or in dry open country. Johor, Minyak Buku, Batu Pahat. Province Wellesley, Permatang Bertam. Distrib. India, Australia.

(3) **C. olitorius** Linn. Sp. Pl. 746; Masters, l.c. i. 397; King, l.c. 118.

Shrubby annual 2 ft. or more tall, nearly glabrous. Leaves ovate-lanceolate serrate, base rounded with 2 subulate appendages, 2 to 4 in. long, ’75 to 2 in. wide; petioles ’75 to 1’5 in. long. Stipules linear. Flowers yellow. Capsule cylindric, 10-ribbed, 5-celled,

(4) C. *acutangulus* Lam. Dict. ii. 104; Wight Ice. t. 739; Masters, l.c. i. 398; King, l.c. 118.

A herbaceous or slightly woody plant, prostrate or erect branched, nearly glabrous, stem with a line of pubescence running up it. Leaves ovate to ovate-lanceolate acute or acuminate, serrate, base rounded, '5 to 3 in. long, '2 to 1:7 in. wide, herbaceous; petioles '1 to 1 in. long. Stipules long, subulate. Flowers '2 in. long, yellow, in axillary pairs. Capsule 1 to 1:5 in. long, cylindric, 6-winged with 3 terminal beaks, 3-celled. Hab. Open ground and rocks by the sea very variable. Singapore, Chan Chu Kang. Johor, Gunong Pantai base (Kunstler). Pahang, Tembeling River sand-banks, a dwarf form; Pulau Jellam, Pahang River. Selangor, Port Swettenham. Perlis, Tebing Tinggi; Penang, Telok Bahang (Curtis). Distrib. India, Australia, Africa, West Indies. Native name: Rumput Baya Roaza.

8. COLUMBIA, DC.

Trees often hairy or pubescent. Leaves alternate, lanceolate often serrate, base usually obliquely bilobed. Flowers in terminal panicles, bracteate. Sepals 5, lanceolate or oblong. Petals shorter or about as long. Stamens numerous. Fruit a winged capsule, wings 2 to 4. Species about 5, Malaya, India, Annam, China.

Leaves lanceolate, long-acuminate, base unequal, grey beneath

Leaves broad ovate, base unequal

Leaves small, oblong or elliptic, acuminate, sub-glabrous, base nearly equal, nor cordate.

Wings of fruit 2

Wings of fruit 4

(1) *C. serratifolia*

(2) *C. integrifolia*

(3) *C. diptera*

(4) *C. Curtisii*

(1) *C. serratifolia* DC. Prod. i. 512.

Tree. Branches villous. Leaves lanceolate acuminate, serrate towards tip, base unequally bilobed, glabrous above; nerves hairy or pubescent, beneath minutely velvety grey, '10 in. long, 3 in. wide or less; petioles '25 in. long. Panicles 6 in. or more long, 2 to 4 in. wide. Flowers numerous about '5 in. across; pedicels '2 in. long. Bracts whorled, obcuneate, deeply cleft into laciniae. Sepals lanceolate acute, white-pubescent outside. Petals shorter, nearly glabrous, oblanceolate thin, orange yellow speckled red. Capsule obovoid, 4-winged, wings narrow, ribbed transversely '3 in. long and wide. *Hab.* Johor, Penyabong (Foxworthy); Pahang, Pulau Tiuman, Juara Bay (Burkill); Pianggu, Endau (Evans). *Distrib.* Borneo, Celebes, Philippines.


Tree 30 ft. tall. Branchlets stellate-hairy. Leaves oblong, shortly acuminate, base unequally lobed, 1 lobe '5 in. longer than
the other; nerves 2 on one side, 1 on the other; nervules prominent beneath, edge entire spinulose, above, stellate-hairy, beneath velvety, 6 in. long, 3 in. wide; petioles 5 in. long. Panicle terminal spreading, 7 in. long, velvety-grey; cymes compact. Bracts ovate boat-shaped, blunt. Flowers 5 in. long, white. Sepals linear-oblong, blunt, hairy. Petals lanceolate oblong, sub-acute, as long. Torus low, silky. Style hairy. Hab. Lime-
stone rocks. Perak at Lenggong (Ridley).


Allied to C. merguensis Planch., but with smaller leaves. I have seen no flowers.

9. TRICHOSPERMUM, Bl.


Capsule transversely elliptic not keeled . . . (1) T. Kurzii
Capsule inversely cymbiform keeled . . . (2) T. cymbiforme


Tree 40 to 100 ft. tall, 15 to 20 in. through. Leaves membranous, ovate-elliptic, acuminate, serrate-crenate, base rounded, sub-truncate, sub-cordate; nerves 5 pairs, 4 to 6 in. long, 2 to 3 in. wide; petioles 5 in. long. Panicles long-peduncled. Flowers 4 in. long, light brown outside, green within. Sepals oblong, acute,


Tree 30 to 40 ft. tall (60 to 100 ft. fide Kunstler), glabrous except inflorescence, petioles and young leaves. Leaves oblong shortly cuspidate, base truncate or shortly cordate, edge faintly serrulate at base, distinctly on top and cusp; nerves 3 pairs, one pair from base, 6 in. long, 2 in. wide; petioles '25 in. long, pubescent. Flowers axillary crowded, not seen developed. Bracts lanceolate thick bl unt, '2 in. long. Fruit panicles 4 in. long, including the peduncle 1-5 in. long and glabrescent, upper branches and pedicels '75 in. long, velvety. Capsule hairy transversely cymbiform, base straight, above rounded with a short point 1 in. wide, '5 in. deep, keeled on the outer edges. Seeds numerous long-hairy. *Hab.* Hill forests, Perak, Larut (Kunstler). Penang, Paya Terobong (Curtis); Bukit Tawan (Haniff). *Distrib.* Sumatra.

This species, of which full specimens have not been obtained, differs from *T. Kurzii* in the smaller leaves, and the fruit in the shape of a reversed boat, the valves being distinctly keeled on the edges, while those of *T. Kurzii* meet exactly on the edge and are not prolonged into a keel. Better specimens of this tree are much wanted.

**10. SLOANEA, L.**

Trees. Leaves simple. Flowers in few-flowered, lax cymes, rather large. Sepals 4, valvate, coriaceous. Petals 4, oblong, entire. Stamens very numerous, pilose. Ovary 4-celled sunk in a disc; ovules numerous. Fruit, a capsule (woody and spiny), or woody velvety, 4-valved with 1 to 2 arillate seeds. Species 60, most S. American, but some Indo-China, China and Malaya.


Big tree. Leaves ovate-oblong, blunt pointed, base round, glabrous; nerves 8 pairs, 4-5 in. long, 3 in. wide; petioles 1 in. long. Peduncles 1-75 in. long, with 3 flowers on pedicels an inch long. Sepals ovate velvety, '3 in. long. Petals velvety, more acuminate. Capsule oblong obovoid, 4-angled, 3 in. long, 1-5 in. through, not spiny bright red. Seeds pendulous, black, ellipsoidal, 1 in. long, almost covered with a red aril. Very rare. Fruit described from Miquel. *Hab.* Woods near sea; Singapore, Kranji (Ridley). *Distrib.* Java.
11. ELÆOCARPUS, L.

Trees, or in high mountains, shrubs. Flowers usually bisexual, in axillary racemes white. Sepals 5, distinct. Petals 5, usually laciniate at tip, from the outside of a cushion-shaped torus often 5-lobed, or of 5 glands. Stamens usually many, never less than 10, more or less aggregate into groups within the torus, alternating with the lobes of the torus; anthers linear, opening by a terminal pore. Ovary 2- to 5-celled, cells 2- to many-ovuled; style columnar. Drupe with one bony stone, 3- to 5- or 1-celled. Seeds pendulous, 1 in each cell, albuminous. Species 50, Indo-Malaya, a few Polynesia, Australia, and New Zealand.

Malay name generally, Mendong, often accidentally Medang, which properly means *Laurinea*.

i. Ganitrus. Ovary and drupe 5-celled (except a variety of No. 3).

Leaves glabrescent.

- Leaves lanceolate; flowers 5 in. long; drupe globose blue, stone tubercled . . . . (1) E. Ganitrus
- Leaves elliptic ovate; flowers 1 in. long; drupe globose, green stone smooth . . . . (2) E. parvifolius
- Leaves tomentose beneath.
- Fruit globose; stipules conspicuous . . . . (3) E. stipularis

ii. Eu-Elæocarpus. Ovary 3-celled; longer cell of anthers bearded with a tuft of hairs.

Leaves glabrescent; nerves faintly puberulous.

- Leaves ovate, stiff, strong-nerved . . . . (4) E. Wrayi
- Leaves lanceolate, thin; nerves fine . . . . (5) E. salicifolius
- Leaves elliptic-ovate, coriaceous 4 to 7 in. by 2 to 4 1/2 in.; flowers 5 in. wide . . . . (6) E. robustus
- Leaves elliptic, very stiff, 4 by 2 in.; racemes 3 in. long; flowers 2 1/2 in. wide . . . . (7) E. floribundus
- Leaves glabrous entirely.
- Racemes very long, many flowered; leaves large . . . . (8) E. nitidus
- Racemes short; leaves small rigid coriaceous . . . . (9) E. acmosepalus

iii. Monocera. Outer cell of anther awned; ovary 2-celled; drupe 1-celled, 1-seeded.

- Leaves broad, elliptic, 5 in. long or more; racemes axillary, 3 to 4 in. long . . . . (10) E. petiolatus
- Leaves oblong; flowers in erect panicle, 9 in. long or more, terminal . . . . (11) E. paniculatus
- Leaves elliptic, short, blunt acuminate, 3 in. long; flowers 5 in. wide . . . . (12) E. Griffithii
- Leaves elliptic lanceolate, long, acuminate, 3 in. long; flowers 24 in. wide . . . . (13) E. Hullettii
- Leaves obovate serrate, 3 in. long; flowers many 2 1/2 in. long; sepals and peduncles silky . . . . (14) E. pedunculatus
- Leaves obovate serrate, 3 in. long; flowers many 2 1/2 in. wide; sepals and petals glabrous . . . . (15) E. Barnardii
- Leaves obovate, 5 by 3 1/2 in. long, decurrent; flowers 4 in. wide . . . . (16) E. Kunstleri
- Leaves obovate, 5 by 2 in.; petioles 1 in. long; flowers few, 7 1/2 in. wide . . . . (17) E. obtusus
- Leaves oblanceolate, 10 by 4 1/2 in. long, decurrent; flowers 1 in. wide . . . . (18) E. rugosus
iv. ACRONODIA. Flowers 4-merous; anthers not awned or bearded.
Leaves tomentose beneath, 6 in. long; panicles red-hairy.
Leaves sparsely tomentose or only the midrib, 3 in. long; flowers small.
Leaves minutely puberulous on nerves; above and beneath; racemes pale, pubescent.
Leaves glabrous.
Racemes 2 in. long, glabrous.
Leaves elliptic, blunt long-acuminate, thin 3 in. long.
Leaves lanceolate, 6 by 1.75 in.
Leaves lanceolate acuminate serrate, coriaceous 5 by 1 in.
Racemes 3 in. long, silky.
Leaves oblanceolate blunt coriaceous long-acuminate.
Leaves ovate very coriaceous, strongly reticulate on both sides.

A big smooth-barked tree, 40 to 50 ft. tall. Leaves submembranous, red when old, lanceolate acute at both ends, minutely serrulate; nerves 10 to 12 pairs, slender, 3.5 to 5.5 in. long, 1.25 to 2.25 in. wide; petioles 3 to 5 in. long. Racemes pubescent from below the leaves, many-flowered, 3.5 in. long. Flowers white, secund, 5 in. long on pedicels 4 in. long. Sepals lanceolate acuminate, pubescent. Petals longer, obovate, lacinate for half the length. Torus short, fleshy. Anthers 30 to 35, the longer ones with 1 to 2 hairs at tip. Ovary ovoid-conic, tomentose, 5-celled; ovules 4 in each cell. Drupe globose, 75 to 9 in. through; bright blue with oily pulp, stone 5-grooved, tubercled, 5-celled. Hab. Malacca (Maingay). Perak; dense jungle at Goping (Kunstler). Penang, Penara Bukit at 1000 ft. altitude (Curtis). Distrib. Assam and Nepal.

Very doubtfully wild here. The seed valued for necklaces.

(2) E. PARVIFOLIUS Wall. Cat. 2662 A. and B.; Masters, l.c. i. 401; King, l.c. 123.
Tree 20 to nearly 100 ft. tall. Branchlets pubescent. Leaves membranous, ovate-oblong acuminate blunt, base cuneate, serrate, glabrous except the pubescent mid-rib, brown beneath when dry; nerves 6 pairs, elevate beneath, 2.5 to 4 in. long, 1.1 to 1.4 in. wide; petioles puberulous, slender, 6 to 7.5 in. long. Racemes from below the leaves, 2.7 in. long, puberulous, silky, buds conic. Flowers 1 in. long. Sepals lanceolate, silky. Petals about as long, cuneiform cut half-way into laciniae. Torus of 5 separate glands, velvety. Stamens 15, shorter than petals; anthers scabrous, sometimes with 2 or 3 hairs at tip. Ovary 5-celled, pubescent. Fruit globose or ovoid, green, 75 to 1 in. through, 5-celled, stone rugose. Seeds 2 or 3. Hab. Common in open country, and
in high jungle, where it attains a much greater size; Singapore, Changi; Bukit Timah. Johor, Kota Tinggi. Malacca, Ayer Panas (Holmberg); Ulu Chembong (Derry). Negri Sembilan, Bukit Kupayiang (Cantley); Perhentian Tinggi. Perak, Thaiping Hills (Kunstler). Penang, Government Hill and Penara Bukit (Curtis). *Distrib.* Borneo. *Native names:* Jambu Kelawar; Jambu Kelat Lawar putih; Medang api; Medang pipit; Mudong Kelawar; Munsaya; Paroh.

Fig. 29.—*Elacocarpus stipularis.*

(3) *E. stipularis* Bl. *Bijdr.* 121; *Masters,* l.c. i. 404; *King,* l.c. 123.

Tree 40 to 60 ft. tall, more or less pubescent all over. Leaves coriaceous, ovate acute or acuminate, base rounded or slightly cuneate, edges entire or very nearly so, above glabrous when adult, beneath tomentose; midrib pubescent on both sides; nerves 9 to 12 pairs, 3·6 to 6·5 in. long, 1·75 to 2·5 in. wide; petioles 5 to 7·5 in. long. Stipules conspicuous 2 in. long, 3- to 4-lobed, lobes acute, tomentose. Racemes axillary and below leaves
minutely tomentose. Flowers '3 in. across; pedicels as long, tomentose. Sepals lanceolate acute, tomentose, inside pubescent. Petals longer, cuneiform, lobed and laciniate, laciniae about 25. Torus of 5 tomentose glands. Stamens 25, half as long as petals; anther-cells unequal, longer ones with a tuft of white hairs at tip. Ovary ovoid-globose, tomentose 3- or 5-celled. Fruit globose or oblong, green, '8 to 1 in. long. Stone 1-seeded. Hab. Common in woods in the low country, Singapore, Tanglin, etc. Johor, Kota Tinggi. Malacca, Merlimau (Derry); Pahang, Tanjong Opi, Kwantan (Foxworthy). Selangor, Kwala Lumpur (Curtis). Perak, Larut Hills (Curtis); Tapa (RRAY); Negri Sembilan, Bukit Kupayiang and Gunong Berumbun (Cantley); Pahang, Kwala Tembeling. Province Wellesley, Tasek gelugur. Distrib. Borneo, Sumatra, Java. Native names: Darumun Pelandok; Medang Tijo; Paroh; Ungank; Pulai Pipit; Pinang Pergam.

This plant varies somewhat in size of leaves and in the number of cells in the ovary. A large-leaved form, rather more tomentose and apparently with entire lanceolate stipules, is the var. latifolia King, l.c. 124, and has been met with at Goping in Perak by Kunstler. A form with 3-celled ovary and oblong fruit occurs with the ordinary form. This is the plant described as E. Scortechinii King, l.c. 124, and has been met with in Singapore on Bukit Timah and Bukit Mandai, Dinding at Bruas (Burn-MURDOCH) and Perak at Relau Tujor by Wray, and at Ulu Bubong by Kunstler, and Sarawak, Borneo. Merrill, Journ. Roy. As. Soc. S. Br. 77, p. 203, separates this species from Blume's stipularis under the name of E. gambir Becc. apparently on a statement of Koorder's that the plants are different. The Javanese form has a tendency to be less hairy beneath the leaves, but I see no other difference.


A small tree with young parts pubescent. Leaves coriaceous, bluntly acuminate, crenate serrate, base rounded, glabrous when adult, black-dotted on the back; nerves till adult pubescent, 6 to 7 pairs, elevate beneath inarching, reticulations wide, 2-25 to 4-5 in. long, 1-25 to 1-75 in. wide; petioles 75 in. long slender. Racemes usually from below, the leaves about half as long to 4 in. long, tomentose often sub-terminal. Flowers '2 in. across. Sepals lanceolate acute, tomentose, inside pubescent, pinkish brown. Petals glabrous, cuneate, cut into 25 laciniae, greenish white. Torus of 5 velvety oblong glands. Stamens 20 to 25, shorter than petals; filaments less than half as long as anthers. Ovary conic, tomentose, 3-celled. Fruit ovoid-globular, 1 to 1'25 in. long, '8 to '9 in. wide, 1-celled. 1-seeded. Hab. Mountains, 5000 to 5500 ft. altitude; Perak, Gunong Bubu at 5000 ft. altitude and Gunong Batu Putih (Wray); Pahang, Gunong Tahan (Robinson).

The form monticola Ridl. of Gunong Tahan has larger nearly entire leaves, and longer racemes sub-terminal.
(5) **E. salicifolius** King, l.c. 125.
A slender tree 30 ft. tall. Branchlets puberulous. Leaves thinly coriaceous, narrow lanceolate acuminate, base cuneate, upper part serrulate-crenulate, glabrous except the puberulous midrib, nerves 8 pairs, 3 to 3.5 in. long, 7 to 9 in. wide; petioles .5 in. long. Racemes from below and with the leaves; rachis slender, pubescent. Flowers 15 in. across, white, fragrant of almonds; pedicels pubescent, 15 to 2 in. long. Sepals lanceolate tomentose outside cream white. Petals little longer cuneiform with a narrowed claw, divided half-way into 8 fimbriate lobes, pubescent inside. Torus of 5 sub-globese glands, reddish brown. Stamens 25, shorter than petals, cells pointed, upper with a tuft of white hairs. Ovary globose, tomentose, 3-celled. Drupe oblong, green. *Hab.* Woods in the south; not common. Singapore, Bukit Timah; Chanchukang (Kunstler, Ridley). *Native names:* Darumon; Jurumong Padi.

(6) **E. robustus** Roxb. *Fl. Beng.* 42; Masters, l.c. i. 402; *Pierre, Fl. For. Cochinchine,* t. 147; Wight, *Ic. t.* 64; *King, l.c.* 126.

Tree 40 to 60 ft. tall. Young parts puberulous. Leaves thinly coriaceous, ovate-lanceolate to ovate-acuminate, base rounded, serrate, glabrous, when young red; nerves 10 to 12 pairs, rather prominent, reticulations conspicuous, fine on back, 3.5 to 9 in. long, 1.75 to 3.5 in. wide; petioles 1 to 2.25 in. long. Racemes from below the leaves 4.5 to 6 in. long, puberulous. Flowers .4 in. wide; pedicels .3 in. long. Sepals lanceolate, pubescent outside, glabrous and keeled inside. Petals broad cuneiform, base acute, cut half-way into 30 laciniae, edges and base hairy. Torus of 5 velvety glands. Stamens 30 to 50. Fruit ovoid-globose, 1 to 1.25 in. long; stone oblong-ovoid, rugose, 3-celled. *Hab.* Open country; Johor, Sungei Kahang (Kelsall), Pahang River, Kwala Pahang. *Dindings,* Bruas. *Penang,* Telok Bahang (Curtis); Setul. Lankawi islands (Curtis). *Distrib.* India. *Native names:* Barong; Kunkuman Jantan; Obak; Sito; Sopi.

var. **ovalis** Ridl. Leaves broadly ovate, base rounded, long, acuminate, margin almost entire, quite glabrous, 7 in. long, 4.5 in. wide; petioles 2.5 in. long, rather stout. Flowers .5 in. across. Sepals strongly keeled within. Petals broad, pubescent all over. Selangor at the Sempang mines (Ridley).


A tree 30 to 40 ft. tall, nearly glabrous. Leaves thinly coriaceous, ovate-elliptic to oblong-lanceolate acuminate blunt, obscurely crenate-serrate or almost completely entire, often pustulate; nerves 5 to 7 pairs; 3 to 5.5 in. long, 1.75 to 2.75 in. wide; petioles rather slender, geniculate at tip, 1 to 1.5 in. long. Racemes
below the leaves, 3 to 4 in. long, many-flowered, glabrous. Flowers \( \frac{4}{3} \) in. across, buds conic acute; pedicels \( \frac{35}{35} \) in. long. Sepals lanceolate, glabrous, often pestulate, edges only pubescent, midrib prominent. Petals cuneiform-oblong, lobed about a fourth of their length with numerous laciniae, edges pubescent. Torus of 5 tomentose glands. Stamens 30 shorter than petals, cells unequal, the longer tufted with white hairs. Ovary ovoid-globose, tomentose, 3-celled. Fruit \( \frac{1}{1} \) in. long, ovoid-elliptic apiculate (when young oblong and long-apiculate); stone narrow ovoid tapering to both ends with 3 vertical grooves and many wrinkles, 3-celled. \( \text{Hab.} \) In forests. Rare. Singapore, Bukit Timah. Negri Sembilan (Kinsey). Perak (Scortechini). \( \text{Distrib.} \) India, Burma, Nicobars.

(8) \textit{E. nitidus} Jack, Mal. Misc. i. (2), 41; \text{Wall. Cat.} 2678; Masters, l.c. i. 401.

Tree 25 to 60 ft. tall. Branchlets puberulous. Leaves thinly coriaceous, oblong-lanceolate acuminate, crenate-serrulate, base cuneate, brown beneath when dry, glabrous; nerves 10 to 13 pairs inarched at tip, 4:5 to 9 in. long, 1:75 to 2:75 in. wide; petioles 1-25 to 2 in. long rather slender. Racemes axillary or below the leaves, puberulous. Flowers \( \frac{15}{15} \) in. long, white; pedicels slender, \( \frac{3}{3} \) in. long. Sepals ovate-lanceolate acute, shorter than petals, puberulous, chiefly on base and edges. Petals cuneiform laciniate for half their length, glandular-pubescent. Torus of 5 sub-globular tomentose glands. Stamens 15 to 35; anthers obtuse, awnless. Ovary globose, tomentose, 3-celled. Fruit ovoid or obovoid, green, \( \frac{1}{5} \) in. long, \( \frac{1}{1} \) in. through; stone 3-celled. Seed \( \frac{1}{1} \). \text{Hab.} Woods, Penang (Jack, Curtis).

var. \textit{leptostachyus} King, l.c. 127. E. leptostachyus \text{Wall. Cat.} 2672; Masters, l.c. 403.

Leaves elliptic-oblong or rounded acute, nearly entire, base rounded, 6 to 9 in. long, 2:75 to 4:5 in. wide; petioles 1 to 1:75 in. long. \( \text{Hab.} \) Dindings, Bruas. Perak, Ulu Bubong (Kunstler); Simpang (Wray). Penang (Wallich).


Tree. Young parts silky pubescent. Leaves thinly coriaceous, drying brown, glabrous elliptic lanceolate, acute or acuminate, base cuneate, margins entire, slightly thickened; nerves 3 pairs inarched within the margin, elevate beneath, reticulations lax, 3 to 4 in. long, \( \frac{25}{25} \) in. wide; petioles slender, \( \frac{75}{75} \) in. long, geniculate. Racemes slender in upper axils 2:5 in. long, puberulous. Pedicels \( \frac{3}{3} \) in. long. Sepals lanceolate-acuminate 5, sparsely hairy or glabrescent, \( \frac{2}{2} \) in. long. Petals cuneate fimbriate, edges ciliate, nearly as long. Stamens 20 to 25; filaments glabrous, as long as the anthers, which are awned, awn nearly as long as the anther and tipped with hairs. Torus of 5 rounded tomentose glands grooved on the back. Ovary ovoid, conic, 3-celled, 6-ovuled, silky
Elaeocarpus.]

XXV. TILIACEÆ.

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The fusiform fruit is unique among our species.

(10) E. petiolatus Wall. Cat. 2673; King, l.c. 130. E. integer Masters, l.c. i. 408. Monocera petiolata Jack, Mal. Misc. i. (5), 43.

Tree 20 or 30 ft. tall, glabrous, terminal. Leaf-buds coated with resin. Leaves deep green, coriaceous elliptic or elliptic-oblong acute or shortly acuminate, edges entire, base rounded; nerves 7 to 8 pairs, reticulations fine numerous, conspicuous when dry, 4·5 to 8 in. long, 2 to 5 in. wide; petioles 1·4 to 3·4 in. long. Racemes glabrous, from below the leaves, 3·5 in. long, many-flowered; buds conic, acute; pedicels 3 in. long. Sepals lanceolate acute, glabrous except edges. Petals about as long, oblong with 10 to 12 laciniae, bases to laciniae silky, a large fleshy villous gland near the base. Torus a 10-lobed fleshy disc. Stamens 18 to 25, shorter than petals; anthers deep yellow at top with a short recurved awn on outer cell. Ovary glabrous. Fruit elliptic, blunt at both ends, 4 to 6 in. long and 3 in. through, dull dark blue; stone slightly rugose, 1-celled, 1-seeded. Hab. Common in lowland woods. Singapore, Garden Jungle; Bukit Timah. Malacca, Merlimau (Derry); Batu Tiga (Holmberg); Pahang Bentong (Foxworthy). Selangor, KwaI Lumpur (Foxworthy). Perak, Chanderiang (Kunstler); Tapu (Wray). Penang (Curtis). Distrib. Borneo, Sumatra, Burma, Trang. Native names: Mendong Pipelakan; Mendong Tanjong; Paru-Paru; Kayu Sepah; Saban.

(11) E. paniculatus Wall. Cat. 2663; Masters, l.c. i. 407; King, l.c. 129.

Tree about 30 to 40 ft. tall, 4 to 6 in. through. Leaves thinly coriaceous light green, lanceolate-oblong acuminate, edges entire, base rounded or slightly cuneate, glabrous; nerves 5 to 7 pairs, reticulations very small, distinct beneath, 4·5 to 8 in. wide; petioles 8 to 2 in. long. Racemes numerous, erect from the upper axils, 6 to 8 in. long; buds silky ovoid acute; pedicels curved, silky 3 in. long. Sepals ovate acuminate, silky outside 2 in. long. Petals as long, lanceolate acuminate entire, silky. Torus a shallow silky disc. Stamens 50, nearly sessile; anthers silky, outer cells long-awned. Ovary 2-celled, silky. Fruit ellipsoid, blunt at each end, blue grey, 4 to 5 in. long, 25 to 35 in. through, stone bony, tuberculate. Hab. Common in lowland woods. Singapore, Selitar; Teban. Johor, KwaI Sembrong (Kelsall); Batu Pahat. Malacca, Brisu (Goodenough); Merlimau (Cantley); Pahang. Kwantan (Foxworthy); Selangor, Sempang; Langat River. Perak, Asam Kumbang (Wray). Province Wellesley, Krian. Lankawi islands
(Haniff). *Native names*: Darumun hitam; Mendong Musang; Tingal Belukar; Jambu Arang.

(12) **E. Griffithii** Masters, l.c. i. 408; King, l.c. 131. Monocera Griffithii Wight, Ill. i. 84, *not* of Müller. 

Tree 30 to 70 ft. tall, glabrous except in inflorescence. Leaves thinly coriaceous, ovate-lanceolate to lanceolate acuminate, edge cartilaginous with shallow mucronate crenulations or sub-entire, base rounded or sub-cuneate; nerves 5 to 6 pairs, forking and inarching within the margin, reticulations minute, distinct, 2-5 to 3-75 in. long, 9 to 14 in. wide; petioles 5 to 1 in. long. Racemes from upper axils, rachis and pedicels 6 to 8 in. long, pubescent. Flowers 5 in. across, buds ovoid-conic. Sepals lanceolate acuminate, silky outside. Petals as long, ovate acuminate, tip 2- to 3-toothed with 2 to 3 lateral fimbriæ, outside minutely silky, inside hirsute with a large basal gland, edges below folded in to form with the gland 2 cells. Torus a 10-lobed shallow disc. Stamens 25 to 30, shorter than petals, silky, outer cell awned, awn much shorter than anther. Ovary glabrescent, 2-celled. Drupe ellipsoid, blunt at both ends, 5 in. long, 3 in. through; stone slightly rugose, 1-celled, I-seeded. *Hab*. Lowland Woods. Singapore, Chan Chu Kang. Johor, Gunong Pulai. Pahang, Pekan. Malacca, Sungei Hudang (Derry). Perak (Wray). Province Wellesley, Nibong Tebal (Curtis). *Distrib.* Tenasserim.

(13) **E. Hullettii** King, l.c. 132. 

Tree 30 to 40 ft. tall, glabrous except inflorescence. Leaves thinly coriaceous, lanceolate-acuminate, edges sub-cartilaginous, entire or obscurely serrate, base cuneate or rounded; nerves 7 or 8 pairs inarching within the margin, reticulations minute, distinct, 2-5 to 3 in. long, 75 to 14 in. wide; petioles 65 to 9 in. long. Racemes axillary, 3 to 3-5 in. long, very slender, 7- to 8-flowered, puberulous. Flowers 3 in. wide spreading; pedicels puberulous, 35 in. long. Sepals linear-lanceolate acuminate pubescent outside. Petals ovate, narrowed to the 10- to 12-fimbriate tip, glabrous outside, villous at the base inside. Torus shallow, 10-lobed, silky. Stamens 20, outer cell of anther with an awn as long as itself. Ovary ovoid pubescent, 2-celled. Drupe ellipsoid blunt at each end, 6 in. long, 35 in. through; stone wrinkled, bony, I-seeded. *Hab*. Forests. Singapore, Bukit Mandai and Bukit Timah (Hullett). Perak, Thaiping Hills at about 2000 ft. altitude (Curtis); Tapa. Penang (Curtis). *Native name*: Darumun pipit.

(14) **E. pedunculatus** Wall. Cat. 2678 in *part*; Masters, in *Hook. fil.* F.B.I. i. 408; King, l.c. 132. 

Tree 40 to 80 ft. tall, glabrous except inflorescence. Leaves coriaceous, oblanceolate or narrowly elliptic-oblong, blunt, base very cuneate, edge cartilaginous crenate-mucronate; nerves 5 to 7 pairs, inarching far from edge, 3 to 4-5 in. long, 1-25 to 1-8 in. wide; petioles 75 to 1-2 in. long. Racemes axillary or below
leaves 3 to 4 in. long hoary-pubescent. Flowers 3 in. wide, buds ovoid acute. Sepals lanceolate acute, minutely silky outside, midrib thickened. Petals little longer, oblong base expanded, tip broad with 10 to 15 fimbriae one-fourth of length, silky on both sides at base, within hooded, edges infolded to a large gland at base forming 2 cells. Torus a 10-lobed glabrous disc. Stamens 15; filaments pubescent, outer cell with recurved awn. Ovary ovoid, glabrous, 2-celled. Drupe ellipsoid, blunt at both ends, \(1/5\) in. long, \(3/3\) in. through, 1-celled, 1-seeded. Hab. Usually a sea-shore tree, but also in forests. Singapore, Sungei Jurong; Loyang; Pulau Tekong; Pulau Bayan. Malacca (Griffith). Perak, Thaiping Hills (Kunstler). Negrí Sembilan, Tampin Hill (Robinson). Penang, Government Hill (Curtis). Native name: Darumun Padi.


Tree. Leaves obovate blunt, glabrous, bluntly serrate; nerves 5 to 6 pairs, 3 to 6 in. long, 1.6 in. wide; petioles 1.2 in. long. Racemes 12- to 20-flowered, as long or little longer than leaves scurfy pubescent. Sepals 5, linear-lanceolate, 2 in. long. Petals obcuneate, as long, laciniate to middle. Stamens about 20; anthers bearded at tip. Ovary 3-celled, pubescent. Fruit olive-shaped, \(8\) in. long, deep blue. Seed smooth. Hab. Perak. Thaiping (Barnard).

(16) E. Kunstleri King, l.c. 133.

Tree 50 to 60 ft. tall, 15 to 20 in. through. Branches thickened at the tip, glabrous except inflorescence. Leaves coriaceous, rounded obovate obtuse, sometimes apiculate, base narrowed, edge slightly crenate serrate; nerves 10 pairs inarching within the edge, reticulations distinct on both surfaces, 5 to 8 in. long, 2.75 in. wide; petioles \(5\) to \(7\) in. long. Racemes below the base crowded, slender, \(1.5\) in. long, puberulous. Flowers 4 in. across; pedicels \(4\) in. long. Sepals lanceolate narrow, sub-acute, pubescent on both sides. Petals as long, oblong-obovate obtuse, laciniae rather broad 6 to 8, silky outside, villous inside. Torus a shallow-toothed cup. Stamens 28 to 30, shorter; outer anther-cell with a recurved awn. Ovary ovoid tomentose, 2-celled. Hab. In open jungle, 500 to 800 ft. altitude. Perak, Gunong Bubu (Kunstler).

(17) E. obtusus Bl. Bijdr. 125; King, l.c. 134. E. monocera Cav. Lc. i. 501; Masters, l.c. i. 405.

Small tree 30 or 40 ft. tall. Branchlets pubescent. Leaves coriaceous, oblong-obovate, tip rounded or blunt, gradually narrowed to the acute base, glabrous; nerves 6 to 8 pairs, reticulations very fine, 4.5 to 6.5 in. long, 2.25 to 2.75 in. wide; petioles \(75\) to \(1.1\) in. long. Racemes axillary among the leaves, puberulous, \(1.5\) to \(2.5\) in. long, few-flowered. Flowers 1 in. across, buds acute. Sepals oblong-lanceolate acute, minutely pubescent. Petals longer, cuneiform, \(5\) in. long, \(2\) in. across, laciniae short, 8 to 10. Torus a wavy cup. Stamens 30 to 50, shorter than petals; anther with a setaceous
awn as long as itself. Ovary ovoid silky 2-celled. Fruit ovoid-oblong, 1'5 in. long, '9 in. wide; stone tubercled, 1-celled, 1-seeded. 

*Hab.* Seashores and open country. Singapore, Bukit Timah; Chua Chu Kang. Johor, Kota Tinggi. Malacca (Griffith); Keru-bong; Merlimau (Cantley); Pahang River. Dindings. Perak, Kwala Dipang (Curtis). *Distrib.* Burma, Sumatra, Java, Borneo. 

*Native names:* Medang Kawan; Medang Paya; Medang Tanah. 


A big tree 50 to 100 ft. tall and as much as 3 ft. through. Young parts pubescent. Branchlets thick. Leaves coriaceous, often glabrous all over, obovate to ob lanceolate-oblong shortly acuminate or blunt, edge obscurely serrulate crenate, base narrowed blunt; nerves 12 to 14 pairs, prominent beneath inarching within margin, glabrous or densely pubescent, 7 to 10 in. long, 2'5 to 3'75 in. wide; petioles 3 to 1 in. long. Racemes axillary below the leaves, 2 to 3 in. long, pubescent. Flowers '9 in. across, pedicels 2 to 3 in. long. Sepals oblong-lanceolate, sub-acute, pubescent. Petals longer, cuneiform silky, cut into numerous laciniae about one-fourth of their length. Torus a shallow cup, pubescent. Stamens 30 to 40, half as long as petals; filaments dilate at base, outer anther-cell long-awned. Ovary ovoid tomentose, 2-celled. Drupe oblong-globose, 1'25 in. through, stone woody with large wing-like processes, 1-celled, 1-seeded. *Hab.* High forest up to 2000 ft. altitude. Malacca (Griffith). Perak, Ulu Bubong; Larut Hills (Kunstler). Penang; Government Hill (Wallich, Maingay, Curtis). *Distrib.* India, Chittagong. 

var. *singaporensis* Ridl. 

A fine tree with obovate obtuse crenate leaves; nerves 6 pairs, 6 in. long, 3 in. wide; racemes 3 in. long, slender. Singapore, Bukit Timah Road (Ridley 5727, 10798). 


Tree 40 to 100 ft. tall. Young branches red-tomentose. Leaves coriaceous, ovate-oblong to elliptic acuminate acute entire, base rounded or shortly cuneate, above glabrous, beneath red-tomentose; nerves 8 to 10 pairs prominent beneath; nervules distinct, sub-parallel, visible beneath, 4 to 7 5 in. long, 2'5 to 4'5 in. wide; petioles 1'75 to 3 in. long, stout tomentose. Racemes crowded below the leaves, 3 in. long, red-tomentose. Flowers 2 in. long, often unisexual, pendent; pedicels as long, curved red-tomentose. Sepals 4, lanceolate acute, red-tomentose. Petals 4, little longer, oblong obtuse, 8- to 10-toothed. Stamens about 12, shorter, scaberulous; anthers pointed, unawned. Ovary ovoid-oblong, glabrous, imperfectly 2-celled. Torus saucer-shaped undulate, hairy. Drupe ovoid-oblong, both ends rounded, blunt. Seed rugose, 1-celled, 1-seeded. *Hab.* Common in woods in the south;

Easily recognised by its redomentum. The flowers are often exclusively male.

(20) **E. glabrescens** Masters, l.c. i. 403; King, Journ. As. Soc. Bengal, l.c. 138.

Tree. Young branches, buds and petioles densely red-tomentose. Leaves coriaceous, ovate to ovate-lanceolate acuminate, edges entire, base rounded above, glabrous except midrib, finely reticulate, beneath rufous-pubescent, but finally glabrous except midrib; reticulations small, conspicuous; nerves 5 to 6 pairs, 2·5 to 3·5 in. long, 1·2 to 1·6 in. wide; petioles 1·25 to 1·75 in. long, glabrescent when old. Racemes 1 to 1·5 in. long, axillary and below the leaves; rachis and pedicels pubescent. Flowers 1·5 in. long; pedicels curved, as long. Sepals 4, ovate-lanceolate, pubescent outside. Petals 4, slightly longer, oblong with 6 to 12 short teeth, pubescent outside. Stamens 10 to 12, shorter; anthers scaberulous obtuse unawned. Ovary ovoid, glabrous. Torus a shallow villous cup. Drupe oblong-obovoid, narrowed to base, 3 in. long, 2 in. wide. Hab. Usually in hill forests. Selangor, KwaIa Lumpur (Curtis); Gunong Mengkuang Lebah, 5000 ft. altitude (Robinson). Penang, Government Hill (Maingay, Curtis) at 2500 ft. altitude. Kedah Peak (Burkill's collector).

(21) **E. polystachyus** Wall. Cat. 2671; Masters, l.c. i. 403; King, l.c. 137.

Small tree 20 to 40 ft. tall. Branchlets silky, rather stout. Leaves coriaceous, lanceolate-elliptic acuminate, base broad rounded, shortly serrulate or nearly entire, glabrous above, midribs and nerves beneath hairy; nerves 7 to 10 pairs, prominent beneath, reticulations very fine on both surfaces, 5·5 to 7·7 in. long, 2·25 to 3·5 in. wide; petioles 2·5 in. long, silky. Racemes from upper axils below the leaves 7 in. long; rachis silky-tomentose. Flowers 2 in. long, nodding ochreous; pedicels curved as long; buds ovoid obtuse. Sepals ovate obtuse, silky outside. Petals elliptic-oblong obtuse, entire or slightly lobed, villous on both sides. Stamens half as long as petals, pubescent; anthers unawned. Torus of 5 thin villous glands. Ovary ovoid villous 2-celled. Drupe oblong, blunt at both ends, 6 in. long, 3·5 in. through, green, stone minutely rugose, 1-celled, 1-seeded. Hab. Woods in the south. Singapore, common, Bukit Timah; Jurong. Johor, Pinerong (Cantley). Distrib. Borneo. Native names: Derumo; Darumun Babi.

(22) **E. Mastersii** King, l.c. 140. E. Acronodia Masters, l.c. i. 401, in part.

Tree 20 to 50 ft. tall. Shoots slightly puberulous, otherwise
glabrous. Leaves thinly coriaceous oblong-lanceolate to ovate-lanceolate acuminate, entire or faintly serrate, base cuneate; nerves 6 to 8 pairs inarching within the edge, 2.75 to 4.5 in. long, 0.8 to 1.4 in. wide; petioles 0.5 to 0.75 in. long. Racemes short, 1 to 2 in. long, few-flowered. Flowers 2 in. across, white; buds ovoid acute. Sepals 4, ovate-lanceolate sub-acute, puberulous or glabrous. Petals oblanceolate or obcuneate, tip rounded more or less laciniate glabrous. Stamens 8 to 10, shorter; anthers unawned. Torus a shallow wavy disc, pubescent. Ovary ovoid glabrous, 2-celled. Drupe ovoid-oblong, 2.5 in. long, 25 in. wide, blue; stone smooth cartilaginous, 1-celled, 1-seeded. Hab. Common in lowland open country and woods. Singapore, Cluny Road (Murton). Johor, Gunong Pulai. Malacca, Mt. Ophir (Maingay), a form with smaller, narrower leaves, with more distinct reticulations. Perak, Ulu Bubong (Kunstler). Kedah, Peak (Lobb). Distrib. Borneo. Native names: Chemanton Merah; Lempedu Burong; Medang Asam; Nilausor; Medang Suggueh; Medang Perak Payah.

Often unisexual and variable in the shape and cutting of the petals. Mountain forms have much smaller and narrower leaves.

Leaves coriaceous lanceolate, tip acuminate, base cuneate, edges serrate; nerves 6 pairs, inarching within the margin, slender midrib stout, reticulations wide little elevate, glabrous except the young leaves; which have silvery-silky edges, 5 to 6 in. long, 1.5 to 1.9 in. wide; petioles 1.5 in. long, rather stout. Racemes axillary below leaves numerous, 2 to 2.5 in. long, glabrous. Flowers secund, 2 in. long, white; buds conic, sub-acute. Sepals 4, lanceolate-acuminate, pubescent. Petals as long, narrow oblong-cuneate, apex fimbriate, base silky, hairy on edge. Stamens shorter, glabrous; filaments short; anthers blunt, not awned, pubescent. Ovary silky. Torus silky. Hab. Mountains at 4800 to 5000 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson).

Leaves ovate-lanceolate acuminate blunt, base cuneate, edges crenulate, coriaceous, glabrous; nerves 7 pairs, reticulations fine elevate beneath, 3 in. long, 1.1 to 1.5 in. wide; petioles slender, geniculate at tip, 1 in. long. Racemes numerous among upper leaves, 2.75 in. long, rachis slender, glabrescent. Flowers numerous, pendent; pedicels silky, 2 in. long; buds conic, acute. Sepals 4, lanceolate, silky outside. Petals 4, oblong cuneate, tip fimbriate with 12 short laciniae. Stamens, anthers glabrous bifid, lobes unequal; filaments shorter. Ovary glabrescent, ovoid. Torus saucer-shaped silky. Hab. Mountains at 4800 to 5000 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson).

Leaves oblanceolate acuminate long narrowed to the base,
edges thickened, serrate, coriaceous, glabrous when adult; nerves faint 7 pairs, reticulations conspicuous, 2'5 in. long, 7'5 in. wide; petioles 2'5 in. long. Racemes few-flowered, 1 in. long; pedicel 2'5 in. long. Sepals 4, linear-oblong obtuse, silky. Petals 4, oblong truncate, shortly lacinate, little longer than sepals silky. Stamens 10; anthers glabrous. Ovary short conic, silky. Torus glabrous. Fruit oblong, 5 in. long. Hab. Mountains; Selangor, Ulu Kali at 3500 ft. altitude (Burn-Murdoch); Perak, Gunong Kerbau, 6600 ft. altitude (Robinson); Ulu Batang Padang (Wray).

var. cuspidata Ridl. Leaves with a long acuminate blunt point, 1'4 in. long; Selangor, Gunong Mengkuang Lebah (Robinson) at 5000 ft. altitude.

King’s punctatus is based on Wray’s plant, which is not glabrous, but minutely appressed silky on both sides; young leaves from other localities are often more or less hairy silky.


Small tree. Young parts pubescent. Leaves ovate, abruptly acuminate acute, or lanceolate, base rounded faintly crenulate with black dots in the crenulations, stiffly coriaceous, glabrous; young leaves red and pubescent; nerves 7 pairs inarching within the margin, closely finely reticulated on both sides and black dotted beneath, 2 to 4 in. long, 1 to 2 in. wide; petioles 5 in. long, pubescent. Racemes from lower or middle axils among the leaves 1'5 to 2 in. long, pubescent. Torus white-hairy, disc-shaped. Stamens glabrous. Drupe ellipsoid, 5 in. long blue black. Hab. Mountains, on an open rocky plateau. Pahang, Gunong Tahan on the Padang 5000 ft. altitude (Ridley).

**DUBIOUS SPECIES**

(1) **E. macrocarpa** Ridl.

Tree. Leaves ovate cuspidate, crenate, glabrous; nerves 9 pairs, prominent beneath, 7 in. long, 3'5 in. wide; petioles 3 in. long. Fruit ovoid, globular, 2 in. through; pericarp woody, 1-celled, 1-seeded. Perak, on Gunong Keledang (Ridley). I was only able to get fruiting specimens of this plant, remarkable for having fruit very greatly larger than any other species. It appears, however, to be certainly an *Elaecarpus*.

**ORDER XXVI. GONYSTYLACEÆ.**

Trees. Leaves alternate. Flowers bisexual, panicled. Calyx cup-shaped, 5-lobed, coriaceous, hairy inside, corolla of numerous setaceous bifid or trident petals. Stamens very numerous 30 to 40; filaments short; anthers basifixed. Ovary 4- to 6-celled; ovules 1 in a cell; style filiform. Stigma clubbed. Fruit a woody ovoid or globose; capsule loculicidally dehiscing; pericarp very thick. Seeds 1 or 2, globose or oblong. Genus 1, Malayan, 2 or 3 species.
GONYSTYLUS, Teysm.

(1) G. Maingayi Hook. fil. F.B.I. i. 200; Gamble, Journ. As. Soc. Beng. lxxxv. (2), 266.

A tree 30 to 70 ft. tall and 10 to 15 in. through. Leaves deep shining green coriaceous; nerves very close and numerous, oblong to oblong-lanceolate acuminate, base round or cuneate, glabrous, midrib beneath pubescent, 5 to 10 in. long, 2.25 to 3.25 in. wide;

petioles thick, 3.35 in. long. Panicles lax about 8 in. long, widely spreading densely pubescent woolly; pedicels 3 in. long. Calyx green, 3 in. across, densely velvety. Petals 15 to 20. Stamens cream colour 40. Capsule about 2 in. long with brown rough pericarp 2.25 in. thick. Seeds large, 1 to 4 globose or oblong. Hab. Forests. Singapore, Garden Jungle; Chua Chukang; Bukit Mandai. Malacca (Maingay). Selangor, Rawang (Kloss). Negri Sembilan, Selaru (Foxworthy). Perak, Tapa (Wray); Goping (Scortechini). Penang Hill (Curtis); Balik Pulau.

Fig. 30.—Gonystylus Maingayi.
These plants have been placed in the *Apetala*, but have of late been considered to be allied to *Tiliaceae*. The corolla consists of very narrow linear organs, split at the top and often to near the base, into 2 or 3 lobes. These were formerly considered to be scales, but appear from position and texture to be really petals.

**Order XXVII. LinÆE.**

Herbs, shrubs or trees. Leaves alternate simple entire or serrate. Inflorescence various. Flowers regular bisexual. Sepals 5 or 6 free or connate at base imbricate. Petals as many imbricate or contort, hypogynous. Stamens 4 to 5 or 10 to 12; filaments united at the base into a ring filiform; anthers versatile. Glands 5 or 0. Ovary entire 3- to 5-celled; styles 3 to 5 free or connate; ovules 1 or 2 inserted in the inner angle of cells, anatropous. Stigma terminal. Fruit a drupe or capsule. Seeds 1 or 2 in each cell. Genera 14, species about 145, whole world (King, *Journ. As. Soc. Beng.* lxii. (2), 189).

Climbing shrubs.

- Racemes very short; fruit drupaceous  
  1. Roucheria
- Racemes elongate; fruit capsular  
  2. Sarcotheca

Trees.

- Petals imbricate; fruit a drupe  
  3. Erythroxylon
- Petals contort; fruit capsular  
  4. Ixonanthes

1. **Roucheria**, Planch.

Lianes with revolute woody tendrils. Leaves alternate, entire or serrate. Flowers in axillary sub-sessile spikes fascicled yellow. Sepals 5. Petals 5. Stamens 10, all fertile, connate into a tube below. Ovary 3- to 5-celled; styles 3 to 5. Drupe small red fleshy. Stone 3- to 6-angled. Species 3 or 4, 1 or 2 Malayan, 2 from Guiana.


Big climber 3 in. through. Bark white. Leaves lanceolate to elliptic-lanceolate caudate-acuminate crenate-serrate, base cuneate deep green coriaceous; nerves 6 to 8 pairs, 3 to 5 in. long, 1'2 in. wide; petioles '35 to 5 in. long. Flowers '35 in. in clusters of 5 to 8. Petals narrowly oblong, thin. Drupe red 2'5 in. long, oblong. **Hab.** Common in low country, Singapore, Malacca to Perak and Penang. **Distrib.** Borneo. **Native names:** Ipoh akar putih; Akar Bijj; Garam-Garam; Akar Kait putih; Akar Musiang; Bhoi (Sakai). **Use:** in the dart-poison of the Sakais. Flowers fragrant.

2. **Sarcotheca**, Bl.

Shrubby climbers. Leaves alternate, entire. Racemes or panicles axillary or terminal, elongate. Flowers pedicelled. Sepals
4 to 5. Petals 5, contort. Stamens 8 to 10 all fertile, connate in a cup below. Ovary 5-celled; styles 5, distinct; ovules 2 in a cell. Capsule globose splitting into 5 at the top. Seed 1 in a cell. Species 2, Malayan.


Leaves thin elliptic acuminate, base rounded, glabrous; nerves 4 pairs inarching within margin, 4 to 5 in. long, 2.1 in. wide; petioles 3 in. long. Panicle puberulous, slender 1.5 in. long, few-flowered. Flowers 1 in. long, white; pedicels 2 in. long. Sepals 4 connate at base rounded, edges ciliate. Petals 5, linear-oblong blunt. Stamens 8 to 10 in 2 rows unequal; anthers ovate-reniform. Styles 3 to 5. Fruit unknown. *Hab.* Very rare. In forests over streams. Pahang, Tahan River (Ridley).

Dr. Stapf doubts that this belongs to this genus, but it fits fairly with the description of Blume's rare and little known species; however, I have not seen fruit of it.

3. **ERYTHROXYLON**, Linn.

Shrubs or trees glabrous. Leaves alternate, entire. Stipules intra-petiolar. Flowers axillary, small, solitary or fascicled, white (or pink). Sepals 5. Petals 5, imbricate with a double ligule on the inner face. Stamens 10 to 12; filaments united in a tube. Ovary 3-, rarely 4-celled; styles as many free or connate; stigmas capitate; ovule 1, rarely 2 in each cell. Drupe 1-celled, 1-seeded. Species 50, chiefly America.

(1) *E. burmanicum* Griff. *Notulae* iv. 468; *Ic. Pl. As.* t. 581, fig. 3; *Hook. fil. F.B.I.* i. 415; *King, l.c.* 190.

Shrub to a big tree. Leaves elliptic or obovate coriaceous blunt narrowed to base, glaucous beneath; nerves 8 pairs not more prominent than nervules, 1.75 to 3 in. long, 7.5 to 1.50 in. wide. Flowers clustered 2 to 4 white; pedicels 25 in. long. Drupe cylindric red 5 in. long; calyx and staminal tube persistent. *Hab.* Open country generally near the sea, common. Singapore, Changi; Suletar. Malacca, Sungei Hudang (Derry); Dindings, Pangkor. Sungei Ujong (Cantley). Pahang, Kwala Pahang; Cherating. *Distrib.* Burma, Tongkah.

The ligule on the petals is a kind of lobed scale attached to the lower part of the petal. *E. coca*, the cocaine shrub of South America, is cultivated to a small extent in the Malay Peninsula.


Trees, glabrous. Leaves alternate entire or crenate serrate. Flowers small, green in axillary, cymose dichotomous panicles. Sepals 5 to 6 shortly connate at base. Petals 5 to 6 perigynous contort, persistent hardening round fruit. Stamens 10 to 20 from the outside of a cupular disc. Ovary 5-celled; style simple; ovules 10. Capsule coriaceous or woody, oblong acute or conic
septicidal, 10-celled dehiscing inwards. Seeds winged. Species 3 to 4, China, Malaya.

Leaves obovate or oblong; petals 2 in. long; capsule 7 in. long.
Leaves coriaceous elliptic not obovate; petals 3 in. long; capsule 1.35 to 1.75 in. long.

(1) *I. icosandra*

(2) *I. reticulata*

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Fig. 31.—*Ixonanthes icosandra.*


Tree 20 to 40 ft. tall. Leaves coriaceous shining green, lanceolate to obovate, top blunt or round, cuneate serrate; nerves 10 to
2 pairs, faint, 2'5 to 5'5 in. long, 1 to 2'5 in. wide; petioles 2'5 to 3'5 in. long. Cymes 1 in. long; peduncle 2 to 3 in. long, erect. Flowers green, 2 in. long, numerous. Stamens 12 much longer. Capsule lanceolate to ovoid, glutinous, 5-valved, 7 to 8 in. long. Seeds 10. Hab. Woods in low country. Common; variable in form of leaf and size of capsule. Singapore to Penang and Kedah. Distrib. Sumatra. Native names: Pagar Anak; Pagar Anak merah or hitam or betina; Buah Tui; Sankau Merah. Use: Timber for house-building.

var. obovata Ridl.; I. obovata Hook. fil. l.c. 417. Leaves sub-coriaceous obovate, tip round, edge crenate 4 in. long, 2 in. wide. Penang (Lobb); Muka head (Curtis).

(2) I. reticulata Jack, l.c. 51; Hook. fil. l.c. 417; King, l.c. 192.

Shrubby to a tree of 20 ft. tall. Leaves stiffly coriaceous, dark green shining, elliptic blunt, base cuneate; nerves 7 to 8 pairs more conspicuous than in the last species, inarching within the margin, 3'5 to 5 in. long, 2 to 2'75 in. wide; petioles 6' to 8 in. long. Cymes shorter, stouter, fewer flowers, 3 in. long. Stamens 10 to 12 long. Capsule 1'35 to 1'75 in. long, oblong woody. Hab. In woods less common than the preceding. Singapore (Wallich); Bukit Timah; Tanglin. Malacca, Mt. Ophir at 3000 ft. altitude, a small tree with more coriaceous leaves and larger flowers. Dindings, Bruas. Penang, Telok Bahang (Curtis). Kedah Peak. Distrib. Borneo. Native names: Jinjagong; Sakit Hudang; Pagar anak.

**Order XXVIII. MALPIGHIACEÆ.**

Trees or shrubs, often climbers. Leaves opposite entire. Inflorescence axillary or terminal. Flowers usually showy, yellow or white, rarely pink often irregular. Calyx 5-partite, imbricate or valvate. Petals 5 usually clawed often fimbriate. Stamens 10 hypogynous or subperigynous equal or 1 or more larger; anthers 2-lobed. Ovary 3-celled; styles 1 to 3; ovules 1 in each cell. Fruit of 1 or more winged samaras (except Brachylophon). Species about 600, mostly American.

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<td>Petals equal yellow; fruit of 3 star-shaped samaras</td>
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<td>Petals unequal white, one large pink; fruit winged large</td>
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<td>Erect shrubs. Fruit not winged</td>
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1. **TRISTELLATEIA**, Thouars.


Fig. 32.—Tristellateia australasica.

Glabrous. Leaves elliptic or ovate acute, base cuneate or rounded; nerves 4 to 5 pairs inarchling faint, 1.75 to 3.5 in. long. 1.75 to 2.25 in. wide; petioles 2 in. long. Racemes 6 in. long, few-flowered. Flowers 1 in. wide. Petals oblong. Stamens unequal, outer ones longest at first yellow soon becoming red. Carpels 5 in. across, 5- to 8-winged, wings lanceolate radiating like a star. *Hab.* In tidal swamps. Singapore, Serangoon; Krangi. Johor, Panchur, Johor River. Pahang, Kwala Pahang. Dindings, Lumut
and Pangkor, Raja Hitam (Curtis). Distrib. Siam. Malay islands, Australia, Formosa.

This popular climber is often cultivated in Singapore as an ornamental plant.

2. HIPTAGE, Gaertn.

Lianes. Leaves coriaceous. Racemes terminal or axillary often compound. Calyx 5-partite. Petals 5, clawed unequal, white, the odd one pink or yellow. Stamens 10, 1 larger than the others, connate at base. Ovary 3-lobed. Styles 1 or 2, stigmatiferous, others rudimentary. Samaras 1 to 3, 3-winged, wings unequal, leathery. Species about 10, tropical Asia.

Leaves often small; nerves 4 pairs; flowers '35 to 1 in. across; racemes silky . . . (1) H. sericea
Leaves always large; nerves 6 pairs; flowers '75 to 1 in. across; racemes slightly pubescent . . (2) H. madablota

(1) H. sericea Hook. fil. F.B.I. i. 419; King, l.c. 194.

Stout liane. Young parts and inflorescence appressed-silky. Leaves coriaceous shining dark green, ovate-lanceolate or oblong acute or acuminate, base round or cuneate, 4'5 to 6 in. long, 1'5 to 3 in. wide; nerves 4 to 6 pairs; petioles '25 in. long. Racemes 1 to 6 in. long, axillary. Flowers '75 to 1 in. across, white, fragrant. Sepals villous oblong. Petals fimbriate, odd one yellow at base. Samara midlobe elongate oblanccolate narrowed at the base 2 in. long, '5 in. wide. Hab. Open country. Pahang, Pekan (Haviland), Selangor, Kwala Lumpur. Perak, Chanderiang (Kunstler). Perlis at Kanga. Distrib. India, Siam, China.

This occasionally occurs in and near gardens in the Malay Peninsula, but I do not think it is wild south of Perlis.

3. ASPIDOPTERYS, Juss.

Lianes with terminal and axillary panicles. Flowers small yellow or white. Calyx 5-partite. Petals 5 not clawed entire. Stamens 10, all perfect. Ovary 3-lobed, sides winged; styles 3
glabrous; stigmas capitate. Samaras 1 to 3 orbicular or oblong, thin membranous. Seed oblong. Species 15, tropical Asia.


Stout long liane. Leaves thin ovate-elliptic, shortly acuminate, base blunt, glabrous; nerves 4 to 6 pairs, 3 to 4 in. long, 1'5 to 2'3 in. wide; petioles '5 to '65 in. long. Panicles of peduncled umbels 1'5 in. long, slender; pedicels '2 in. long. Flowers white '2 in. across. Samaras 3 orbicular ovate thin membranous veined 1 in. long and wide, nucleus winged. *Hab.* In forests. Singapore, Bukit Mandai; Selitar. Malacca, Bukit Bruang; Merlimau. Selangor, KwaIa Lumpur. Penang, Government Hill to 100 ft. altitude (Curtis). *Distrib.* Tenasserim.

### 4. BRACHYLOPHON, Oliver.

Erect glabrous shrubs with subcoriaceous leaves and terminal racemes of yellow flowers. Calyx 5-partite. Petals 5 obovate obtuse. Stamens 10 all perfect, alternate shorter, filaments longer than anthers, which open by pores. Ovary 3- to 4-lobed and 3- to 4-celled; styles 3 to 4 slender; ovules 1 in each cell pendulous anatropous. Fruit of 3 cocci keeled along the back, the top produced with a very short wing-like process. Species 1, Malay Peninsula.

(1) **B. Curtisii** Oliv. Ic. Pl. t. 1566; King, l.c. 197. B. Scortechinii King, l.c. 197.

An erect shrub 3 to 5 ft. or small tree about 20 ft. tall or less. Leaves membranous to coriaceous lanceolate or oblong-lanceolate narrowed to both ends, 7 in. long, 2 to 2'5 in. wide; nerves 7 to 15 pairs; petioles '1 in. long. Racemes elongating to 1 in. or more, with lanceolate acuminate persistent bracts, many-flowered. Pedicels slender 1'2 to 1'5 in. long. Sepals obtuse. Petals '4 in. long. Fruit '4 in. long reticulate. Sepals and filaments persistent. *Hab.* Perak, Sungai Larut (Wray). Penang, Batu Feringhi (Curtis). var. *Hullettii* Ridl. B. Hullettii King, l.c. 196.

Leaves more coriaceous finely nerved and conspicuously reticulate. Small tree. *Hab.* Malacca. Mt. Ophir at 3000 ft. altitude in woods on the bank of the stream (Hullett).

### Order XXIX. OXALIDACEÆ.

Herbs, shrubs or trees. Leaves alternate or whorled, usually pinnate. Stipules 2. Inflorescence axillary umbellèd or cymose or racemose, regular or nearly so. Sepals 5. Petals 5 hypogynous, imbricate. Stamens usually 10; filaments more or less connate. Ovary 3- to 5-lobed, 3- to 5-celled; styles 3 to 5 usually
free. Fruit capsular 3- to 5-lobed or a berry. Species about 300, whole world.

Herbaceous or stem slightly woody.
Leaves trifoliate
Leaves pinnate, many leaflets
Trees.
Fruits baccate
Fruits drupaceous
Climber.
Fruits dehiscent

1. **OXALIS**, Linn.

Herbs (rarely shrubs). Leaves radical or alternate usually trifoliate. Flowers regular, on axillary peduncles. Sepals 5, imbricate. Petals 5 contort; glands of disc none. Stamens 10 all similar. Ovary 5-lobed, 5-celled; styles 5 free; ovules 1 or more in each cell. Capsule dehiscing loculicidally, valves persistent. Seeds numerous small. Species 200, chiefly American.

- Creeping herb; flowers small yellow
- Bulbous plant; flowers large pink
- Erect branched plant; flowers small

(1) **O. corniculata** L. var. villosa Hook. fil. F.B.I. i. 436; King, l.c. 198.


(2) **O. corymbosa** DC. *Prod.* i. 696.

A plant with a mass of small tubers and rather large trilobed leaves, the lobes round retuse, 1.5 in. wide; petioles 4.5 in. long, all pubescent. Peduncle hairy 4 to 5 in. tall with an umbel of pink showy flowers 1 in. across. Introduced as an ornamental plant, has run wild on Penang Hill, as it has in many parts of the world; said to be of Mascarene origin.

(3) **O. Barrelieri** Linn. *Sp. Pl. ed.* ii. 624.

An erect often branched slender pubescent herb about 1.2 in. tall, with small pink and yellow flowers. Occurs as a weed in the Botanic Gardens. Native of West Indies and South America. It occurs also in Java.

2. **BIOPHYTUM**, DC.

Herbs simple or branched with a tuft of pinnate leaves at the top of the half-woody stem. Leaflets opposite oblique oblong truncate. Peduncles terminal with an umbel of small white, pink
or yellow flowers. Sepals 5 lanceolate acute. Petals 5. Stamens 10; filaments free, outer ones smaller. Styles 5. Stigmas notched or bifid. Capsule ovoid or oblong splitting loculicidally into 5 valves. Seeds numerous small. Species about 20, all tropics.

Leaflets 18 to 20 pairs; sides parallel, base and apex truncate; flowers white
Leaflets 10 pairs, tip rounded; flowers yellow
Small plant; leaflets 7 pairs; flowers yellow

(1) **B. adiantoides** Wight in Hook. fil. F.B.I. i. 437; King, l.c. 199.
Stem woody 6 to 8 in. tall, erect pubescent, bearing 15 to 20 or more leaves in a tuft. Leaves 6 to 8 in. long; rachis hairy; leaflets about 23, oblong, top rounded mucronate, base truncate auricled, more or less hairy, 5 in. long, 15 in. wide; peduncles spreading hairy 6 in. long, umbel densely bracteate 1 in. long. Flowers 6 to 12 showy white, with yellow claws to the petals. Capsule oblong. *Hab.* Rocky banks of streams in mountain forests. Pahang, Tahan River; Pahang River. Perak, Plus River (Wray); Temengoh; Kwala Dipang (Curtis). *Distrib.* Mergui, Indo-China. Native name: Payong all (Ali’s umbrella).

(2) **B. sensitivum** DC. Prodr. i. 690.
Stem glabrous 4 to 6 in. tall. Leaves 22 to 23; rachis hairy; leaflets 10 pairs, lower ones oblong 4 in. long, 1 in. wide, apex rounded, sides curved minutely apiculate, base truncate rounded; peduncles 2 to 3 in. long hairy. Flowers yellow 2 in. wide; pedicels as long as sepals. Fruit oblong shorter than the hairy lanceolate sepals. *Hab.* Casual weed. Malacca (Griffith). Penang Hill and near the coast (Curtis). *Distrib.* Tropics generally.

Small annual 6 in. tall. Leaves 2.5 in. long; leaflets 25 in. long, oblong with round tips, 7 pairs; rachis hairy; peduncles 1 in. long, slender hairy. Flowers 3 or 4 small bright yellow. Sepals lanceolate acuminate hairy little longer than the fruit. *Hab.* Kelantan. A few plants in a rubber plantation, Chanding on the Kelantan River (Ridley). *Distrib.* Indo-Malaya.

### 3. AVERRHOA, L.

Trees. Leaves alternate pinnate. Flowers small regular red or pink. Sepals 5 imbricate. Petals 5 contort. Stamens 10 united at the base or 5 without anthers. Ovary 5-lobed, 5-celled; styles 5. Berry oblong acid. Species 3 or 4, probably of South American origin, but 2 cultivated all over the tropics.

(1) **A. Bilimbi** Linn. Sp. Pl. 428.
Short stout tree. Leaflets 5 to 17 pairs, oblong to lanceolate pubescent beneath. Flowers in tufts on stem and branches. Fruit green warty about 3 in. long resembling a gherkin. *Native
name: Bilimbi, not known wild anywhere, but recorded for Goa, with the name Balimba, by Garcia in 1593.

(2) **A. Carambola** Linn. Sp. Pl. 428.
Leaves 2 to 5 pairs ovate, glaucous beneath. Flowers in tufts on branches. Fruit 4 in. long acutely and deeply 4-angled, yellow, acid or sweet. Origin unknown. *Native name*: Kembola.

I have found one or more old trees in abandoned village sites in Pahang at Temerloh.

### 4. CONNAROPSIS, Planch.

Trees or shrubs. Leaves 1- to 3-foliolate; leaflets coriaceous entire. Flowers small white or lavender in terminal or axillary paniced cymes. Sepals 5 imbricate connate at the base. Petals 5 imbricate. Stamens 10; filaments united at base alternate shorter. Ovary 5-angled, 5-celled; styles subulate 5 more or less united; ovules 2 in each cell. Fruit a berry (5-lobed when dry) 1- to 2-celled, 1- to 2-seeded. Species 5, Malay Peninsula and Borneo.

Leaves trifoliate
Leaves simple.

Leaves ovate, glaucous beneath
Leaves lanceolate; panicle erect, 3 in. long
Leaves lanceolate, 4/5 in. long; panicle very lax; branches short
Leaves oblong, 6 to 12 in. long, stiff; flowers 1/2 in. long, glabrous
Leaves oblong 7 in. long, thinner; flowers 1/2 in. long; calyx silky
Leaves oblong, 4 in. long; calyx mealy

Tree. Branchlets glabrous. Leaves trifoliate; leaflets coriaceous, glabrous, elliptic-lanceolate acuminate, narrowed to base, sub-glaucous beneath; nerves 4 pairs, 2 to 3 in. long, 5 to 1 1/2 in. wide; petioles 6 in. long; petiolules 2 in. long. Panicles terminal and axillary pubescent dense, 1 in. long to lax, spreading, 4 in. long. Flowers 1/2 in. long, red. *Hab.* Malacca (Griffith, Maingay).

2. **C. monophylla** Planch. *in* F.B.I. *i*. 440; *King*, l.c. 200. (Fig. 34, p. 333.)
A medium or small tree 20 to 50 ft. tall. Branchlets pubescent. Leaves 1-foliolate, glaucous beneath, coriaceous, glabrous ovate-acuminate, base rounded or cuneate; nerves 6 pairs, 2 to 3 1/2 in. long, 8 to 1 in. wide; petioles 6 to 8 in. long. Panicles terminal or axillary, tomentose erect; branches 1 1/2 in. long, dense-flowered. Flowers claret colour, 1 in. long, puberulous or glabrescent. Fruit globose, red. *Hab.* Open country; Johor. Malacca, Selangor, Perak, Dinding, Negri Sembilan. *Native names*: Pupoi; Belimbing Besih; B. Bulat; B. Keris or B. Kra; B. Penjurur or B. pipit. *Use*: Fruit eaten, usually cooked.

Tree, glabrous. Leaves simple, thinly coriaceous oblong
acuminate acute, base round; nerves 5 to 6 pairs, reticulations conspicuous beneath not glaucous 4 in. long, 1'6 in. wide; petioles '5 in. long; petiolules '2 in. long. Panicles axillary and terminal erect 3'5 to 4'5 in. long lax; branches '2 to '3 in. long. Sepals ovate acute. Petals oblong narrowed at base. Hab. Perak, Hermitage Hill (Curtis).

Tree 40 to 50 ft. tall. Leaves simple coriaceous lanceolate

acuminate, base round, 3 to 4'5 in. long, 1'4 to 2 in. wide; nerves 6 pairs slender, reticulations fine conspicuous beneath; petioles '5 in. long; petiolules '2 in. long. Panicles slender lax, puberulous, terminal and axillary 2'5 to 6 in. long; branches distant '2 to '3 in. long; branchlets crowded at the tip. Sepals oblong obtuse glabrous. Petals cuneate truncate, cherry red. Fruit globose. 2-celled cherry red. Hab. Forests. Perak, Thaiping Hills (Curtis, Kunstler).
(5) **C. macrophylla** King, l.c. 443.
Shrub or tree. Branchlets stout glabrous. Leaves simple stiff coriaceous oblong sub-acute base rounded, 6 to 12 in. long, 2'5 to 3'65 in. wide; nerves 8 or 9 pairs elevate, reticulations distinct lax beneath; petioles 3 in. long thick. Panicles spike-like axillary or terminal; rachis thick glabrous; branches '1 in. long or less, few-flowered. Flowers deep red, '2 in. long, glabrous very shortly pedicelled. Hab. Local in forests. Singapore, Chan Chu Kang. Dingdings. Lumut, Pangkor (Curtis). Perak, Goping and Salama (Kunstler); Thaiping. Penang, Pulau Inajah (Curtis).

Tree. Leaves thin coriaceous oblong sharply acuminate base round; nerves 8 pairs, slender prominent beneath; glaucescence beneath, 7 to 7'5 in. long, 3 in. wide; petioles '75 in. long. Panicles raceme-like from upper axils 12 in. long; branches '25 in. long, puberulous. Sepals ovate blunt silky-tomentose. Petals deep red '1 in. long. Stamens, filaments very slender. Styles separate. Hab. Pahang, Pianggu, Endau (Evans).

(7) **C. simplicifolia** Ridl.
Leaves thin coriaceous simple oblong, base round, over 4 in. long and 2'2 in. wide, midrib elevate beneath; nerves over 7 pairs elevate beneath; petioles '75 in. long. Racemes terminal 2, 4'4 in. long puberulous. Flowers in tufts 3 to 4 together; pedicels '1 in. long, white-mealy. Sepals 5, imbricate, ovate blunt, white-mealy. Petals twice as long, '12 in. long, obovate oblong, clawed, imbricate, apparently dark red. Stamens very short connate at base in a ring. Ovary conic; styles 5. Hab. Pahang, Kwantan, Galing (Foxworthy). **Native name:** Belimbing Cherichek.

In the only specimen I have seen the leaves are both imperfect.

### 5. DAPANIA, Korth.

Woody climbers. Leaves alternate unifoliate; petioles jointed about the middle. Flowers small red in spike-like racemes, axillary or from the old wood. Sepals 5 imbricate connate at base. Petals oblong; stamens 10, bases connate in a cup, above free unequal. Ovary 5-lobed, 5-celled; cells with 1 or 2 ovules. Fruit club-shaped 5-lobed dehiscing into a 5-rayed star with a seed on each ray. Species 4 or 5, Malay Peninsula and Sumatra.

(1) **D. scandens** Stapf, l.c. Pl. l. 1997; King, l.c. 201.
A glabrous liane 50 to 100 ft. long. Leaves coriaceous ovate-elliptic acuminate, base rounded; nerves 4 or 5 pairs, 3 to 5 in. long, 1'25 to 1 in. wide; petioles '1 in. long; petiolules '1 in. long. Racemes puberulous, 1'5 to 2'5 in. long slender. Flowers many crimson often male only '1 to 1'5 in. long; pedicels very short. Sepals obtuse rounded ciliate. Petals oblong narrowed at base twice as long. Stamens alternate long and short; filaments
lanceolate acuminate; anthers ovate. Fruit '3 in. long, '4 in. across after dehiscing. *Hab.* Dense jungle. Perak, Ulu Bubong (Kunstler); Waterloo (Curtis); Tapa; Batang Padang (Wray). *Distrib.* Sumatra.

**Order XXX. Balsaminaceae.**

Herbs usually succulent. Leaves opposite or alternate. Flowers few on axillary or terminal racemes rarely branched. Sepals 3, 2 small, 1 at back petaloid spurred. Petals 3 or 5, outer large, lateral bilobed. Stamens 5; anthers cohering. Ovary oblong 5-celled. Stigma sessile 5-toothed; ovules many. Capsule fleshy loculicidal, valves 5 elastically springing away from the axis or a drupe. Seeds smooth or tubercled. Species 600 or more, tropics of Asia and Africa and North Temperate region.

Lateral sepals connate in pairs; fruit explosive . . . 1. Impatiens
Lateral sepals free; fruit drupaceous . . . . 2. Hydrocera

1. **Impatiens**, L.

Succulent herbs. Leaves opposite or whorled or alternate. Flowers axillary or terminal 1 rarely more flowered; peduncles irregular resupinate, blue, white, pink, or yellow. Sepals 3, rarely 5, imbricate, 2 minute or 0, 2 lateral small green, 1 posterior large petaloid spurred. Petals 3 (or 5) anterior large (standard), lateral 2-lobed (wings). Stamens 5; filaments short thick; anthers cohering. Ovary oblong 5-celled; ovules many. Stigma sessile 5-fid. Capsule green pulpy loculicidally dehiscing elastically into 5 valves. Seeds numerous. Species about 600, whole world.

Leaves opposite or whorled; flowers pink; spurred sepal not funnel-shaped; spur long.
Plant more or less hairy.
Leaves narrow linear-lanceolate, lower ones sessile . . . (1) I. griffithii
Leaves lanceolate acuminate, all petiolate.
Spur 1 in. long; leaves not glaucous beneath, standard orbicular or obovate . . . (2) I. Wrayii
Spur 1 in. long; leaves glaucous beneath, standard obovate retuse . . . (3) I. sarcantha
Spur 1½ in. long; leaves lanceolate spinulose glaucous beneath . . . (4) I. polycycla
Plant glabrous.
Leaves ovate acute . . . (5) I. Curtisii
Leaves lanceolate . . . (6) I. exilipes
Leaves large serrate; flowers large yellow . . (7) I. Oncidoides
Leaves alternate, spurred sepal funnel-shaped with a short curved spur; flowers not spreading.
Stem thick fleshy 2 to 5 ft. tall; flowers yellow . . (9) I. mirabilis
Stem fleshy smaller; flowers violet . . . 10 I. Vaughani
Stem slender shrubby; flowers white small.
Leaves ovate; nerves conspicuous . . . (11) I. Ridleyi
Leaves ovate-lanceolate; nerves almost invisible . . . . . . . . . (12) I. cryptoneura
Stem succulent herbiaceous.
Leaves ovate or oblong; flowers large white . . (13) I. Scortechinii

(1) I. Griffithii Hook. fil. Journ. Linn. Soc. iv. 120; F.B.I. i. 445; King, l.c. 203.
Herb 1 to 2 ft. tall, slender, puberulous. Leaves opposite petiolate or in whorls of 3 above, sessile linear-lanceolate acute, base acuminate serrate-toothed, beneath glaucous; nerves 6 pairs red sparsely hairy, above hairy all over, 3'5 in. long, '2 to '3 in. wide. Pedicels slender 1 to 1'75 in. long. Flowers 1 in. across rose pink. Sepals ovate-oblong acuminate, spur slender 1'5 in. long. Capsule elliptic swollen in the middle. Hab. Damp spots on mountains near water, Malacca, Mt. Ophir, on Gunong Tunduk at 3000 ft. altitude (all collectors). Kedah, Gunong Jerai at 3000 ft. altitude (Lobb). Native name : Inai Bukit.

Herb 1 ft. tall, glabrous with young parts often hairy. Leaves opposite or whorled in threes, lanceolate acuminate or ovate or oblong-lanceolate entire or spinulose-serrate, base narrowed, 2'25 to 3 in. long, '5 to '75 in. wide; petioles '2 in. long. Pedicels 1'5 in. long. Flowers rose pink with crimson centre, 1 in. across. Sepals ovate long-cuspitate 3- to 5-nerved, spur 1'1 in. long, slender. Standard orbicular or obovate keeled with a central process. Wings bilobed, basal lobe oblong obtuse, lateral larger obcordate. Capsule ellipsoid. Seed hairy. Hab. On rocks in streams. Perak, Batang Padang (Wray).

Herb 4 to 12 in. tall. Stem hairy. Leaves opposite or in whorls of 3 at the top, lanceolate acuminate narrowed at base serrulate-spinulose, above hairy, beneath glaucous; nerves conspicuous 6 pairs hairy, 3 to 4 in. long, '25 to '75 in. wide; petioles '9 in. long. Sepals ovate keeled cuspitate; spur slender 1'2 in. long. Petals standard obovate retuse '5 in. long keeled cavaudate, wings oblong truncate broadest at the top, all rose pink with a dark eye. Capsule lanceolate blunt 1 in. long. Seed obovate compressed glabrous. Hab. Pahang, Telom on rocks in streams (Ridley).

A branched herb with nearly glabrous stem. Leaves in whorls of 2 to 5, lanceolate acuminate narrowed to base serrate-spinulose with scattered long hairs above, glaucous and glabrous beneath; nerves hardly visible, 1 to 1'5 in. long, '4 in. wide; petioles '2 in. long. Peduncles 1'5 to 2 in. long. Flower 1 in. across rose pink. Sepals '2 in. long ovate cavaudate; spur 1'5 in. long very slender. Capsule ovoid dilate in centre '5 in. long. Seeds pilose. Hab.
Perak, on a sand-bank in the Kertai River, Temengoh. A single plant (Ridley).


Large branched glabrous herb. Leaves mostly opposite (a few alternate), ovate acute, narrow at base, their edges minutely serrate or crenate, glaucous beneath sparsely hairy above and beneath on the midrib and nerves about 8 fine pairs, 2·5 in. long, 1·5 in. wide; petioles slender 2 in. long. Pedicels 1 in. long. Flowers 75 in. wide, pink. Standard cuneate obcordate with a mucro in the notch, wings deeply bilobed, basal lobe obovate retuse mucronate. Capsule 4 in. long gibbous fusiform. Seed obovoid papillos. Hab. Wet rocks in forest. Perak, Thaiping Hills, abundant at Maxwell’s Hill, 3000 ft. altitude (all collectors).


Branched glabrous herb about 2 ft. tall. Leaves opposite in whorls of three, broadly lanceolate acuminate narrowed to base, serrate-spinulose, quite glabrous, glaucous beneath; nerves 6 pairs; 3 to 4·75 in. long, 7 to 1 in. wide; petioles 5 in. long. Pedicels 2 to 3 in. long. Flowers rose pink, 1 in. across. Sepals obovate-oblong cuspidate, spurred one boat-shaped mucronate 4 in. long; spur slender 1·3 in. long. Petals standard obovate cuneate truncate with a short point and a short rounded keel; wings broad, basal lobe oblong retuse, upper petal obovate retuse. Capsule short 6 in. long broad fusiform, beaked. Seed obovoid flattened glabrous. Hab. Damp spot by the forest road, Perak, on the road between Tapa and Jor, abundant at one spot (Ridley).


Succulent herb 2 to 4 ft. tall. Leaves ovate-lanceolate to ovate acuminate acute, narrowed at base, edge crenulate denticulate, 1·5 to 6 in. long, 1 to 2 in. wide; nerves 18 pairs; petioles 1 to 1·5 in. long. Racemes subterminal with 1 or 2 large yellow flowers occasionally striped Indian red on upper lobes, 1·5 in. across. Sepals ovate cuspidate; spur slender 1·5 in. long. Petals standard ovate keel rounded green; wings very unequally bilobed, lower lobe narrow oblong, upper large hatchet-shaped, shortly bilobed; filaments rather long. Capsule fusiform 1 in. long. Seed flat ovoid glabrous. Hab. In damp muddy spots in forests at about 2000 to 4500 ft. altitude. Selangor. Menuang Gasing (Kloss); Gunong Mengkuang Lebah (Robinson); Sempang Mines, Semangkok. Perak, Gunong Kerbau 4500 ft. altitude (Robinson); Telom; Ulu Batang Padang, 4900 ft. altitude (Wray).

The "Golden Balsam" is very distinct from any other species here in its large yellow flowers—a very beautiful plant.


Stem fleshy brown dilate at base above, branched, 2 to 5 or

FL.M.P., t.
more feet tall, 22 in. through at base. Leaves deciduous, at the apex of branches only, thin obovate or ovate narrowed to base crenate; nerves 13 to 14 pairs, glabrous, 5 to 9 in. long, 3'-5 to 4'-5 in. wide; petioles 1 to 1'-5 in. long. Racemes axillary 8 in. long with 4 or 5 yellow flowers at the top opening singly. Flowers 1'-75 in. long, not patent. Sepals lateral, ovate green and yellow, spurred one large funnel-shaped '6 in. across. Spur shorter incurved. Standard oblong rounded. *Hab.* On limestone cliffs in the north. Lankawi, Terutau (Curtis); Perlis at Kanga.

![Fig. 34.—Impatiens mirabilis.](image)


A branched fleshy-stemmed plant about 2 ft. tall. Leaves only at tips alternate ovate or elliptic acuminate entire or crenate, base rounded or cuneate, 8- to 10-nerved, 3'-5 to 4 in. long, 2 to 2'-25 in. wide; petioles 3 in. long. Flowers 1 in. across, white or violet to deep purple, spur cream colour, on short pedicels. Sepals oblong obliquely cuspidate, spurred one funnel-shaped with a short incurved bifid spur. Petals standard small oblong cuspidate; wings lower lobes rounded shortly stipitate, upper connate rounded oblong. *Hab.* On limestone rocks in the north. Jalor at Biserat
on the Patani River (Gwynne-Vaughan). Perlas at Tebing Tinggi. Setul on rocks (Ridley).


Small shrubby plant about 1 ft. tall branched. Leaves alternate ovate acuminate crenate narrowed to base, glabrous 2.25 to 2.5 in. long, 1.25 in. across; petioles slender 0.5 in. long. Peduncle 1.5 in. long slender. Flowers 75 in. long white with brown spots in mouth, not patent. Sepals lateral ovate to orbicular cuspidate, spurred one funnel-shaped broad 0.5 in. long; spur curved 2 in. long. Petals, standard oblong retuse cuspidate with a short fleshy keel at base; wings confluent bilobed, lower lobes ovate acuminate curved, upper oblong rounded at tip. Capsule small fusiform. Seed tubercled. Hab. Limestone rocks in damp spots. Selangor, Batu Caves (Ridley, Curtis).


Shrubby plant branched, about 12 in. tall glabrous. Leaves alternate ovate-lanceolate acuminate serrulate, base acute; nerves 4 or 5 pairs almost invisible; petioles 0.5 in. long, 0.5 in. wide. Flowers small sub-globose. Sepals green broad ovate. Spurred one wide cup-shaped with short curved spur. Petals, standard obovate cuspidate, keel with short elevation at base, wings connate, basal lobes long curved lanceolate acuminate, upper ones shorter oblong. Hab. Limestone rocks. Perak at Ipoh (Curtis).


Succulent herb 1 to 3 ft. tall and stem 1 to 1.5 in. through. Leaves alternate crowded at the tip ovate to oblong acuminate, base narrowed, serrat or serrulate, 2.5 to 7 in. long, 1.25 to 2.5 in. across; petioles 2 in. long. Pedicels solitary or 2 or 3 on a short peduncle 0.5 in. long or less. Flowers about 1 in. across, white with reddish yellow in the mouth. Sepals oblong-orbicular, spurred, funnel-shaped one large 0.5 in. long; spur clubbed and curved shorter. Petals, standard obovate-oblong or cuneate, keel slightly thickened; wings connate, lower ones stipitate rounded, upper ones oblong rounded connate. Hab. Limestone rocks. Perak. Sungei Siput (Curtis); Gunong Malacca (Kunstler). Lenggong (Ridley). Perlis, Tebing Tinggi.

Excluded Species

I. chinensis L., "Malacca Griffith," Hook. fil. F.B.I. l.c. 444. Some error. This plant has not been collected in the Peninsula.


I. peltata Hook. fil. is also a native of the area outside our boundary.
2. HYDROCERA, Bl.


Erect marsh plant. Stem angled. Leaves narrowed to both ends, serrate, glaucous beneath, 1·5 to 6 in. long, 2 to 3 in. wide. Flowers 1 in. across, crimson pink with yellow and white markings; spur short, curved. Drupe red juicy, globose, '75 in. through. Hab. Rice-fields in or near shallow water; local, but sometimes abundant. Malacca (Griffith). Pahang, along Pahang River. Selangor, Telok Gadong; Port Swettenham (Burkill). Penang, Pulau Betong; Balik Pulau. Kelantan, near Kota Bharu; Perlis, Kanga.

var. latifolia Ridl.; **H. triflora**, Wight and Arnott, Prodr. i. 140.

Leaves 1·5 in. wide. Hab. Rare. Malacca (Griffith). Distrib. India, the broad-leaved variety; Cochin-China, Siam and Java, the narrow-leaved one. Native names: Inai Paya; Tampinah.

Order XXXI. RUTACEÆ.

Trees or shrubs (rarely herbs) glandular-resinous. Leaves usually imparipinnate opposite or alternate exstipulate. Flowers in axillary or terminal cymes or panicles bisexual, regular. Calyx 4- to 5-lobed. Petals 4- to 5-valvate or imbricate. Stamens 4 or 5, 8 or 10, rarely more (in *Citrus*); filaments free, hypogynous; anthers 2-celled opening inwards. Disc within stamens lobed, sometimes cylindric. Ovary of 4 or 5 connate or free carpels; ovules usually 2 in a cell; styles as many, free or united. Stigmas terminal. Fruit a capsule, berry or drupe, or of 1 to 4 cocci. Seeds usually solitary in the cells, albumen fleshy or 0. Species about 700, whole world (King, Journ. As. Soc. Beng. lxii. (2), p. 205).

**Triphasia trifoliolata** DC. Prod. 1536. The lime-berry, a dwarf spiny shrub with flowers 5 in. long and small red berries, probably a native of China, is often cultivated as a hedge plant or for its fruit used, in preserves or for making orange brandy.

Fruit of dehiscent cocci; ovaries partly united.

Leaves opposite; trees or shrubs not thorny.

Stamens 4 or 5.

<table>
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<th>Species</th>
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<th>1. Evodia</th>
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<td>Seed globose</td>
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<td>1. Evodia</td>
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<td>Seed flat, winged</td>
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Evodia.]

XXXI. RUTACEÆ. 341

Stamens 8, 4 perfect, 4 imperfect. Leaves alternate often thorny; shrubs; seeds globose. Fruit indehiscent.

Trees or shrubs unarmed.

Trees; petals valvate 4; drupe large 4-celled; leaves simple.

Shrubs; leaves 1- to 5-foliolate; petals very small imbricate; berry small 1 to 3 seeds.

Shrubs; leaves pinnate or simple.

Leaves hairy; petals valvate; drupe small.

Leaves glabrous; petals imbricate; drupe small.

Shrubs or trees glabrous.

Flowers rather large; leaves thinly coriaceous; fruit a berry. Leaves 3- to 8-foliolate.

Flowers large; leaves pinnate; rachis winged; fruit an orange.

Climbers, spiny; leaves trifoliolate.

Trees, usually spiny; leaves unifoliolate; fruit an orange.

Stamens 8 to 10.

Anthers linear-oblong; disc cylindric.

Anthers ovate-oblong; disc cupular.

Stamens 20 to 60 insert round a large cupular disc.

Tree, spiny; leaves imparipinnate; fruit large globose with woody rind.

1. EVODIA, Forst.

Trees or shrubs. Leaves opposite 3-foliolate, rarely 1-foliolate, entire. Flowers small, white rarely pink, unisexual or bisexual, in panicked axillary cymes. Sepals 4 or 5 imbricate. Petals 4 or 5 valvate or sub-imbricate. Stamens 4 or 5; filaments subulate; anthers oblong. Ovary 4-lobed, 4-celled; ovules 2 in a cell. Fruit of 2 to 4 coriaceous cocci; endocarp horny elastic, splitting along the inner edge. Seeds 1 or 2 in a coccus, testa bony or coriaceous, black shining, albumen fleshy. Species about 25, from Mascarene Islands to tropical Asia and Australia.

Leaves trifoliolate.

Softly tomentose beneath. (1) E. latifolia

Glabrous. Leaflets obovate; cymes rather large; cocci "2 in. long.

Leaflets thin acuminate; bush or small tree. (2) E. malayana

Leaflets coriaceous large, tip round; small tree.

Leaflets coriaceous; tall tree 60 to 70 ft. tall. (3) E. glabra

Leaves glabrous, coriaceous; cocci "4 in. long. (4) E. robusta

Leaves glabrous, thin; flowers in globular heads. (5) E. macrocarpa

Leaflets very coriaceous, pubescent beneath. (6) E. pilulifera

Leaflets unifoliolate. (7) E. pachyphylla

(8) E. simplicifolia

3. Tetractomia

4. Zanthoxylum

5. Acrophyllia

6. Glycosmis

7. Micromelum

8. Clausena

9. Murraya

10. Merrillia

11. Luvunja

12. Paramignya

13. Atalantia

14. Citrus

15. Feronia
(1) **E. latifolia** DC. *Prodr.* i. 724; *Hook.* fil. *F.B.I.* i. 489; *King,* l.c. 207.

Small tree 20 ft. tall. Branches 4-angled, puberulous. Leaflets 3 obovate or elliptic blunt or shortly acuminate, base cuneate, above glabrous except the tomentose midrib and nerves, beneath softly tomentose; nerves 13 to 18 pairs elevate beneath; leaflets 5 to 9 in. long, 2'5 to 4'5 in. wide; petiolules 2 to 4 in. long; petioles puberulous 4 to 6 in. long. Cymes axillary broad 3 to 4 in. across, puberulous on stout 2 in. long peduncles. Flowers white less than 1 in. long, densely crowded in heads 2 in. across. Sepals pubescent. Petals glabrous. Stamens not much longer. Cocci 2 to 4 in a flower, ovate blunt, 1 in. long, glabrous, 1- or 2-seeded. Seeds black shining. *Hab.* In woods common. Johor, Batu Pahat. Malacca, Nyalas (Derry); Selandor (Cantley). Negri Sembilan, Rantau (Cantley). Selangor, Bukit Kayu Kapur. Dindings, Lumut (leaves quite glabrous). Perak, Bujong Malacca; Slim (Cantley); Larut Hills; Tea Gardens. Penang, Moniot’s Road (Curtis). *Distrib.* Java. *Native names:* Pauh-Pauh; Leban Pelandok, or Leban Pelandok nasi or jantan; Pauh-Pauh betina; Serapoh Jantan.

There is a thinner-leaved form on Penang Hill and Malacca, resembling *E. accedens* Miq., but with flowers of *E. latifolia* DC. (Hook. fil. l.c. var.).

(2) **E. malayana** Ridl.; E. Roxburghiana *Hook.* fil. *F.B.I.* l.c. 488, partly; *King,* l.c. 208.

A bush to a small tree 20 ft. tall. Leaves trifoliolate, glabrous; leaflets thinly coriaceous, obovate or oblong shortly acuminate; nerves 12 to 18 pairs, sub-horizontal, 2'5 to 6 in. long, 1'25 to 3'25 in. wide; middle leaflet largest; petiolules 1 to 2 in. long; petioles 2'3 to 2'5 in. long. Cymes pedunculate, spreading puberulous 2 to 3 in. wide; peduncle 2 to 3 in. long. Flowers white, 1 in. across; pedicels pubescent. Sepals oblong, blunt. Stamens longer than petals. Cocci 2 to a flower, ovoid acute. Seed 1 or 2, black shining. *Hab.* Open country common in thickets. Singapore, Tanglin; Bukit Timah. Johor, Tanjong Kupang. Pahang, Pekan. Malacca, Brisu; Merlimau. Perak, Chanderiang (Kunstler). Province Wellesley, Permatang Bertam. Kelantan, Kota Bharu. Lankawi, Kesap (Haniff). *Native names:* Kiandang; Mesera jantan; Pauh-Pauh; Pauh-pauh paya; Rudomo; Stengah or Tengah Burong.

I am compelled to give this plant a new name, as *E. Roxburghiana* *Hook.* fil. is a mixture of several species; the name was originally suggested by Bentham in the *Flora of Hongkong* (without any specific diagnosis and no type specimens) for a series of species. The greater part of the plants quoted by Hooker are of an Indian species, much larger, and with different leaves and flowers.

(3) **E. glabra** Bl. *Bijd.* 245; *Hook.* fil. *F.B.I.* i. 489; *King,* l.c. 208.

Big tree 40 to 70 ft. tall, 2 to 3 ft. through. Leaves trifoliolate;
petioles 2 to 4 in. long; leaflets obovate, top rounded, base narrowed, glabrous or with midrib pubescent; nerves 8 to 9 pairs elevate, 3.5 to 7 in. long, 2.5 in. wide; petiolules not winged 1/2 in. long. Cymes corymbose puberulous, 4 in. across; peduncle 3 in. long or less. Flowers white. Sepals round ovate. Petals oblong obtuse. Cocci ovoid-globose 1 in. long rugose. *Hab.* Common in woods in the low country. Singapore, Bukit Timah; Tanglin, Selitar. Selangor, Sungei Buloh (Foxworthy). Perak, Ulu Bubong (Kunstler). Penang, Waterfall (Curtis). *Distrib.* Andamans and Nicobars, Java, Sumatra.

![Figure 35](image-url)

**Fig. 35.—Evodia robusta.**

(4) **E. robusta** Hook. *fil.* F.B.I. i. 488; *King, l.c. 209.*

A small tree. Branchlets hoary. Leaves trifoliolate; leaflets coriaceous oblong, median one obovate obtuse or shortly acuminate blunt; nerves 8 pairs elevate beneath, 7 in. long, 4 in. wide or less; petioles 2 to 2.5 in. long; petiolules winged to base or nearly 1/2 in. long. Cymes about 3.5 in. across, puberulous. Flowers small, white. Sepals ovate pubescent. Petals oblong ovate, acute.
Cocci 2 to 3 rugose. *Hab.* Woods in the south, Singapore (Main-gay); Bukit Timah (Hulet); Chua Chu Kang, etc.

This differs from *E. glabra* Bl. in the less obovate leaves, much shorter petiolules and ovate acute petals.


Tree 40 to 50 ft. tall. Leaves trifoliolate; leaflets stiffly coriaceous, glabrous, oblong to elliptic-oblong acute, narrowed to a blunt base; nerves 14 to 18 pairs sub-horizontal, 6 to 12 in. long, 2 to 3 in. wide; petioles 3 to 4 in. long; petiolules '1 to '2 in. long. Cymes axillary pyramidal short peduncled tomentose. Flowers '1 in. long, white densely crowded. Sepals triangular acute, pubescent. Petals puberulous. Cocci 3 or 4 obovate blunt '4 in. long, hairy inside, puberulous outside. Seeds 2. *Hab.* Forests in low country, rare. Perak, Thaiiping (Wray, Kunstler); Penang, Government Hill (Abrams).


Shrub 6 to 15 ft. tall. Leaves trifoliolate; leaflets thinly coriaceous elliptic to oblong shortly acuminate, base narrowed, rounded, glabrous; nerves 9 to 10 pairs oblique inarching far from margin, conspicuous as are the lax reticulations, hairy on both sides, 3″ to 8 in. long, '25 to 2″75 in. wide; petioles 3 to 4″5 in. long hairy; petiolules hairy '15 to '4 in. long. Cymes axillary tomentose; peduncles 2″5 in. long; branches few. Flowers white in dense globose heads, 2″5 in. across, less than 1 in. long. Sepals ovate acute tomentose. Petals glabrous. Cocci ovoid tomentose outside. Seeds 1. *Hab.* High forests. Local, at 2500 to 3000 ft. altitude. Malacca, Mt. Ophir; Perak, Larut (Kunstler); Telom (Ridley).


A shrub, dwarf to a treelet 15 ft. tall. Branches tomentose. Leaves trifoliolate, very variable in size according to altitude; leaflets coriaceous elliptic-obovate or rounded, obtuse narrowed at base, dull light green, pubescent beneath on the midrib and occasionally on the edge, punctate above, 5 to 6 in. long, 3 in. wide; petioles '3 in. long; petiolules '2 in. long, at 5000 ft. altitude, reduced to 2 in. long, '1″5 in. wide, with petioles '5 in. long and petiolules '1 in. long at 7000 ft. altitude. Cymes axillary puberulous; peduncles '1″75 in. long or less; branches few, few-flowered, all tomentose. Flowers white. Sepals ovate tomentose. Petals '2 in. long oblong acute, keel tomentose. Ovary very tomentose. Cocci large '4 in. long, pubescent hairy. Seed 1, black. *Hab.* High mountains 4000 to 7000 ft. altitude; Pahang, Gunong Berumbun; Wray's Camp, Gunong Tahan. Perak, Gunong Bubu, 5000 ft. altitude (Wray); Gunong Kerbau (Robinson, Haniff) at 7000 ft. altitude; Bujong Malacca (a form with acute leaves).
Shrub 7 ft. tall, branched. Leaves 1-foliolate, coriaceous elliptic obtuse, tip sub-crenate, base rounded, glabrous; nerves 16 pairs; nervules and reticulations conspicuous, 3 to 3'75 in. long, 1'75 in. wide; petioles 5 in. long. Panicles in axils of upper leaves. Flowers unknown. Cocci 4, rugose glabrous 5 in. across. *Hab.* Rocky places at 5000 ft. altitude. Pahang, Gunong Tahan (Robinson).

**Excluded Species**

**Evodia pedunculosa** Hook. *fil.* F.B.I. i. 489. Singapore (Lobb), apparently a *Tetractomia*, the locality very doubtful.

2. **TERMINTHODIA**, Ridl.

Shrubs or small trees. Leaves unifoliolate, alternate or opposite, sub-coriaceous. Flowers small in axillary corymb. Calyx 4-lobed, lobes rounded. Petals 4, triangular. Disc large, 4-angled glandular. Stamens 4; filaments subulate, short; anthers small. Ovary 4-lobed protruding from disc; style central. Stigma small capitate. Cocci 1 to 3, boat-shaped dehiscing along the inner edge. Seeds 1 or 2 in each coccus flattened and winged, exalbuminous. Species 3, Malayan.

(i) **T. viridiflora** Ridl. *Journ. F.M.S. Mus.* vi. 141.
Shrub 3 or 4 ft. or tree 15 ft. tall. Leaves alternate aromatic, obovate, tip rounded or retuse or acuminate, 2 to 3 in. long, 1'5 to 2 in. wide; petioles 3 in. long. Panicles pubescent axillary, 5 in. across on a 1'5 in. long peduncle. Sepals pubescent. Petals acute, green, 12 in. long, glabrous. Stamens nearly as long; filaments thick subulate. Cocci 25 in. long, boat-shaped. Seeds 2, ovoid or obovate, thin, 12 in. long, tip rounded. *Hab.* Open rocky places at 5000 ft. altitude. Pahang, Gunong Tahan (Ridley).


Leaves 6 to 9 in. long; flowers 25 in. long; cocci 5 in. long . . . (1) **T. majus**
Leaves 2'5 to 5 in. long; flowers 13 in. long; cocci 25 in. long . . . (2) **T. Roxburghii**
(1) **T. majus** Hook. fil. F.B.I. i. 491; King, l.c. 211. Tetramerista paniculata Kurz, Journ. Bot. 1875, p. 333.

Tree with stout branches. Leaves very coriaceous, obovate-elliptic blunt; nerves 12 to 16 pairs, 8 to 9 in. long, 3 to 4 in. wide; petioles 2 to 2'25 in. long, thick. Cymes glabrous, 6 to 7 in. long. Flowers '25 in. wide glabrous. Stamens 4, perfect; staminodes minute 4. Cocci '5 in. long, keeled. Seed oblong. Hab. Malacca, (Maingay). Only once found and locality not certain.

(2) **T. Roxburghii** Hook. fil. l.c. 491; l.c. Pl. 1512; King, l.c. 212. Melicope tetrandra Roxb. Fl. Ind. ii. 257.

Tree 30 to 80 ft. tall, 1'5 to 2 ft. through, glabrous. Branches rather-stout. Leaves sub-coriaceous obovate, tip rounded rarely apiculate, long narrowed to base; nerves fine 7 to 9 pairs, 2'5 to 6 in. long, 1'5 to 3 in. wide; petioles '5 to 1 rarely 1'25 in. long. Cymes pubescent above, 3 to 4 in. across spreading, on a peduncle 4 in. long. Flowers '13 in. across, pale yellow or greenish white. Stamens 8, alternate row attached to sepals. Cocci 1 to 3, '25 in. long. Seeds oblong. Hab. Forests to 3000 ft. altitude. Singapore (Maingay). Perak, Thaiping Hills (Derry, Kunstler). Penang Hill (Curtis). Native names: Kertak Hudong; Medang Hudang.

### 4. ZANTHOXYLUM, L.

Shrubs or trees often prickly. Leaves alternate trifoliolate or unequally pinnate. Leaflets entire or crenulate. Flowers small pink, white or green often unisexual. Calyx 3- to 8-fid. Petals 3 to 5. Disc small. Stamens 3 to 5. Ovary of 1 to 5 oblique i-celled carpels; ovules 2; styles sub-lateral. Fruit of 1 to 5 cocci globose, coriaceous-fleshy i-seeded dehiscing ventrally; endocarp horny. Seed oblong or globose. Testa bony or crustaceous blue or black. About 80 species, tropics.

**Unarmed shrub. Leaves trifoliolate; fruit '3 in. through.**

- Rachis thorny; leaves 7- to 9-foliolate; fruit '25 in. through.
- Thorny tree. Leaves pinnate; fruit '12 in. through.

(1) **Z. ovalifolium**

(2) **Z. hirtellum**

(3) **Z. myriacanthum**

(1) **Z. ovalifolium** Wight, Ill. i. 169; Hook. fil. l.c. 492; King, l.c. 213.

Shrub or small tree. Branchlets puberulous, unarmed. Leaves 3-foliolate; leaflets sub-coriaceous elliptic-oblong, obtuse-pointed, base narrowed, edge crenulate; nerves 10 to 14 pairs, 2 to 5 in. long, 1'2 to 2'5 in. wide; petioles 1'25 to 2'5 in. long; petiolules '2 to '4 in. long. Cymes slender axillary; branches few. Flowers '12 to '2 in. long few, 4- to 5-merous. Coccus 1, sub-globular, pitted, 3 in. through. Hab. Singapore (Wallich 7469). Not seen again. Distrib. India.

Specimen doubtful. Wallich says the branches are armed, but there are no spines on the specimens and the Indian plant is unarmed.

Apparently a climber armed with short curved thorns. Branches shortly stiffly hairy. Leaves 6 in. or more long; rachis slender strongly armed; leaflets 7 to 9, coriaceous elliptic, bluntly cuspidate, edge crenulate or undulate; nerves beneath pubescent slender about 8 pairs, above shining glabrous; petiolules 1 in. long or less. Panicles slender lax axillary 2 to 3 together with few flowers about 2 in. long. Flowers 1 in. wide pubescent. Sepals triangular acute. Fruit spikes 3 in. long, pubescent stout with short branches. Coccus flattened, oval pubescent wrinkled, 25 in. long. Seed nearly as long slightly flattened, polished black. *Hab.* Woods, Singapore, Yochukang (Ridley). Pahang, Temerloh. Dindings, Lumut (Curtis).

(3) **Z. myriacanthum** Wall. Cat. 1214; Hook. fil. F.B.I. i. 496; King, l.c. 214.

A tree 20 to 80 ft. tall and 2 to 3 ft. through, very thorny. Leaves deep green, coriaceous 1 to 16 ft. long; leaflets 4 to 9 pairs coriaceous ovate or oblong-lanceolate acuminate, entire or minutely crenate; nerves 8 pairs, 3 to 4 in. long, 125 to 15 in. wide; petioles 3'5 in. long; petiolules 1 in. long. Cymes 6 to 8 in. long, terminal spreading; peduncle 3'5 in. thorny. Flowers 2 in. across, white sub-sessile 4-merous. Cocci usually 2 globose compressed, 1 in. long. *Hab.* Hill woods. Pahang, Telom. Malaeca (Maingay); Merlimau (Derry); Perak, Goping (Kunstler); Dindings, Lumut, Penang, Government Hill, 2500 ft. altitude (Curtis, Wallich). *Native names:* Kabu-Kabu Hutan; Membuloh.

The height given is that of Kunstler. I have only seen it very much smaller, about 6 to 8 ft. tall.

### 5. ACRONYCHIA, Forst.

Tree with opposite or alternate leaves i-foliolate; leaflets entire. Flowers small, green or white in terminal or axillary corymb. Petals 4 valvate revolute. Stamens 8 inserted under a thick 8-angled tomentose disc. Ovary within the disc 4-celled; ovules 2 in each cell; style terminal. Fruit a 4-celled drupe. Seeds black. Species about 18, tropical Asia and Australasia.

Flowers in cymes 35 to 75 in. diameter . . . (r) A. laurifolia
Flowers in racemes 15 in. diameter . . . (2) A. Porteri

(1) **A. laurifolia** Bl. Bijdr. 245; Hook. fil. F.B.I. i. 498; King, l.c. 214. A. arborea Bl. Bijdr. 244.

A small tree about 12 to 30 ft. tall. Branchlets puberulous. Leaves sub-opposite thinly coriaceous dark shining green, oblong-elliptic or obovate obtusely acuminate or blunt, base narrowed, glabrous; nerves 14 to 18 pairs looping within the edge, 2 to 6 in. long, 11 to 24 in. wide; petioles 5 to 75 in. long. Cymes axillary slender 2 in. long with few opposite branches; peduncles 2'5 in. long. Flowers narrow in bud, 35 to 75 in. across when open,

(2) A. Porteri Hook. fil. F.B.I. i. 498; King, l.c. 215.

Tree 15 to 70 ft. tall, 15 to 20 in. through. Bark white. Leaves opposite or alternate, coriaceous oblong narrowed to base, acute or acuminate, glabrous; nerves 8 to 10 pairs, 3 to 8 in. long, 1.25 to 3 in. wide; petioles 5 to 7.5 in. long. Racemes 1 or more from each axil, puberulous, 3 in. long. Flowers scattered 15 in. across. Buds globose; pedicels 15 in. long to 2 in. long in fruit. Sepals triangular acute. Petals ovate-oblong pubescent inside. Drupe, ovoid, dark green 4 in. through, 4-angled when dry. Hab. Forests. Singapore, Bukit Timah, Garden Jungle. Malacca (Griffith); Batang Malacca (Derry); Sungei Hudang (Derry). Perak, Thaiping (Kunstler). Penang (Wallich); Government Hill (Maingay, Curtis). Native names: Katiak; Bunau Hutan; Melaman.

6. GLYCOSMIS, Correa.

Shrubs or treelets. Leaves 1- to 5-foliolate; leaflets alternate. Flowers small white in axillary rarely terminal panicles. Calyx 4- or 5-partite imbricate. Petals 4- or 5-imbricate. Stamens 8 or 10 surrounding a disc; filaments subulate dilate below; anthers small with an apical gland. Ovary 2- or 5-celled; ovule 1, pendulous in each cell. Berry pulpy, small to as big as a cherry. Seeds 1 to 3 oblong, testa membranous. Species about 20, tropical Asia and Australia.

Flower solitary axillary or sub-terminal panicle; ovary glabrous; fruit as large as a cherry.
Flowers several axillary; ovary glabrous; fruit as large as a pea.
Leaves simple large, coriaceous narrow elliptic-lanceolate.
Leaves simple, large, thinner, broad elliptic.
Leaves 1- to 3-foliolate; panicles spike-like, glabrous.
Leaves 3-foliolate; panicles tomentose, spreading.
Leaves 5-foliolate, thin; nerves conspicuous.
Leaves 5-foliolate; nerves faint; inflorescence glabrous.
Leaves 5- to 7-foliolate; inflorescence red-tomentose.
Leaves 7-foliolate, large quite glabrous; ovary pilose or tomentose.
Leaves large 1.25 to 2.25 in. across.
Leaves small 0.75 to 1.7 in. wide.

(1) G. macrocarpa
(2) G. crassifolia
(3) G. macrphylla
(4) G. citrifolia
(5) G. rupestris
(6) G. malayana
(7) G. monticola
(8) G. tomentella
(9) G. elata
(10) G. sapindoides
(11) G. puberula
(1) **G. macrocarpa** Wight, Ill. i. 109.

Tree, glabrous. Leaves 1- to 5-foliolate, sub-coriaceous; 1-foliate leaf, with leaflet elliptic-lanceolate acuminate, base shortly narrowed 7½ in. long, 2½ in. wide, gland-dotted; nerves about 8 pairs; petioles 1·75 in. long, 3-foliolate leaves 6 in. long, with distant lanceolate leaves acuminate shortly narrowed to base 3 in. long, 7 in. wide; petiolules 1 in. long. Flowers white 2 in. long solitary axillary on a very short peduncle or sub-terminal in dense short panicles 5 in. long; branches angled. Sepals ovate acuminate. Petals oblong acuminate. Stamens, filaments broad and thick. Fruit as big as a cherry 7½ in. through puncticulate. *Hab.* Perak (no locality given) at 4500 ft. altitude (Wray). **Distrib.** Southern India.


**G. pentaphylla** var. longifolia Hook. fil. **F.B.I.** i. 500.

Branches stout, woody. Leaves simple elliptic-lanceolate narrowed to base, bluntly acuminate, very coriaceous, gland-dotted above; nerves fine, 8 or more pairs inconspicuous, 9 in. long, 2·1 in. wide; petioles thick, 5 in. long. Flowers small in very short axillary clusters, very few; rachis and ovate sepals red-romentose. Petals broad lanceolate, blunt, glabrous. Stamens with a glandular blunt apiculus to anther. Ovary glabrous. Fruit fleshy. *Hab.* Malacca (Maingay). Only once collected.


Shrub. Leaves simple thinly coriaceous elliptic, narrowed slightly at base, acuminate; nerves 10 pairs prominent inarching within margin, 8 in. long, 3½ in. wide, pale beneath; petioles thick, 2 in. to 1 in. long. Panicles terminal 1 to 2 (axillary in upper 2 axes) 2·5 in. long with very short 1 in. long branches. Flowers very small in umbels at the tips of the branches. Ovary conic, glabrous on a large disc. *Hab.* Hill woods; local. Penang (Wallich 6377, Curtis 89).

var. **macrorachis** King, l.c. 217 (sub **pentaphylla**).

Erect shrub 2 to 4 ft. tall. Leaves elongate lanceolate acuminate 13 in. long, 3½ in. wide. Panicle 6 in. long; branches scattered distant 2 in. long. Fruit round, white. *Hab.* Penang, Waterfall and Pulau Betong (Curtis 89) in forests.


Short stiff shrub or bush 4 to 8 ft. tall. Leaves 1- to 3-foliolate thinly coriaceous elliptic-lanceolate; nerves 12 to 13 pairs, faint, 4½ in. long, 1½ in. wide; petioles 1 to 2½ in. long; petiolules 1 in. long. Panicle glabrous axillary and terminal almost spike-like erect 5 to 2 in. long. Ovary glabrous, globose. Fruit as big as a pea, pale pinkish white. *Hab.* Open country and villages,
local but often abundant, Singapore, Tanglin. Kelantan, Kwala Lebir, Setul (Ridley). Distrib. China, Java, Borneo, Philippines and as a garden escape in the West Indies. Native names: Nerapih (for one species of Glycosmis, Gimlette, Malay Poisons).


var. tomentosa *Ridl. l.c. Inflorescence red-hairy, Lankawi Pulau Segai; Pulau Adang (Ridley). Distrib. Siam, Koh Samui.

This is near *G. puberula* Lindl., hardly differing except in the glabrous ovary.

Glabrous shrub. Buds red-tomentose. Leaves thin sub-membranous, 5-foliolate; leaflets elliptic, bluntly acuminate, shortly narrowed at the base; nerves impressed above, conspicuously elevate beneath, 5 pairs inarching within margin, gland-dotted above or not, 3.5 to 5.5 in. long, 1 to 2 in. wide; petioles 5 to 1 in. long; petiolules 1 to 2 in. long. Panicles axillary or terminal 2 to 3 in. long; branches spreading 1 in. long, glabrous rarely red-scurfy. Flowers small globose. Sepals orbicular ciliate-edged. Petals small, oblong blunt; filaments broad. Ovary cylindroconic, glabrous, 5-celled. Fruit globose narrowed at base, white, 2 in. through. Hab. In the woods in the low country, our commonest species. Singapore, Chan Chu Kang; Johor, Selangor; Kwala Lumpur. Perak, Larut (Kunstler). Penang (Wallich, Curtis, etc.). Kelantan, Chaining Woods. Native names: Buluntoh Burong; Cherit Morai; Pulong.

Glabrous. Leaves 5 in. long; leaflets 5, coriaceous, lanceolate acuminate blunt base narrowed cuneate; nerves 6 pairs, faint 3 to 4 in. long, 5 to 1 in. wide; petioles 1 in. very slender; petiolules 1 in. long. Panicle 1 in. long; branches 2 in. long. Flowers very small, globose sessile. Sepals rounded. Petals ovate. Stamens, filaments very short; anthers apiculate. Hab. Malacca, Mt. Ophir, Gunong Mering at 3000 ft. altitude (Ridley).

Buds red-pubescent. Leaves 12 in. long; leaflets 5 to 7 elliptic bluntly acuminate, base rounded, thinly coriaceous, not gland-dotted; nerves 6 to 7 pairs conspicuous beneath forming wide arches, scurfy pubescent as are the midrib, petiolules 2 in. long.

(9) \textbf{G. elata} Ridl. \textit{Journ. F.M.S. Mus.} x. 130.

Shrub 6 to 8 ft. tall. Stem stout. Leaves 18 in. long with 5 leaflets oblong-elliptic, glabrous, pale beneath, base cuneate, tip shortly acuminate; nerves 5 to 7 pairs, freely black-dotted beneath, 7 in. long, 2 in. wide; petiolules 2'5 in. long. Panicles in lower axils 3 in. long. Flowers numerous 2 in. long, white. Sepals very short ovate acute. Petals oblong, glabrous. Stamens 10, 5 as long as petals, 5 shorter. Ovary flask-shaped, glabrous. Fruit ovoid beaked yellow spotted brown. \textit{Hab.} Damp forests. Kelantan in the Chaning Woods and near Kota Bharu (Ridley).


Shrub. Branches stout. Leaflets large 5 to 7, elliptic or oblanceolate narrowed to the base acuminate thinly coriaceous, densely gland-dotted on both surfaces; nerves elevate beneath 6 to 9 pairs invisible above, inarching within the margin, 3'5 to 6 in. long, 1'25 to 2'25 in. wide, the lowest ones smallest; petioles 1'75 to 2'75 in. long, pustular as is the rachis. Panicle short axillary 1'5 in. long, dense. Calyx-lobes ovate acute. Petals oblong 1 in. long obtuse, backs rufous. Ovary flask-shaped red-pilose. Disc small. \textit{Hab.} Penang (Wallich), Waterfall (Ridley).

(11) \textbf{G. puberula} Lindl. \textit{Wall. Cat.} 6375; \textit{Hook. fil. F.B.I.} i. 501; \textit{King}, i.e. 218.

Shrub? Branches pustular; buds red-tomentose. Leaves 5 in. long 3-foliate; leaflets sub-coriaceous elliptic acuminate, base narrowed acuminate; nerves faintly elevate about 6 pairs inarching invisible above, 3 to 4'5 in. long, 1'75 to 1'4 in. wide, densely gland-dotted on both sides; petioles slender 1'4 in. long; petiolules slender 2 in. long. Panicles small; branches few, short, 1 to 1'5 in. long, red-tomentose. Flowers very small. Sepals rounded ovate. Petals small oblong tomentose. Stamens 10; filaments cylindric; anthers glandular on tip and back. Ovary globose, conic red-tomentose. \textit{Hab.} Penang (Wallich); Waterfall (Curtis). Perak (Scortechini), a variety with leaves more coriaceous. \textit{Distrib.} Philippines.

7. \textbf{MICROMELUM}, Bl.

Shrubs or small trees. Leaves imparipinnate. Leaflets alternate oblique, membranous. Flowers small white in corymbose cymes large and terminal. Calyx cupular 3- to 5-toothed. Petals 5, valvate. Stamens 10 inserted round a disc; filaments linear-
subulate, alternate ones shorter. Ovary 5-celled (rarely 2- to 6-celled); ovules 2 in each cell; style 1. Berry pulpy 1- or 2-seeded. Seed oblong. Species 4 to 5, Asia and Polynesia.

Leaflets ovate lanceolate, glabrescent; cymes pubescent.

Leaflets lanceolate, base very oblique tomentose; cymes very tomentose.

(1) **M. pubescens**

Large shrub or treelet. Branchlets and leaf-rachis puberulous but eventually glabrescent. Leaves 6 to 18 in. long; leaflets 9 to 15 alternate lanceolate or ovate-acuminate, edges undulate, base slightly narrowed oblique; nerves 9 to 12 pairs, 1·5 to 3·5 in. long, 5 to 2 in. wide; petioles up to 3 in. long. Cymes 6 to 8 in. across, peduncled, many-flowered. Flowers '25 to '5 in. long, greenish white. Calyx 5-toothed. Ovary pubescent. Berry ovoid to oblong glabrescent orange '3 to '4 in. long. Hab. Common in open country. Pahang, Kwala Tembeling; Temerloh. Malacca, Selandor (Cantley). Negri Sembilan, Bukit Tampin; Bukit Kanding (Cantley). Perak, Tanjong Malim; Ulu Bubong (Kunstler). Penang, Tanjong Bunga (Curtis). Perlis near Kanga. Distrib. Tropical Asia and Australia. Native names: Chemama jantan.

(2) **M. hirsutum**

Shrub or small tree tomentose. Leaves 6 to 12 in. long; leaflets 9 to 25, lanceolate to oblong-lanceolate, base very oblique, edges obscurely serrate, tomentose beneath; nerves 5 to 10 pairs, 1·5 to 3·5 in. long, 8 to 1·5 in. wide; petioles up to 2 in. long. Cymes very tomentose, lax, 4 to 6 in. across or less. Flowers 25 in. across, white. Calyx deeply 5-lobed. Ovary very villous. Berry orange. Hab. Open country, less common than the last, Malacca, Mt. Ophir (Hullett). Perak, Gunong Keledang. Penang (Jack, Porter). Kelantan Kota Bharu (Ridley). Distrib. Indo-Malaya. Native name: Chemama.

8. **CLAUSENA**, Burm.

Shrubs or trees. Leaves imparipinnate membranous; leaflets oblique. Flowers small in lax panicles. Calyx 4- or 5-lobed. Petals 4 or 5 imbricate. Stamens 8 or 10 inserted round a tall disc, alternate ones shorter; filaments usually dilate. Ovary stipitate, 4- or 5- (rarely 2- or 3-) celled; ovules 2. Berry pulpy ovoid or oblong. Species 14, tropical Asia, Africa and Australia.

(1) **C. excavata**

Shrub or treelet, odour nauseous. Branches, young leaves and inflorescence pubescent or tomentose. Leaves 6 to 12 in. long;
leaflets 15 to 29 lanceolate acuminate oblique, base narrowed, above glabrous when adult, 1.5 to 3.4 in. long, 0.5 to 1 in. wide; petioles 0.5 in. long; petiolules less than 1 in. long. Panicle terminal narrow, lax 4 to 12 in. long; branches spreading. Flowers 0.25 in. across, 4-merous white; pedicels longer. Buds globose. Stamens 10. Ovary smooth oblong, pulpy pale pink translucent 0.2 in. long. Seed 0.5 to 1 in. long. Use: The leaves eaten as a potherb by Tamils, and perhaps introduced by them.

9. **MURRAYA**, Linn.

Shrubs or trees unarmed. Leaves pinnate with alternate petioled leaflets, bases oblique or cuneate. Flowers solitary or in short panicles axillary or terminal. Calyx 5-partite. Petals narrow 5, free imbricate. Stamens 10 on an elongate disc, alternate ones shorter; anthers ovate. Ovary 2- to 5-celled, narrowed into a long style. Stigma capitate. Berry oblong or ovoid 1- to 5-celled, 1- to many-seeded. Seeds flat, glabrous. Species 5, tropical Asia.

(1) **M. exotica** Linn. *Mant.* ii. 563; *Hook. fil. F.B.I.* i. 502; *King, l.c.* 220.

A shrub or small tree. Leaves 4 to 5 in. long, deep shining green 3- to 8-foliate; leaflets thinly coriaceous, ovate to ovate-lanceolate often rhomboid, acuminate tip blunt notched, base cuneate, often slightly oblique, 1 to 2 in. long, 4 to 8 in. wide. Cymes axillary or terminal an inch long, few-flowered. Flowers 0.5 in. long, white fragrant. Sepals oblong, obtuse. Petals oblong lanceolate. Stamens much shorter. Ovary 2-celled; style long, slender. Stigma capitate. Berry ovoid or globose red, 0.5 in. long. Seeds 2. *Hab.* Wild on limestone hills, often cultivated in gardens. Selangor, Bukit Kamuning. Perak, Pondok Tanjong (Haron). *Distrib.* India, China, Australia. *Native name*: Kamuning. Use: The roots give the beautiful wood used for Kris-handles and sheaths.


Leaves thin light green, 8 in. long; leaflets 13 on a winged green rachis, base triangular, 3 to 3.5 in. long, 1.5 in. wide. Flowers 1 in. long, light green. Sepals 1 in. long. Petals 1 in. long. Fruit green turning yellow, 4 in. long, 3 in. through, rind 1 in. thick, pulp olive green. Seeds grey. Hab. River-banks and in forests. Pahang near Gunong Tahan (Robinson); Bentong (Foxworthy).

Fig. 36.—Merrillia Caloxylon.


This plant is intermediate between Limonia and Murraya, having the disc and style of the latter and the foliage and fruit of Limonia. Mr. Swingé has named the genus after Mr. Merrill, a Philippines botanist.

11. LUVUNGA, Ham.

Glabrous lianes with axillary straight or hooked spines. Leaves trifoliolate; leaflets coriaceous, entire. Flowers in axillary fascicled
or panicked racemes, white, fragrant. Calyx cupular, entire or 3- to 5-lobed. Stamens 8 to 10 inserted round a disc. Ovary 2- to 5-celled; ovules 2 in a cell; style stout. Stigma capitate. Berry large, ellipsoid, rind thick. Seeds large, ovoid, 2 or 3.

Species 4, Indo-Malayan.

Leaves narrower; nerves conspicuous; stamens glandular, connate. Leaves broader more elliptic; nerves inconspicuous; stamens woolly, free.

(1) *L. scandens* Ham. Wall. Cat. 6392; Hook. fil. F.B.I. i. 509; Bot. Mag. t. 4522; Pierre, Fl. For. Cochinchine, t. 188; King, l.c. 222.


Big liane with hooks. Leaflets 4½ to 8 in. long, 1½ to 4½ in. wide, elliptic; nerves fine, inconspicuous, 8 to 12 pairs; petioles 1½ to 4½ in. long. Racemes in fascicles 1½ to 5 in. long. Flowers several, white, 5 in. long. Calyx very shortly toothed. Petals not recurved. Stamens free, woolly above. Fruit oblong ellipsoid an inch long, strongly gland-dotted. *Hab.* Dense forest. Singapore, Changi. Pahang. Perak (Wray). *Distrib.* India, Sumatra.

12. PARAMIGNYA, Wight.

Shrub, usually spiny. Leaves 1-foliolate, sub-coriaceous. Flowers rather large, white, fragrant, axillary, solitary or fascicled. Calyx cupular. Petals oblong, 4 or 5. Stamens 8 to 10 inserted round a columnar disc; filaments free, linear; anthers linear-oblong. Ovary 3- to 5-celled; ovules 1 or 2 in each cell. Style elongate. Berry ovoid or pear-shaped, triquetrous, resinous glandular. Seeds large, oblong compressed. Species 6, Indo-Malayan.

*P. grandiflora* Wall. Oliver, Journ. Linn. Soc. v. Supp. ii. 42, “Singapore Lobb,” is a plant with flowers 75 in. long. It is otherwise only known from Tenasserim. The locality Singapore is probably wrong.

Spines very small. Spines straight 2 in. long; fruit angled.

(1) *P. Griffithii*  (2) *P. longispina*
(1) P. Griffithii Hook. fil. F.B.I. i. 510.
Shrubs shortly spiny, glabrous or pubescent. Leaflets coriaceous, elliptic or oblong, short blunt acuminate, 3 to 5 in. long, 1.5 to 2.3 in. wide, base rounded. Flowers solitary or fascicled axillary or slender, 3 in. long, white fragrant. Calyx acutely 5-lobed. Petals oblong 3 in. long, blunt. Stamens 10; filaments hairy, longer than the linear-oblong anthers. Ovary 5-celled; ovules 2 in each cell. Hab. Singapore (Hullett). Malacca (Griffith). Distrib. Burma.

This has been made a variety of the Indian and Chinese P. citrifolia, and I doubt if it is specifically distinct.

(2) P. longispina Hook. fil. F.B.I. i. 511; King, l.c. 224.
A low spiny shrub, 75 to 1.5 in. long. Leaves elliptic-oblong, acute or obtuse; nerves indistinct, 2.5 to 4.5 in. long, 1.5 to 1.75 in. wide; petioles 2 in. long. Flowers white, 35 in. long, axillary, solitary or 2 or 3 on a 1 in. long pedicel. Calyx 5-toothed. Petals oblong obtuse. Stamens 10 glabrous, equal; anthers as long as the filaments, apiculate. Ovary on the disc. Fruit ovoid, triquetrous, apiculate, 1.25 to 1.75 in. long, green or brown, resinous, 3- or 4-celled. Seeds compressed, beaked. Hab. Common in tidal river mud, but it does not seem to flower often. Singapore, Jurong; Kranji. Malacca (Maingay). Perak (Kunstler). Distrib. Burma. Native name: Limau Lelang. Use: Fruit used in medicine.

13. ATALANTIA, Correa.

Shrubs or small trees armed or not. Leaves unifoliate coriaceous. Flowers axillary, fascicled or in short racemes or panicles. Calyx 3- to 5-lobed or irregularly split. Petals 3 to 5 free or adnate to the stamens forming a tube. Stamens 6 to 8, rarely 15 to 20, inserted round a cupular or annular disc; filaments free or connate; anthers ovate-oblong or cordate. Ovary 2 to 4, rarely 3- to 5-celled; ovules 2 or 1 in each cell. Berry globose 1- to 5-celled, 1- to 5-seeded with thick rind. Species about 10, tropical Asia.

Thorny, leaves coriaceous, tip retuse.
Stamens connate . . . . . . (1) A. monophylla
Thorny bush; leaves thin cuspitate . . . . . . (2) A. cuspidata
Unarmed; leaves thinner, tip blunt.
Stamens free . . . . . . (3) A. Roxburghiana
Thorny climber; stems velvety.
Stamens free . . . . . . (4) A. hispida

A shrub or treelet about 20 ft. tall, with short sharp spines. Leaves lanceolate to ovate, tip obtuse usually notched, edges entire, base cuneate or rounded, 1.25 to 2.5 in. long, 6 to 1.4 in.
wide; petioles 2 to 3 in. long. Racemes or cymes about 1 in. or less long, puberulous longer than the flowers. Flowers white, 35 to 5 in. long. Calyx irregular lobed, edges scarious. Petals oblong obtuse. Stamens 8 or fewer, bases joined in a tube, tips free. Ovary sessile on an annular disc. Berries globose, green, 6 to 8 in. through. Hab. Open country near the sea in the north. Kedah, Pulau Song-Song. Lankawi, Terutau island (Curtis). Perlis, Chupeng. Distrib. India. Native names: Akar merlimau; Empenai.


(3) A. Roxburghiana Hook. fil. F.B.I. i. 513; King, l.c. 225. Sclerostylis Roxburghii Wight, Lc. l. 72.

A shrub unarmed 6 to 10 ft. tall. Leaves dark green thinly coriaceous, elliptic tapering to both ends, blunt not retuse; nerves fine 10 to 14 pairs, 4 to 6 in. long, 175 to 225 in. wide; petioles 25 in. long. Racemes short, few-flowered. Flowers nearly 5 in. long. Calyx-lobes 4, obtuse. Petals 4, obovate. Stamens 8; anthers oblong-ovoid; filaments free, short. Ovary 2-celled, sessile. Berry globose, 6 to 8 in. through, sparsely pitted, greenish yellow. Hab. Open country and limestone hills. Malacca (Griffith); Malacca town; Ayer Panas. Negri Sembilan, Seremban; Tampin (Goodenough). Perak, Goping, limestone hills, to 1000 ft. altitude (Kunstler). Pahang, Kwala Lipas (Machado). Native name: Limau Pagar. Use: As a fence plant.

(4) A. hispida Guillaumin, in Lecomte Not. Syst. i. 182.

Slender hairy climbing shrub. Thorns recurved 25 in. long. Leaves alternate thin coriaceous, oblong or oval acuminate, base round much reticulate with large glands beneath, midrib strongly elevate, 2.5 to 4 in. long, 15 to 2 in. wide; petioles 15 in. long. Flowers solitary, axillary. Sepals 5 oblong acute, velvety outside. Petals 5, elliptic slightly velvety outside, 3 in. long. Stamens 10; filaments velvety. Disc forming a cylindric gynophore, velvety. Fruit 25 to 5 in. through, globose or 2- to 5-lobed according to the number of seeds, red. Hab. Open country. Kelantan, Tumpat, Kota Bharu (Ridley). Distrib. Cochin-China.
14. CITRUS, Linn.

Spiny trees or shrubs. Leaves alternate, unifoliolate, coriaceous; petiole often winged. Flowers axillary, fascicled or in cymes, white or pinkish, fragrant. Calyx cupular 3- to 5-lobed. Petals 4 to 8, linear-oblong, imbricate. Stamens 20 to 60 insert round a large cupular disc; filaments connate; anthers oblong. Ovary many-celled; ovules 4 to 8. Berry large, fleshy, many-celled. Seeds with coriaceous or membranous testa. Species about 5, tropical Asia.

Besides the ones mentioned below we have in cultivation the orange Citrus aurantium, Linn., the Pumelo C. Decumana, Murr.

Petioles broad winged . . . . (1) C. hystrix
Petioles narrow winged . . . . (2) C. medica
Petioles slender non-winged . . . . (3) C. malaccensis

(1) C. hystrix DC. Prod. i. 539; Hook. fil. F.B.I. i. 515.
Tree resembling a pumelo. Spines slender, sharp. Leaf-petioles obovate, large, top broad retuse, base narrowed, 2 to 2'5 in. long, 2 in. across; petioles at base short and thick; leaflets elliptic cuspidate slightly narrowed at base, crenulate, sub-coriaceous to rather thin. Flowers small white. Fruit globose 4 in. through, rind green sometimes tubercled, very thick and pithy, pulp small, pale and acid. Hab. Open country. Pahang (Machado). Malacca, Bukit Kedondong (Derry). Perak, KwaIa Dipang.

The following cultivated plants may be varieties of the lime.

var. Limau Kasturi. Small tree 10 to 12 ft. tall, not armed. Leaves elliptic or oblongate to nearly obovate, '75 to 1'75 in. long, '5 to 1 in. wide; petioles not winged, jointed, '2 to '5 in. long. Flowers '4 in. long, solitary. Petals oblong, linear, axillary. Fruit small globose, 1 in. through. Use: Used in chutneys and preserves.

var. Limau hijau. Leaves oblongate narrow at both ends; petioles under 1 in. long. Fruit small globose, green becoming yellow. The common lime.

var. Limau nipis. Spiny. Leaves oblong, rounded at both ends, 2'5 in. long, 1'5 in. wide; petioles very short, '1 in. long. Fruit globose, smooth, rind thin.

var. Limau Nipis Kapas. Leaves large elliptic as much as 4 in. long, 2 in. wide; petioles jointed at top, '25 in. long. Flowers solitary axillary; pedicels rather long and not broad.

var. Limau Kadangsa. Tree not spiny. Leaves lanceolate or oblong, narrow at base, tip blunt rather coriaceous, 2 to 3 in. long, 1 in. wide; petioles winged, narrow oblongate, '5 in. long, '2 in. wide. Flowers small, '25 in. long, several in a cyme. Petals

var. *Limau Perut.* Spiny. Leaf ovate blunt, base round; petioles round or obovate as large or even larger than the leaflet, 1 in. long, 1'5 in. across.

var. *Limau Susu.* Spiny. Leaves elliptic-oblong, tip round, base shortly narrowed, 3 in. long, 1'75 in. wide; petioles 1'2 in. long. Flowers large, 1'5 in. long in sub-terminal cymes of several flowers. Petals broad blunt, oblong. Fruit about 2 in. long, globose beaked, beak thick and blunt, yellow rind thin, pulp abundant, very acid. Only used in washing clothes. A variety from Telok Pinang, Perak, had spines 1 in. long. Leaves 1'5 in. long. Fruit lanceolate in outline. Flowers as big as the other form or a little bigger.

(3) *C. malaccensis* Ridl.

Unarmed tree. Leaves mostly 1-foliolate, some trifoliolate; leaflets sub-coriaceous elliptic or elliptic-lanceolate acuminated blunt, base narrowed; nerves about 14 pairs sunk above, elevate beneath, 7 in. long, 3'5 in. wide; petioles slender, 1'5 in. long, grooved not jointed. Flowers in axillary cymes of 4; pedicels 1'25 in. long. Sepals 5 lanceolate acuminated acute, free nearly to base. Petals 5, linear-oblong, slightly dilate upwards, 1'5 in. long. Stamens few and free; filaments linear; anthers oblong. Ovary cylindric stalked; style thick. Stigma large capitate. Fruit oblong over 4 in. long and 3 in. through, rind rather thick. Seeds very numerous, obcuneate, apex round base narrowed to an acute point nearly 1 in. long. *Hab.* Malacca, Nyalas (Goodenough); Bukit Sadanen (Derry). *Native name:* Limau Hantu.

I am dubious as to the genus of this plant, it may be a *Limonia*.

15. **FERONIA**, Gaertn.

A spiny tree. Leaves alternate imparipinnate; leaflets opposite, sessile entire; petioles often winged. Flowers in terminal panicles or racemes. Calyx small, flat 5-toothed. Petals 5 (or 4 to 6). Stamens 10 to 12 inserted round a short disc; filaments dilated, sides and front villous; anthers linear-oblong. Ovary oblong 5- to 6-celled; ovules many in many series on 5 to 6 parietal placentas; style none. Stigma oblong, fusiform. Fruit large, globose, 1-celled, many-seeded, rind woody. Seeds embedded in pulp. Species 1, India and Java.


Tree about 30 ft. tall, deciduous, glabrous. Leaves smelling of aniseed, 3 in. long; leaflets obovate, base cuneate 1 in. long, 1'4 in. across. Panicles 1'5 in. long. Flowers 1'2 in. across, dull red, unisexual; pedicels pubescent. Fruit 2'5 in. through. *Hab.* Open country, orchards, Perlis at Kanga. *Distrib.* India, Malay Islands.
Order XXXII. SIMARUBÆ.

Trees or shrubs, usually bitter with pinnate, rarely simple leaves, alternate; stipules o. Inflorescence axillary; racemes panicled or cymose. Flowers usually unisexual and small, regular. Calyx 3- to 5-lobed, valvate or imbricate. Petals 3 to 5 (rarely 0). Disc annular or elongate (rarely 0). Stamens as many or twice as many; filaments free, often with a scale at base; anthers oblong, introrse, dehiscing longitudinally. Ovary free, lobed, 1- to 6-celled; styles 2 to 3 free. Fruit drupaceous, capsular or samaroid of 2 to 6 carpels. Seeds solitary, pendulous, albuminous. Species 130, tropical and sub-tropical regions.

Leaves compound.

- Stamen 8 or 10; thorny bush
- Stamen 4; tree; paniculate
- Stamen 4; shrub; minute cymes in racemes
- Stamen 5; tall shrub; panicles spreading large

Leaves simple.

- Flowers umbellated on long peduncles; fruit large ovate, winged; small tree
- Stamen 10; flowers panicked; gigantic tree; fruit like a mango

1. HARRISONIA, Brown.

Glabrous spiny shrubs. Leaves unequally pinnate or 1-foliate. Flowers unisexual in bracteate cymes. Calyx small, 4- to 5-fid. Petals 4 to 5, longer. Disc hemispherical. Stamens 8 to 10, dilate at base. Ovary globose or 4- or 5-lobed; ovules solitary; styles connate or free at base. Fruit a small globose berry with 2 or 3 pyrenes. Species 3 to 4, tropics of Old World.

Leaves 5- to 9-foliate; racis winged; flowers terminal

1. HARRISONIA

- Stamen 8 or 10; thorny bush
- Stamen 4; tree; paniculate
- Stamen 4; shrub; minute cymes in racemes
- Stamen 5; tall shrub; panicles spreading large

Leaves simple.

- Flowers umbellated on long peduncles; fruit large ovate, winged; small tree
- Stamen 10; flowers panicked; gigantic tree; fruit like a mango

1. HARRISONIA, Brown.


Scandent sarmentose shrub, thorny. Leaves 2.5 in. long, 5- to 9-foliolate; racis flattened or winged; leaflets ovate-rhomboid crenate, ’7 in. long, ’5 to ’7 in. wide. Cymes terminal, 2 in. long, 8- to 20-flowered; pedicels ’1 in. long, hairy. Calyx small; sepals ovate acute. Petals dull red lanceolate, ’2in. long. Filaments unequal, white slender, scales at base hairy. Styles united, hairy. Fruit of 3 to 5 carpels. Hab. Open country. Perlis at Kanga. Distrib. Burma, Siam, China, Malay islands.


Shrub, prickly. Leaflets 3, ovate to rhomboid acuminate, serrate, narrowed at base petiolulate; racis not winged, ’6 to
1 in. long, '3 to '6 in. wide. Flowers on axillary tubercles, '1 to '3 in. long, on slender pedicels, '5 to '75 in. long. Sepals small ovate. Petals '1 in. long, lanceolate reflexed. Stamens 8, bases hairy. Fruit pea-shaped, 3- to r-celled. Hab. Perak (Scortechini). I have seen no specimen. Distrib. Andamans and Philippines.

2. PICRASMA, Blume.

Trees or shrubs, bitter. Leaves imparipinnate. Flowers small unisexual, in axillary panicles. Calyx small, 4- to 5-toothed. Petals 4- or 5-valvate. Disc thick, entire. Stamens 4 or 5, hairy, no scales. Ovary 3- to 5-partite, free; styles united in middle only. Fruit 1 to 3 fleshy or coriaceous drupes surrounded by the enlarged coriaceous petals. Species 4, Indo-Malaya, China, Japan, America.

(t) P. javanica Blume Bijdr. 248; Hook. fil. F.B.I. i. 520; King, l.c. 227; Benn. Pl. Jav. Rar. 197, t. 41.

Tree 30 to 60 ft. tall; leaflets 3 to 7, membranous, elliptic to elliptic-lanceolate acuminate entire or (old leaves) undulate, base narrowed or rounded; nerves 4 to 6 pairs, 2 to 3 in. long, '1 to '5 in. wide. Panicles white, 6 in. long (the peduncles 4 in. long). Flowers numerous, crowded at branch ends small, white. Sepals ovate, pubescent, minute. Petals '1 in. long, ovate concave. Stamens 4; filaments pubescent in male, villous in female. Disc woolly. Style single. Drupe 1 to 3, enlarged; petals '3 in. across. Hab. Malacca (Maingay). Perak (fide King). Distrib. Java.

3. BRUCEA, Mill.


(t) B. sumatrana Roxb. Fl. Ind. i. 449; Hook. fil. F.B.I. i. 523; King, l.c. 228.

Shrub 4 to 6 ft. tall. Branchlets pubescent. Leaflets 9, lanceolate acuminate, coarsely serrate-dentate, base oblique acute softly pubescent; nerves 10 to 12 pairs, 1 '5 to 3 '5 in. long; whole leaf 10 to 14 in. long; petioles 2 '5 to 5 in. long; petiolules 1 in. long. Panicles 2 to 3 '5 in. long. Flowers minute, purple, pubescent. Drupes ellipsoid oval black. Hab. Open country, widely spread from Singapore to Perlis on both coasts. Distrib. Indo-Malaya. Native names: Kosam (Chinese); Cherek Jantan; Embalau, or Embalau Padang or Embalau Betina; Hampedu Bruang; Lada Pahit. Use: The fruit used for dysentery.

4. EURYCOMA, Jack.

Treelets or tall slender shrubs. Bark and wood bitter. Leaves on the apex of the branches paripinnate; leaflets numerous glabrous

Leaflets acute 3 to 4 in. by 75 to 1 in.; flowers '25 in. long
Leaflets acuminate 2.5 to 5.5 in. by 1.7 in.; flowers '4 in. long

(1) **E. longifolia**

(2) **E. apiculata**

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FIG. 37.—*Eurycoma apiculata.*


A slender red-stemmed shrub or treelet about 15 ft. tall often unbranched. Leaves terminal, 18 to 24 in. long; leaflets softly coriaceous, oblong-lanceolate acute, base oblique cuneate, dark green glabrous 3 to 4 in. long, '75 to 1 in. wide. Panicles over 2 ft. long, glandular hairy. Sepals ovate green. Petals ovate-lanceolate, reddish pubescent, '25 in. long. Stamens longer than calyx. Disc-glands bilobed ciliate. Drupes 1 to 5, stipitate ovoid,
5 in. long, 25 in. through, yellowish brown. Hab. In dry woods, rocky stream banks, etc. Common. Singapore, common, Tanglin; Changi. Johor, Sungei Bau; Mt. Austin. Pahang, Pekan. Malacca, Bukit Bruang, etc. Perak, Ulu Temengoh; Thaiping. Pulau Adang. Penang (Wallich, 8522); Waterfall Hill (Curtis), Setul. Distrib. Tavoy, Cambodia, Sumatra, Borneo. Native names: Bidara Pahit; Duak; Juak; Tongkat Baginda; Lapedu Pahit. Use: The bitter bark used in fever, an excellent bitter.

(2) E. apiculata Bennett, in Hook. fil. F.B.I. i. 522; King, l.c. 230. (Fig. 37, p. 362.)

Shrub 3 to 8 ft. tall. Leaves 12 to 15 in. long; leaflets oblong-lanceolate abruptly acuminate, base acute hardly oblique, 2·5 to 5·5 in. long, 1 to 1·7 in. wide. Panicles lax 8 to 15 in. long glandular, black pubescent. Branches short. Petals linear, glandular outside, glabrous within, 4 in. long, reddish brown. Stamens as short as calyx. Disc glands minute entire. Drupe ovoid black with a red dorsal line outside. Hab. Dry woods. More of a hill plant than the preceding and commonest in the north. Distrib. Selangor, Sempang Mines; Sungei Buluh; Petaling. Perak, Larut Hills (Kunstler); Gunong Kerbau at 4000 ft. altitude (Robinson); Penang, Government Hill. Province Wellesley, Tasek Gelugur. Native names: Bidara Pahit; Bidara Putih or merah; Penawar Pahit; Sempedu Pahit.

5. SAMADERA, Gaertn.

Glabrous trees with coriaceous, large, simple leaves. Flowers bisexual in peduncles or axillary or terminal umbels. Calyx small, 3- to 5-lobed. Petals much longer, 3 to 5, coriaceous imbricate. Disc large conical. Stamens 8 to 10 with a small scale at base. Carpels 4 to 5, free; style free at base united above. Ovule solitary. Fruit of 1 to 5 large compressed drupes narrowly winged. Species 4, Madagascar, tropical Asia.

(1) S. indica Gaertn. Fruct. ii. t. 156; Wight, Ill. t. 68; Hook. fil. Ic. Pl. t. 7; F.B.I. i. 519.

A tree 30 to 35 ft. tall or a shrub, stout. Leaves fleshy, coriaceous light green, oblong-elliptic-lanceolate, 8 in. long, 3 in. wide; petioles 5 in. long, thick. Flowers 20 or more in an umbel; peduncle 5 to 9 in. long; pedicel 5·5 in. long, red. Calyx-lobes rounded ciliate, red. Petals 4, narrowed oblong pubescent, pale green or yellow 75 in. long. Stamens 8. Fruit oval, flat, 3 in. long, 2 in. wide. Hab. Rather rare in tidal swamps, Singapore. Johor, Tanjong Kupang; Kwala Sembrong (Kelsall). Distrib. India, Ceylon, Malay islands, Polynesia.

6. IRVINGIA, Hook. fil.

Gigantic, glabrous trees. Leaves coriaceous, entire. Flowers small in axillary panicles. Calyx 4- to 5-partite, imbricate. Petals
4 to 5, imbricate. Disc very large, cushion-shaped. Stamens 10, inserted beneath the disc; filaments slender, long. Ovary conical, 2-celled; style simple; ovules solitary. Drupe large, 1-seeded. Species 4, 3 African and 1 Malayan.

(i) \textit{I. malayana} Oliver Ic. \textit{Pl.} 1247; Hook. \textit{fil.} \textit{F.B.I.} i. 522; King, \emph{l.c.} 230.

A vast tree over 150 ft. tall with grey bark, large buttresses and a big head of foliage, 80 ft. to first branch. Leaves simple ovate or elliptic coriaceous acute, base rounded; nerves 14 to 16 pairs inconspicuous, 3'5 to 5'5 in. long, 1'75 to 2'4 in. wide; petioles 6 to 7 in. long. Panicles axillary and terminal with few spreading branches 2 to 4 in. long. Flowers 2 in. across. Calyx-lobes ovate blunt. Petals dark green reflexed. Stamens white as long. Ovary conic. Disc large, orange. Fruit ovate flattened 2 in. long, green with orange fibrous pulp resembling a mango. \emph{Hab.} Singapore, Tanglin; Bukit Timah. Malacca, Merlimau (Derry). Selangor, Kwala Lumpur (Foxworthy). \emph{Distrib.} Burma, Siam. \emph{Native names:} Pauh Kijang; Merlang.

\section*{Order XXXIII. OCHNACEAE.}

Glabrous trees or shrubs. Leaves alternate simple coriaceous. Stipules 2. Inflorescence panicled or umbellate bracteate. Flowers showy green, white, red or yellow. Sepals 4 to 5 free imbricate persistent. Petals 5, rarely 4 to 10, hypogynous imbricate, disc enlarged after flowering rarely. 0. Stamens 4, 5, 8, 10, or indefinite, insert on the disc; filaments persistent; anthers sometimes opening with pores. Ovary short 2-celled or elongate and 1- to 10-celled; ovules 1 or 2 in each cell; style simple subulate. Stigmas simple. Fruit indehiscent drupaceous or baccate compound, each drupe 1- to 4-seeded or capsular and 1- to 5-celled. Seed 1 to numerous. Species 160, chiefly American.

\textbf{Tribe i. OCHNEAE.} Ovary 2- to 10-celled; ovules 1 in each cell; seed exalbuminous; big shrubs or trees.

\begin{itemize}
\item Stamens indefinite
\item Stamens 10
\item Stamens 4
\end{itemize}

\textbf{Tribe ii. EUTHEMIDAE.} Shrublets; ovary 5-celled; ovules 2 in each cell; seeds albuminous.

\begin{itemize}
\item Stamens 5 with 5 staminodes
\end{itemize}

\section*{1. OCHNA, Linn.}

Trees or shrubs. Leaves simple serrate 2-stipulate. Flowers large yellow in panicles or umbels. Sepals 5-coloured. Petals 5 or 10; disc very thick especially in fruit, red. Stamens indefinite; anthers longitudinally dehiscing. Ovary 3- to 10-lobed, lobes
1-celled, 1-ovuled. Fruit 3 to 10 black drupes on enlarged red disc. Species 20, tropical Africa and Asia.


A low-branched tree, 20 ft. tall. Leaves deep shining green, elliptic acuminate blunt; nerves horizontal numerous faint, 4 to 5 in. wide, \( \text{r}5 \) to 2 in. long; petioles \( \text{r}12 \) in. long. Stipules lanceolate. Flowers 2 or 3 in axillary cymes; peduncles \( \text{r}5 \) in. long; pedicels \( \text{r}25 \) in. long. Sepals oblong \( \text{r}75 \) in. long. Petals large yellow. Stamens \( \text{r}5 \) in. long; anthers very small. Disc over \( \text{r}25 \) in. wide. *Hab.* Heaths, Perlis, Ginting Kabok. *Distrib.* S. Siam.

2. GOMPHIA, Schreb.

Medium trees or large shrubs. Leaves alternate coriaceous shining 2-stipulate. Flowers yellow, red, or white in axillary or terminal racemes or umbels. Sepals 5 persistent. Petals 5 imbricate. Disc thick lobed. Stamens 10 inserted at base of disc; filaments very short; anthers opening by terminal pores. Ovary deeply 4- to 6-lobed, lobes 1-celled, 1-ovuled; styles connate. Stigma simple. Drupes 5 or fewer on a broad disc. Species 80, chiefly S. American.

Flowers in diffuse panicles, yellow . . . . (1) *G. sumatranana*
Flowers in fascicles of 3, yellow; leaves very narrow . . . . . . . . . . . . . . . . . . (2) *G. microphylla*
Flowers in corymbs red . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . (3) *G. Hookeri*
Flowers smaller in umbels, white . . . . . . . . . . . . . . . . . . . . . . . . . (4) *G. corymbosa*


A tree about 40 ft. tall. Trunk stout. Leaves elliptic-oblong acuminate narrowed to base or rounded, edges serrulate at upper end, main nerves very numerous and free, reticulations as fine intra-marginal nerves conspicuous 1 to 2 pairs, deep shining green 3'5 to 7 in. long, \( \text{r}15 \) to 2'25 in. wide; petioles \( \text{r}5 \) in. long. Panicles terminal lax spreading 8 in. long; branches distant. Flowers bright or pale yellow, \( \text{r}35 \) in. across. Sepals ovate narrow. Petals larger oblong retuse. Anthers longer than filaments. Ovaries 5; styles connate. Drupes obovate or reniform. *Hab.* Common in the low country. Singapore, Bukit Timah (Hullett, Wallich), Johor, Kota Tinggi (Feilding); Batu Pahat (Kelsall). Malacca, Bukit Panchur (Derry). Mt. Ophir. Pahang, Tahan River. Dindings (Wallich). Perak, Larut; and Goping (Kunstler). Penang, Government Hill (Curtis). *Distrib.* Sumatra, Borneo. *Native names:* Mata Ketam Batu; Murmagong; Libu; Luis; Siburu; Janggut Keli; Kelat Ampedu Jawa; Kelat Pagar Anak; Mendapor.

(2) *G. microphylla* Ridl. (Fig. 38, p. 366.)

Fair-sized tree. Leaves close set coriaceous narrow lanceolate acute, base narrow, serrulate; nerves invisible, midrib elevate on
both sides, 1.5 to 2.5 in. long, 5 to 6 in. wide; petioles 0.5 in. long. Flowers in terminal fascicles bright yellow on a peduncle 1 in. long. Pedicels 2 in. long. Sepals lanceolate blunt 2 in. long greenish. Petals oblong obtuse 2 in. long. Drupe semi-orbicular sub-reniform purple black 15 in. long. Hab. Lankawi, Dayong Bunting (Robinson).


A small shrubby tree 60 ft. tall and 10 to 15 in. through. Leaves entire ovate-oblong or oblong-lanceolate, base rounded, tip blunt or shortly acuminate, stiffly coriaceous; nerves numerous faint, 2.5 to 6 in. long, 1 to 2 in. wide; petioles 1.5 to 3.5 in. long. Flowers deep red 3.5 in. across, crowded in lateral or terminal clusters with many bracts. Pedicels 5 to 1 in. long slender. Sepals lanceolate blunt. Petals oblong obtuse as long. Anthers as long as filaments. Carpels subglobose or obovoid 2 in. through. Hab. Sandy woods near the sea. Malacca, Sungei Hudang (Derry). Perak, Larut (Kunstler). Distrib. Borneo. Native names: Kasi; Tampoi Paya.
G. Hookeri var. corymbosa King, l.c. 233.

Shrub 6 to 8 ft. to a tree of 20 ft. tall. Leaves entire coriaceous oblong or lanceolate subacute dark green, 4'5 in. long, 1 to 1'5 in. wide; petioles 2 in. long. Umbels on the ends of short branches densely many-flowered, 1 to 2 in. across. Pedicels '25 to 1 in. long, slender. Flowers '25 in. across, white. Sepals oblong blunt deflexed. Petals linear narrower. Stamens 6 to 9; anthers longer than filaments. Carpels obovate reniform. Hab. Forests in the hills. Easily recognised by its white flowers. Singapore, top of Bukit Timah. Perak, Goping at 500 to 1000 ft. altitude. Larut Hills to 2000 ft. altitude (Kunstler), Penang Hill (Curtis).

3. TETRAMERISTA, Miq.

Shrubs or trees. Leaves large coriaceous entire. Flowers in axillary racemes with large foliaceous bracts. Sepals 4 persistent. Petals 4 persistent. Stamens 4, filaments dilate at base; anthers dehiscence sutural. Ovary 4-angled. Species, 1 or 2 Malayan.

(1) T. glabra Miq. Fl. Ind. Bat. Supp. 54; Bann. in Hook. fil. F.B.I. i. 526; King, l.c. 233.


4. EUTHEMIS, Jack.

Glabrous shrublets. Leaves alternate coriaceous simple shining serrulate. Stipules deciduous ciliate. Flowers pink or white in terminal or leaf-opposed racemes or panicles. Sepals 5 imbricate. Petals 5 longer imbricate. Disc small conical. Stamens 5 with alternate staminodes; anthers open by terminal pores. Ovary elongate; style one; stigma small entire. Berry of 5 pyrenes white or red each 1- or 2-seeded. Species about 6, Malaya.

Erect; leaves oblong-lanceolate 3'5 to 8 in. long; petals oblong-ovate; fruit globose white, pink or red ...... (1) E. leucocarpa
Prostrate ascending; leaves narrow lanceolate 3 to 4 in. long; petals linear; fruit 5-angled deep red .... (2) E. minor
(1) E. leucocarpa Jack, Mal. Misc. v. 16; Hook. Ic. Pl. 711; Benn. l.c. i. 526. King, l.c. 234.

Shrublet erect little branched 1 to 6 ft. tall. Leaves oblong-lanceolate tapering to both ends, spinulose serrate dark shining green; nerves very numerous fine, 3·5 to 8 in. long, 1·2 to 2 in. wide; petioles 5 to 1·5 in. long flat winged. Racemes or panicle 2 to 6 in. tall, with 1 or 2 branches at base. Flowers in pairs '6 to 7 in. across white; pedicels 1 to 2 in. long remote. Bracts ovate acute. Sepals ciliate ovate obtuse. Petals oblong-ovate. Anthers connivent subsessile. Ovary round white. Berry snow-white, rose or red, globose, top rounded 2 to 3·5 in. through. Hab. Sandy woods near the sea and mountains common, a very pretty plant. Singapore, Kranji, Johor, Pengaram. Malacca, Mt. Ophir at top. Pahang, Pekan. Perak, Bujong Malacca (Scortechini); Ulu Bubong 900 ft. altitude and Kinta 2500 to 4000 ft. altitude (Kunstler). Distrib. Lingga, Borneo, Banca, Native names: Pelawan Beruk; Tambo.

The Bornean E. robusta Hook. fil. seems to me merely a larger form of this.

(2) E. minor Jack, Mal. Misc. v. 18; Benn. l.c. i. 526; King, l.c. 235; Ridl. Journ. Roy. As. Soc. S. Br. 54, p. 34.

Small prostrate ascending shrublet. Leaves distant narrow lanceolate minutely serrate hardly spinulose, 3 to 4 in. long, 1·25 in. wide; petioles winged to base 3 in. long. Panicle slender 6 in. long hardly in pairs. Sepals ovate ciliate green becoming pink, caducous in ripe fruit. Petals small linear-oblong white. Ovary angled green. Berry 5-angled, top flat, dark red. Hab. Singapore, Chua Chu Kang in sandy woods by the river. Locally abundant, but I have only seen it here. Distrib. Pulau Battam; Bangka.

DUBIOUS

E. elegantissima Wall. Roxb. Fl. Ind. (ed. Carey) ii. 305; E. pulcherrima Wall. Cat. 2518; Hook. fil. F.B.I. i. 527 is not an Euthemis. It appears to be a seedling of Gomphia sumatrana, and was collected by Wallich in Singapore.

ORDER XXXIV. BURSERACEÆ.

Resinous trees (rarely shrubs). Leaves alternate imparipinnate. Inflorescence racemose or paniculate. Flowers regular small bisexual or unisexual. Calyx 3- to 6-lobed. Petals 3 to 6 free. Disc annular or cupular or absent. Stamens 3 to 6 inserted at the base or margin of the disc; filaments free or connate at base; anthers dorsifixed bilocular. Ovary 2- to 5- (rarely 1- )celled; ovules 2 rarely 1 in each cell; style simple. Stigma entire to 5-lobed. Fruit drupaceous with a hard putamen, rarely pseudo-
;

xxxiv. burserace^.

Trioninui.]

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capsular dehiscing into 3 lobes, with 3 winged seeds.
{King, Journ.
As. Soc. Beng. Ixii. (2), 235.)
Species 250, tropics of both worlds.
Perianth pentamerous.
Fruit capsular seed winged
i.
Perianth 3- to 6-merous; fruit drupaceous.
Stamens 6
calyx small
drupe large
stone
triquetrous stony
.2.
Drupe usually small stone crustaceous ellipsoid 3.
Stamens 3 or 6 calyx large drupe oblique
globose
•4Stamens 3, calyx small; drupe gibbous globose 5.
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Triomma

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Canarium
Santiria

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1.

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TRIOMMA,

Hook.

Trigonochlamys
Icicaster

fil.

Leaves

imparipinnate
exstipulate.
Leaflets
few.
in terminal panicles.
Sepals 5 ovate.
Petals 5 ovate little longer.
Stamens 5
filaments very short
anthers minute. Ovary ovoid
ovules 2 in each cell.
Stigma
sessile.
Fruit dry dehiscent opening into 3 ovate acuminate
woody valves, pyrenes solitary 3-angled with a large sub-orbicular
wing.
Species i, Malay Peninsula, Sumatra.
(i) T. malaccensis Hook. fil. Trans. Linn. Soc. xxiii. 171
Ic. PL 2824, 2825;
King, I.e. 236; Ridl. Journ. Roy. As. Soc.
Tree.

Flowers

bisexual

small

;

;

S. Br. 35, p. 86.

An aromatic resinous tree about 60 ft. tall or more and 2 ft.
through with grey flaky bark. Leaves 6 to 10 in. long; leaflets 9
coriaceous oblique elliptic or ovate lanceolate acute or acuminate
nerves 7 pairs, 3*5 to 4 in. long, 1-5 in. wide; petiolules '2 in. long,
terminal one '5 in. long.
Panicle 3 in. long tomentose much
branched. Flowers '2 in. across pedicelled whitish green. Anthers
chestnut.
Fruit 2*75 in. long, 2'i in. wide, base broad on a stout
Hab. Forests in the south. Singapore, Garden
2 in. peduncle.
Malacca (Maingay). Selangor, Ginting Sempah.
Jungle.
2.

CANARIUM,

Linn.

Leaves imparipinnate alternate. Flowers
in terminal or axillary panicles or racemes small, unisexual, males
Big trees resinous.

smaller in larger inflorescences, females larger in smaller inflorescences.
Bracts conspicuous. Calyx campanulate 3-lobed valvate.
Petals 3, usually longer. Stamens 3 or 6 on edge or outside the disc
or free, or confluent at base with no disc.
Ovary 3-celled, cells
Drupe
2-ovuled;
Stigma capitate.
style
various or none.
elliptic with hard fleshy outer coat, stone usually triquetrous,
very hard, i- to 3-celled. Species about 90, tropical Asia.

Stamens
Stamens

3.

.

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(i) C.

.

Filaments united in a tube.
Leaves glabrous; flowers large -3 in. long
Leaves slightly pubescent on nerves, glaucous
beneath
.

Fl.M.P.

caudatum

6.

I.

(2) C.

(3)

grandiflorum

C. purpurascens

BB


(1) **C. caudatum** King, l.c. 240.
Tree 20 to 60 ft. tall, 3 to 7 in. through, glabrous except calyx. Leaves 8 to 13 in. long; leaflets 5 to 7 coriaceous, oblong to ovate, long caudate acuminate, base shortly or rather long narrowed; nerves 7 to 9 pairs inarching distinct, 3 to 6 in. long, 1.5 to 2.25 in. wide; petiolules 4 to 5 in. long, terminal one 1.2 to 1.6 in. long. Male panicles terminal lax 7 in. long; branches few 2 in. long. Flowers few 0.2 in. long, yellow. Calyx widely campanulate. Stamens 3; anthers oblong shorter than filaments, outside the disc. Drupes ellipsoid narrowed at both ends 2 to 2.5 in. long, greenish yellow 0.6 in. through. **Hab.** Dense forests below 1000 ft. altitude. Not common. Selangor, Sepang Woods. Perak, Ulu Kerling and Ulu Bubong (Kunstler). **Distrib.** Sumatra.

Peculiar in having only 3 stamens, but the fruit is that of a Canarium.

(2) **C. grandiflorum** Benn. in Hook. **fil.** F.B.I. i. 553; King, l.c. 242.
A tree. Branchlets stout pubescent. Leaves 9 to 12 in. long acuminate base rounded glabrous above, beneath often pubescent; nerves 10 to 12 pairs 3 to 4 in. long, 1.35 to 1.75 in. wide; petiolules 0.2 in. long. Male panicle 3 in. long puberulous; branches few long. Flowers few clustered. Calyx campanulate teeth broad flat pubescent outside. Petals longer oblong thick flat pubescent outside. Anthers linear longer than filaments, which are dilated and form a tube. Ovary hairy. Female flowers 0.4 in. long in axillary racemes or short panicles; ovary ovoid hairy. Drupe narrow ellipsoid sub-trigonus; stone 1.35 in. long. **Hab.** Lowland woods. Uncommon. Singapore (Hullett); Jurong Road (Burkill). Malacca (Maingay); Merlimau (Cantley). **Native name:** Kajam Pengali.

(3) **C. purpurascens** Benn. l.c. i. 532; King, l.c. 245.
Tree 50 to 80 ft. tall, 15 to 20 in. through. Branchlets red puberulous. Leaves 8 to 14 in. long; leaflets 7 to 9 coriaceous
Canarium.

XXXIV. BURSERACEÆ.

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glabrous oblong elliptic gradually acuminate, base rounded or slightly narrowed, edge undulate, beneath glaucous purplish; nerves 10 to 11 pairs, 2·5 to 5·5 in. long; petiolules 2·5 to 2·5 in. long, terminal one 1 in. long. Stipules rounded cordate, 5 in. long. Male panicles 6 to 18 in. long with scattered branches 2 to 4 in. long. Bracts ovate tomentose large. Calyx tubular tomentose, teeth broad. Petals broad oblong acute, tomentose outside.

Stamens 6; anthers oblong longer than filaments, which are connate at base. Disc o. Ovary glabrous. Female racemes or panicles 2 to 5 in. long; ovary ovoid pubescent; style short and thick. Stigma 3-lobed. Drupe elliptic-ovoid blunt at both ends, 2 in. long, 1·15 in. through, green. Hab. Dense jungle in the lowlands. Singapore, Selitar. Malacca (Griffith). Perak, Goping; Batang Padang District (Kunstler). Penang. Telok Bahang and Muka Head (Curtis).
(4) *C. pilosum* Benn. l.c. i. 533; King, l.c. 243.

Tree 30 to 60 ft. tall. Branchlets red-pubescent with strigose hairs. Leaves 12 to 18 in. long; leaflets 3 to 7 thinly to rigidly coriaceous serrate oblong-lanceolate to elliptic abruptly acuminate, obscurely crenulate-serrate, base cuneate or rounded, glabrous when adult except midrib and 12 to 13 pairs of nerves hairy, reticulations and nerves prominent beneath, 4–5 to 5–6 in. long, 1·5 to 2·5 in. wide; petiolules 15 to 25 in. long, terminal one 1 in. long. Stipules paired subulate hairy. Male racemes axillary 6 in. long interrupted hairy. Flowers 5 in. long few. Calyx tubular entire tomentose. Petals narrow oblong puberulous on both sides. Anthers 6 linear, half as long as filaments, which are connate into a tube for one-third of their length. Ovary pilose. Drupes oblong-trigonal blunt at both ends, 1·1 in. long, 1·5 in. through, purplish sparsely hairy on a short thick 2-in. long hairy panicle. *Hab.* Woods. Singapore, Changi. Malacca (Maingay). Selangor, Batu Tiga. *Native name:* Kadondon Krut or Kadondon Hutan.

var. *hirtellum* Ridl. *C. hirtellum* Benn. l.c. i. 534; King, l.c. 244; *Hook.* fil. *Jc. Pl.* 1575. (Fig. 39, p. 371.)

Leaves more distinctly serrate and hairy on the nerves above and over the whole surface beneath. Calyx more distinctly 3-lobed. Fruit dark blue when ripe (Kunstler). *Hab.* Common, up to 1000 ft. altitude in forests in the northern part of the peninsula. Perak, Larut Hills and Goping (Kunstler); Thaiping (Wray); Batang Padang district (Kunstler). Penang, Chalet (Curtis), 1000 ft. altitude (Wallich).

(5) *C. rufum* Benn. l.c. i. 533; King, l.c. 244.

Tree 20 to 60 ft. tall. Branchlets, inflorescence; petiolules and underside of leaves tomentose. Leaves 12 to 15 in. long; leaflets 7 to 11 coriaceous elliptic or broadly oblong, shortly abruptly acuminate, base rounded, edge serrate, above glabrous except midrib; nerves 12 to 15 pairs, prominent as are reticulations beneath, 3 to 6 in. long, 2 to 2·75 in. wide, lowest leaflets smaller than uppers; petiolules 3 to 4 in. long, uppermost 1·25 to 1·5 in. long. Male panicles very stout terminal 12 in. long; branches short. Bracts numerous broad ovate blunt. Male flowers 2·5 in. long. Calyx very coriaceous campanulate, teeth short silky-tomentose on both sides. Petals longer concave-tomentose outside. Stamens 6; anthers linear longer than the filaments which are connate into a short tube outside the disc. Female flowers, panicles shorter; flowers 5 in. long. Petals narrower. Stamens connate one-third their length into a tube. Drupe elliptic smooth green 2·5 to 3 in. long, 1 to 1·3 in. through; stone acutely 3-angled, apex sub-acute. *Hab.* Singapore, Tanglin. Pahang, Bentong (Foxworthy). Malacca, Bukit Batu Serdang (Derry). Dindings, Lumut. Perak, Goping and Larut (Kunstler); Selama (Wray). *Native
names: Kadondon Bulan; Kerat Tulonjok; Kerat Telampok; Sangol or Sungol Hutan; Kedondong Pasir.

(6) **C. parvifolium** Benn. l.c. i. 536; King, l.c. 241.

A large tree. Branchlets slender glabrous except inflorescence. Leaves 6 to 12 in. long; leaflets 5 to 9 coriaceous oblong-lanceolate or elliptic acuminate acute, base rounded or slightly narrowed; nerves 7 to 8 pairs invisible above, faint below, 2 to 3 in. long, 8 to 1 in. wide; petiolules 2 in. long, terminal one 35 in. long. Panicles terminal slender, 2 to 3.5 in. long; branches few. Flowers 2 in. long. Calyx campanulate entire or obscurely 3-lobed. Petals much longer elliptic obtuse puberulous all over. Stamens 6 as long; anthers oblong shorter than filaments slightly united at base, disc annular. **Hab.** Rare in forests. Singapore, Bukit Timah. Malacca (Maingay, Griffith); Selandal (Goodenough). Perak, Batang Padang (Kunstler).

(7) **C. kadondon** Benn. l.c. i. 535; King, l.c. 247.

Tree 40 to 50 ft. tall, 6 to 8 in. through glabrous. Leaves 6 to 12 in. long; leaflets 7 to 9 elliptic-oblong entire coriaceous shining reticulate, blunt acuminate, base rounded or cuneate; nerves 6 to 9 pairs, 2.5 to 5 in. long, 1 to 2.25 in. wide; petiolules 35 to 7.5 in. long. Panicles terminal axillary; branches short or spreading corymbose puberulous 3 to 7 in. long. Buds globular 1.5 in. long pale green. Calyx cup-shaped pilose outside, teeth short. Petals round ferruginous-pilose outside. Stamens 6; anthers ovate as long as filaments free. Disc broad lobed. Ovary glabrous. Drupe ellipsoid-ovoid narrowed at tip, 1.15 in. long, 4 in. through, plum-colour. **Hab.** Woods, common. Singapore, Bukit Timah; Garden Jungle; Changi, Pahang, Tenerlo, Malacca, Bukit Nanyak (Cantley); Bukit Minyak (Goodenough). Perak, Bernam River and Thaiping (Kunstler). Penang, Muka Head (Curtis); Telok Bahang (Fox). **Native names:** Kadondon Hutan; Kadondon Mata Hari; Mesiput; Kadondon Krut.

(8) **C. nitidum** Benn. l.c. i. 532; King, l.c. 251.

A tree to 30 ft. tall, nearly entirely glabrous. Leaves 7 to 12 in. long; leaflets 7 to 9 coriaceous shining oblong shortly acuminate entire, base round or narrow; nerves 7 to 9 pairs, 3.5 to 6.5 in. long, 1.2 to 1.8 in. wide; petiolules 4 to 6 in. long. Panicles lax spreading puberulous 8 in. long; branchlets 25 in. long. Pedicels as long as calyx. Flowers 5 in. long. Calyx cup-shaped entire puberulous then glabrous. Petals oblong three times as long. Stamens 6; filaments connate at base only. Drupe oval glaucous green, 1.5 in. long, 1.1 in. through. **Hab.** Woods and open country in coast district, Singapore, Changi; Bukit Timah, common. Malacca, Bukit Bruang (Goodenough). Negri Sembilan, Tampin (Burkill). Perak, Chanderiang and Goping (Kunstler). **Native names:** Cana Hutan; Kedondon hutan; Kedondon Krut.

Bark grey. Leaflets many crowded ovate-lanceolate acutely acuminate, base broad round, stiffly coriaceous; nerves about 30 pairs slender sub-parallel, 10 in. long, 4 in. wide; petiolules thick '25 in. long. Drupe 1 in. long oblong triquetrous '6 in. across. *Hab.* Pahang, Pulau Tinggi (Burkill).

Apparently allied to *C. hispidum* Bl., but the leaves quite glabrous and very stiff, the fruits like those of *C. Radlkoferi*. The ovate short cordate leaflets, nearly sessile, are very peculiar.

(h) *C. denticulatum* Bl. *Bijdr.* 1162. C. Kunstleri *King, l.c.* 248.

Tree 60 to 70 ft. tall, 15 to 20 in. through. Branchlets and inflorescence scurfy-tomentose. Leaves 14 to 20 in. long; leaflets 7 to 11 sub-coriaceous oblong or elliptic-oblong acuminate acute, base rounded, glaucous beneath; nerves 12 to 15 pairs, 4 to 8 in. long, 2'25 to 3'25 in. wide; petiolules 3'4 in. long. Stipules elk-horn-shaped 1 in. long. Male panicles terminal 10 to 12 in. long spreading; flowers '3 in. long crowded at the branch tips. Bracts oblong longer than buds. Calyx cut nearly to base into three ovate spreading lobes brown. Petals yellow ovate tapering at each end, tomentose outside. Stamens 6; anthers oblong, shorter than the free filaments. Disc corrugated. Ovary minute or 0. Female panicles as large; flowers larger. Drupes ellipsoid blunt at each end, 1 in. long, 16 in. wide. *Hab.* Forests 200 to 300 ft. altitude. Perak, Larut Hills and Kinta River (Kunstler); Gapis Pass (Curtis), male. Gunong Bubu (Kunstler), male. *Distrib.* Java.

The males have very narrow leaves and the females broad ones, the petals in Curtis’ plant are strongly keeled and the anthers much larger than the filaments, but on the whole I think that all these specimens are Blume’s species.

(i) *C. hispidum* Bl. *Bijdr.* 1163.

Big tree. Leaflets 24 in. long, about 13 elongate oblong, glabrous scabrous above, hairy beneath, shortly acuminate, coriaceous base rounded, entire; nerves elevate beneath about 24 pairs, 9 in. long, 2 in. wide; petiolules '1 in. long or hardly any, terminal one 1 in. long. Panicles elongate hairy (male) over a foot long; branches 1 to 3 in. long. Flowers clustered shortly pedicelled '3 in. long. Calyx bell-shaped, lobes broad ovate short. Petals much longer ovate tomentose. Stamens free; filaments pilose. Disc thick urceolate hairy. Drupe oblong blunt at both ends 3 in. long; stone ellipsoid acuminate narrowed at base, obscurely trigonous with a rib down each face. *Hab.* Perak at Gapis (Wray). *Distrib.* Java, Sumatra, Borneo, Celebes. *Native name*: Damar Degen.

(j) *C. rubiginosum* Benn. *l.c.* i. 534; *King, l.c.* 248.

Tree. Branchlets and inflorescence tawny-tomentose. Leaves
9 to 12 in. long; leaflets 5 to 7 coriaceous elliptic or oblong, abruptly blunt acuminate, entire, base rounded or slightly narrowed, glabrous except midrib; nerves 10 to 13 pairs beneath, reticulations distinct, 3'5 to 4'5 in. long, 1'25 to 2 in. wide; petiolules 6 in. long, terminal one 1'5 in. long. Panicles (male) terminal 12 in. long; branches 2 to 5 in. long spreading; rachis angled tomentose. Flower-buds small globose crowded at branch end. Calyx cup-shaped entire. Petals deltoid much larger 1 in. long tomentose outside. Stamens 6 shorter on the outside edge of a cushion-like disc; anthers oblong as long as the free filaments. Drupe ellipsoid 1 in. long, 6 in. through. Hab. Malacca (Maingay). Pahang, Bentong Gading (Foxworthy).

(i3) C. secundum Benn. l.c. i. 532; King, l.c. 250. C. Bennettii Engler Mon. p. 119.

Tree 20 to 30 ft. tall, 10 to 15 in. through. Branchlets slender rusty-tomentose. Leaves 12 to 18 in. long; leaflets 7 to 9, thin, coriaceous oblong caudate-acuminate, minutely serrate-dentate or sub-entire, base rounded to cuneate glabrous except midrib above, hairy beneath; nerves 10 to 15 elevate beneath, 3 to 6 in. long, 1'6 to 2 in. wide; petiolules 2 to 3 tomentose, terminal one 1 to 2 in. long. Stipules reniform tomentose outside 35 in. long, 5 in. wide. Panicles slender terminal pendulous 10 to 18 in. long; branches remote 2 to 6 in. long. Flowers sub-sessile in terminal heads white tinted pink or dark pink. Bracts numerous. Calyx lobes broad brown. Petals oblong sub-acute tomentose outside. Stamens 6; anthers longer than free; filaments, outside disc. Drupe elongate ovoid trigonous acute, 2 in. long, 1 in. through. Hab. Woods common, Singapore (Wallich); Garden Jungle. Johor, Sedenah. Malacca, Bukit Batu Serudang (Derry). Perak, Goping and Gunong Bubu (Kunstler). Penang, Batu Feringhi. Native names: Damar Kijai; Kasumba; Kasumbi.

EXCLUDED AND DOUBTFUL SPECIES

Canarium commune Linn. Introduced from the Moluccas in 1796 by Christopher Smith, and planted as a roadside tree occasionally in the towns.

Canarium glaucum Bl. King, l.c. 491. The only specimens given here by King are also given for C. purpurascens Benn.

C. littorale Bl. Bijdr. 1164. In Kunstler's collection (Perak 2000 to 2500 ft. altitude, Larut No. 6998) is a fruiting specimen of a large-leafleted glabrous tree with a rather long fruit, 2 in. long in a large calyx cup. King refers it to C. parvifolium, which it cannot be. It closely resembles C. littorale Bl. of Java, but the single specimen is insufficient to be certain of.
3. **SANTIRIA**, Bl.

Resinous tree. Leaves 3-foliolate or imparipinnate; leaflets oblique entire. Flowers small bisexual in axillary or terminal panicles. Bracts minute. Calyx cup-shaped 3-lobed. Petals 3 longer. Disc annular. Stamens 6 on the edge of disc. Ovary 3-celled; ovules 2 in a cell; style short or 0. Stigma capitiate or 3-lobed. Drupe ellipsoid more or less compressed on the ventral side, not trigonous; stigma-scar lateral or basal, 1-celled, 1-seeded. Stone usually crustaceous. Species about 30, Malayan.

**Panicles longer than the leaves.**

- Leaflets 12 to 20 in. by 2.5 in. long; panicle glabrous.
- Leaflets 5 by 2 in. long; panicle stiff hairy; fruit large oblong pink.
- Leaflets 3 to 6 in. by 2 in. long, glabrous; panicle little longer than leaves; flowers very small tomentose; fruit oblong 5 in. long, oblique red.

**Panicles shorter than the leaves.**

- Leaves glabrous; flowers minute; leaflets stiff coriaceous elliptic long-acuminate to 5 in. long.
- Flowers small; leaflets thin ovate-elliptic acuminate to 5 in. long.
- Leaflets large stiff coriaceous; leaflets 3 elliptic, 5 by 2.5 in. long; flowers 15 in. long; fruit 1.5 in. long.

**Panicles large; flowers small.**

- Leaves glabrous.
- Leaflets 7 by 9 in. long; leaflets 10 in. long.
- Leaflets 4 in. long; panicle over 12 in. long spreading.
- Leaflets 8 in. long, lanceolate.
- Leaflets oblong 6 in. or more long; panicle very dense, short.

Leaves hairy beneath.
- Young leaves and panicle scurfy-puberulous.
- Nerves beneath hairy; panicle red hairy.
- Leaves densely velvety beneath.

(1) *S. floribunda*  
(2) *S. laxa*  
(3) *S. fasciculata*  
(4) *S. minutiflora*  
(5) *S. apiculata*  
(6) *S. macrocarpa*  
(7) *S. leevigata*  
(8) *S. oblongifolia*  
(9) *S. longifolia*  
(10) *S. Wrayi*  
(11) *S. conferta*  
(12) *S. costata*  
(13) *S. multiflora*

(1) *S. floribunda* King, l.c. 254.

Tree 20 to 30 ft. tall, 3 to 4 in. through. Branchlets stout, scurfy-pubescent. Leaves 2 to 3 ft. long, base auricled, puberulous when young, glabrous when old; leaflets 13 to 17 coriaceous, oblong shortly abruptly acuminate, base rounded; nerves 20 to 30 pairs, 9 to 20 in. long, 2.35 to 5 in. wide; petiololes thick 5 in. long. Panicles 2 to 3 ft. long, slender much branched; branchlets short with 3- to 5-flowered cymules. Flowers 1 to 2 in. long. Calyx flat 3-angled. Petals deltoid deep red fleshy concave glabrous. Stamens, anthers oblong. Drupes elliptic apiculate glabrous 1 in. long, 5 in. through, pink, on long pendulous peduncles. *Hab.* Dense jungle rather rare. Selangor, Ginting Bidai. Pahang, Pahang River. Perak, Gunong Pondok (Kunstler).

A tree 50 to 90 ft. tall. Branchlets, rachis of leaves and inflorescence densely rough-hairy. Leaves 14 to 22 in. long; leaflets 7 to 9 oblong to oblong-elliptic, shortly abruptly acuminate, base cuneate often unequal; nerves 12 to 14 pairs hairy beneath, 5 to 8 in. long, 1'75 to 2'5 in. wide; petiolules '4 to '5 in. long. Panicles long pendent 2 to 3 ft. long. Male flowers '25 in. long, deep red, on pedicels '4 in. long glabrous. Calyx-teeth broad blunt. Petals much longer lanceolate. Anthers ovate. Female flowers larger. Petals oblong blunt '3 in. long. Stamens abortive as long as pistil. Ovary thick oblong 3-lobed. Stigma sessile 3-lobed large. Drupe ellipsoid 1 to 1'4 in. long, '6 to '7 in. through, bright rose pink, stone thin flattened on one side. \textit{Hab.} Forests, common, Singapore, Bukit Timah; Garden Jungle. Malacca, Bukit Bruang (Curtis); Bukit Sadanen (Derry). Negri Sembilan, Bukit Tumiang (Cantley). Pahang, Sungei Tahan. Perak, Larut (Kunstler). Penang Hill (Curtis). \textit{Native names:} Sayang; Kedondon Bulan; Kayu Rau.

(3) \textit{S. fasciculata} Benn. l.c. i. 539; King, l.c. 255.

Tree 40 to 50 ft. tall, 10 to 15 in. through. Branchlets, rachis and panicles at first puberulous. Leaves 10 to 15 in. long; leaflets 5 to 7 membranous elliptic to elliptic-oblong caudate-acuminate, base cuneate, glabrous; nerves 7 to 8 pairs bold beneath inarching, 4'5 to 9 in. long, 2 to 3 in. wide; petiolules '75 to 1 in. long. Panicles slender terminal; branches few lax with distant 6- to 10-flowered cymules. Flowers '05 in. long. Pedicels tomentose. Calyx cupular hispid-tomentose outside, teeth deltoid acute. Petals little longer deltoid glabrous. Anthers ovate. Ovary ovoid glabrous. Drupes oblique ovoid gibbous at base. Stigma-scar terminal 8 in. long, '6 in. through, light red or waxy crimson. \textit{Hab.} Forests, Pahang, Tahan River. Malacca, Bukit Sadanen (Derry, Maingay). Perak, Larut (Kunstler, Wray). Penang (Curtis).

var. \textit{puberula} \textit{S. puberula} Benn. l.c. i. 537; King, l.c. 256.


Maingay's specimens are smaller than the type with less prominent nerves, but I think only a state of \textit{S. fasciculata}.


Tree. Leaves 7 in. long; leaflets 5 coriaceous elliptic to ovate cupululate-acuminate blunt, base broad or shortly narrowed; nerves about 6 pairs elevate beneath, 3 to 5 in. long, 1'5 to 2 in. wide; petiolules 1 in. long. Panicles lax axillary 2 to 3 in. long. Flowers very small cymose and racemose on branch-ends. Sepals 3 broad ovate. Petals larger ovate blunt. Stamens 5; anthers

(5) S. apiculata Benn. l.c. i. 537; King, l.c. 259.

Tree 40 to 60 ft. tall, 10 to 15 in. through. Leaves 6 to 8 in. long; leaflets 3 membranous oblong or elliptic to ovate bluntly acuminate, base round or cuneate, glabrous; nerves 8 pairs; 3'5 to 5'5 in. long, 1'75 to 2'25 in. wide; petiolules 4 to 6 in. long. Panicles slender lax 2 to 3 in. long glabrous. Flowers greenish white very small crowded at tips, unisexual. Calyx cupular, teeth short blunt. Petals round. Anthers ovate. Ovary in females ovoid pubescent. Disc lobed and corrugate. Drupes ovoid-globose '5 in. long, scar near the base, yellowish red. Hab. Common in lowland woods. Singapore, Bukit Timah; Garden Jungle. Johor, Tebrau. Malacca (Maingay); Bukit Sadanen (Derry). Selangor, Kwala Lumpur (Foxworthy). Perak, Larut (Kunstler). Native name: Kerantei Batu.


Glabrous tree 40 to 80 ft. tall, up to 2 ft. through. Leaves 5 to 9 in. long, thinly coriaceous dark green; leaflets 3 to 5 elliptic-oblong to ovate short blunt apiculate base cuneate or rounded; nerves 7 to 9 pairs bold inarching, 3 to 4'75 in. long, 2 to 2'75 in. wide; petiolules 3'5 to 5 in. long, terminal one i in. long. Panicles axillary 3 in. long; branches spreading 5 to 1 in. long. Cymules 2- to 6-flowered. Flowers 2 to 2'5 in. long white. Calyx thick cupular triangular. Petals twice as long fleshy broad oblong concave, tip thickened inarched hooded. Filaments much shorter than the lanceolate anthers, outside the quadrate lobes of the thin annular disc. Drupes oblique ovoid, 1'25 to 1'5 in. long, '75 in. through on peduncles 1 in. long waxy deep pink or red. Hab. Dense wet jungle rare. Perak, Larut (Kunstler).

(7) S. lavigata Bl. Mus. Bot. Lugd. Bat. i. 211; Benn. l.c. i. 538; King, l.c. 257.

Tree 50 to 150 ft. tall, 4 to 5 ft. through, glabrous except inflorescence. Leaves 9 to 17 in. long; leaflets 7 to 9 coriaceous elliptic-oblong short acuminate, base rounded sub-cordate or narrowed oblique; nerves 11 to 17 pairs slightly elevate, beneath reticulate on both sides, 4'5 to 9 in. long, 1'5 to 2'8 in. wide; petiolules 3 in. long. Panicles 6 to 8 in. long, axillary spreading, tips puberulous. Flowers less than 1 in. long crowded in cymes. Bracts 0. Calyx cupular entire or with a waved edge, puberulous outside. Petals deltoid round, tip inarched, filaments longer than anthers. Drupes '6 in. long ovoid blunt, one side flattened; stigma-scar near tip, on '5 in. long peduncle, dark red to black. Hab. Common in lowland woods. Singapore, Garden Jungle. Bukit Timah. Johor, Tanjong Kupang. Malacca, Bukit Sadanen (Derry). Sungei Hudang (Derry); Selandor (Cantley). Selangor,


Tree 50 to 80 ft. tall, 1·5 to 2 ft. through. Leaves 12 to 18 in. long, light green; leaflets 7 to 9 thinly coriaceous oblong or ovate blunt acuminate, base rounded or shortly cuneate, reticulate, glabrous above, minutely scurfy beneath; nerves 10 to 13 pairs or less inarching, 4 to 6 in. long, 1·75 to 2·25 in. wide; petiolules '5 to '7, terminal one '5 in. long. Panicles axillary terminal 6 in. long and wide or less divaricate spreading. Flowers pale yellow, crowded at tips 1 in. across. Calyx campanulate, teeth large deltoid scurfy. Petals sub-rotund longer puberulous. Anthers oblong as long as filaments. Disc thin lobed. Drupes ovoid-elliptic or globose oblique '7 in. long, '5 in. through, green tinged purple. **Hab.** Dense low jungle, common. Malacca (Maingay); Machap (Derry). Perak, Ulu Bubong and Larut (Kunstler). Penang (Curtis). **Distrib. Sumatra, Borneo, Java. Native name:** Kerantei.


Tree 10 to 20 ft. tall, 4 to 6 in. through, glabrous. Leaves dark green 2 to 3 ft. long; leaflets 11 to 15 pairs narrowed oblong-lanceolate acuminate, base rounded oblique, coriaceous reticulate beneath; nerves 12 to 14 pairs, 9 to 11 in. long, 1·75 to 2 in. wide; petiolules '65 to 1 in. long stout. Flowers unknown. Fruiting panicles 4 to 9 in. long. Drupes ovoid, scar terminal '75 to 1 in. long, '5 in. through, rich waxy pink. **Hab.** Rare. Dense jungle. Perak, Larut (Kunstler); Penang Hill (Curtis).


Tree 20 to 30 ft. tall. Branches very thick up to 1 in. through. Leaves 12 to 30 in. long; rachis trigonous puberulous; leaflets 13 to 15, oblong, short blunt acuminate, base round, slightly oblique glabrous reticulate; nerves 10 to 15 pairs, 6 to 11 in. long, 2·5 to 4 in. wide; petiolules '5 to 1 in. long. Panicles 3 to 4 in. long, several densely crowded in an axil puberulous. Flowers '1 to '15 in. long. Calyx cupular, teeth 3 broad glabrous. Petals round. Stamens 6; anthers ovate, longer than filaments. Disc corrugated. Drupes oblique ovoid blunt both ends '6 to '75 in. long. Stigma-scar near the peduncle. **Hab.** Perak. Gunong Keledang (Wray); Larut (Kunstler). Perhaps only a variety of the next species.

(11) **S. conferta** Benn. l.c. i. 537; King, l.c. 261.

Small tree 20 to 30 ft. tall. Branchlets stout red-puberulous as are rachis, back of leaves and inflorescence when young. Leaves
12 to 18 in. long; leaflets coriaceous 9 to 13, oblong to oblong-lanceolate tapering to point, base rounded, minutely reticulate on both sides; nerves 10 pairs, 3'-5' to 6 in. long, 1'-6 to 2 in. wide; petiolules '6 to '7 in. long. Panicles 3 to 4 in. long, several in an axil rufous-pubescent dense. Flowers 1 to '15 in. long. Calyx cupular, teeth short broad red-tomentose. Petals rotund puberulous imbricate. Anthers ovate as long as the flat filaments. Disc annular. Drupes obliquely ovoid black about '5 in. long. Stigma-scar near base. *Hab.* Malacca (Maingay).

(12) **S. costata** Benn. *l.c.* i. 537; *King, l.c.* 260.

Tree 50 to 70 ft. tall, 15 to 20 in. through. Branchlets puberulous. Leaves 6 to 9 in. long; rachis hairy; leaflets 5 to 7 coriaceous oblong-lanceolate to elliptic blunt, base acute or rounded, above glabrous smooth, below reticulate; nerves 9 to 11 elevate hairy beneath, 3'-5' to 4'-5' in. long, 1'-25 to 2 in. wide; petiolules '35 to '5 in. long. Panicles 2 in. long hairy. Flowers 1 in. long, fascicled at the ends of the branches. Calyx cupular lobes very short blunt. Petals ovate blunt. Disc small annular. Drupes ovoid '75 in. long, 5 in. through. Stigma-scar apical, white. *Hab.* Open hill woods at 800 to 1200 ft. altitude. Malacca (Maingay). Perak, Gunong, Bubu Range (Kunstler).

(13) **S. multiflora** Benn. *l.c.* i. 538; *King, l.c.* 261.

Tree 50 to 60 ft. tall, 1-5 to 2 ft. through. Branchlets stout rusty-tomentose as are rachis, underside of leaves and inflorescence. Leaves dull dark green, brown beneath, 9 to 15 in. long; leaflets 5 to 7 coriaceous oblong or elliptic-oblong apex tapering subacute, base rounded; nerves bold 15 to 20 pairs sub-horizontal, 4'-5' to 10 in. long, 2 to 3 in. wide; petiolules thick '2 to '5 in. long. Panicles numerous axillary 6 in. long. Flowers numerous '1 in. long unisexual crowded. Calyx cup-shaped entire or with 3 short teeth, tomentose. Petals longer pale yellow thick broad, ovate apex inflexed glabrous. Filaments thick. Disc ring-like fleshy. Drupe ovoid glabrous, '75 in. long scar below the tip, on elongate panicles. *Hab.* Dense low marshy forest. Malacca (Maingay). Pahang, Bukit Goh (Foxworthy). Selangor, KwaIa Lumpur (Foxworthy). Perak, Larut (Kunstler). *Distri.* Borneo.

### 4. TRIGONOCHLAMYS, Hook. fil.

Tree. Leaves alternate imparipinnate. Flowers uni- or bisexual. Calyx large keeled with 3 large valvate segments. Petals 3 valvate. Disc annular. Stamens 3 or 6 inserted on the disc-edge; filaments short. Ovary 3-celled subglobose; style straight; ovules 2 in each cell. Drupe obliquely globose 1-celled 1-seeded; pericarp thin; endocarp thin brittle. Species 2, Malay Peninsula.

- **Stamens 3**  
- **Stamens 6**

   (1) **T. grandifolia**

   (2) **T. Griffithii**
(1) **T. grandifolia** Ridl. *Journ. Roy. As. Soc. S. Br.* 54, p. 31. Tree. Leaves over 12 in. long. Petiole, rachis and back of leaves densely red-tomentose; leaflets 7 elliptic obtuse or cupulidate base rounded, edge denticulate, stiffly coriaceous, above glabrous; nerves 12 pairs elevate, 6 in. long, 2 in. wide; petiolules 25 in. long. Panicle male 6 in. long, female shorter; branches few short densely red-tomentose. Flowers crowded sessile 5 in. long. Calyx campanulate, lobes deltoid acute, 5 in. long, 4 in. across coriaceous red-hairy. Petals as long lanceolate obtuse, backs hairy, edges glabrous. Stamens 3 free to base; anthers lanceolate. Disc annular setose; ovary in female tomentose. *Hab.* In forest local. Singapore, Bukit Timah (Cantley and Ridley). This seems to be its only known locality.


Tree 60 to 80 ft. tall, 2 to 3 ft. through. Branchlets puberulous. Leaves 6 to 12 in. long; rachis puberulous; leaflets 13 to 15 thinly coriaceous oblong-lanceolate bluntly acuminate, base very shortly cuneate, dark green, midrib above and back tomentose-pubescent; nerves 13 to 15 sub-prominent, 15 to 3 in. long, '65 to 1 in. wide. Panicles short dense tomentose, bracts linear oblong. Flowers 35 in. long unisexual. Calyx velvety light brown. Petals narrower elliptic white, light brown inside, tomentose. Stamens 6 short. Disc glabrous. Ovary globose glabrous. Fruit 5 in. through 'dark blue.' *Hab.* Dense jungle in the low country, Singapore, Selitar; Grange Road. Johor, Tanjong Bunga (Ridley). Pahang, Rumpin (Foxworthy). Malacca (Maingay, Griffith); Selandor (Goodenough); Brisu and Sadanen (Derry); Jus (Cantley). Perak, Ulu Kerling and Ulu Bubong (Kunstler). *Native names*: Babi Kerus; Kijai or Damar Kijai; Kasir; Kadondon Matahari; Kempas Roman.

### 5. ICICASTER, Ridl.


Order XXXV. Meliaceae.

Trees, rarely shrubs. Leaves alternate pinnate (rarely simple, Turraea, Beddomea); leaflets opposite or alternate more or less at base. Flowers bisexual or unisexual regular in axillary panicles usually racemose or spicate, white or yellow. Calyx 3- to 6-lobed rarely entire or with free sepals, usually imbricate in bud. Petals 3 to 6, free, rarely connate at base. Stamens 3 to 12, insert outside a disc; filaments connate in a tube (free in Cedrela); anthers sessile in the tube hardly exsert. Disc tubular, annular or obsolete. Ovary 3-celled; ovules 2 in a cell; style 1. Stigma capitate. Fruit capsular, drupaceous or baccate with coriaceous pericarp. Seed arillate. About 700 species, mostly tropical, both hemispheres (King, Journ. As. Soc. Beng. lxiv. (2), 16).

Stamens united in a tube. Cells of ovary 1- to 2-ovuled.
Leaves simple; flowers axillary
Leaflents serrate
Leaflents entire; flowers and staminal tube elongate, narrow.
Leaves trifoliolate; fruit baccate; stigma 3- to 5-toothed
Leaves pinnate; fruit capsular; stigma 1, entire.
Petals in 2 rows; disc short below ovary
Petals in one row; disc short, annular
Disc cylindric, longer than ovary
Flowers globose; stamen-tube globose.
Petals 3; stamens 6 or 10
Petals 3; stamens 3 or 6; flowers unisexual on different trees.
Petals 5; fruit pulpy indehiscent; style none
Petals 5; fruit large pulpy indehiscent; style thick
Petals only partly joined exsert.
Leaves simple, anthers on a fleshy ring

1. Turraea
2. Melia
3. Sandoricum
4. Megaphyllae
5. Chisocheton
6. Dysoxylum
7. Amoora
8. Aphanamixis
9. Aglaia
10. Lansium
11. Walsura
12. Heynea
13. Beddomea
Cells of ovary 2- to 8-ovuled; fruit globose de-hiscing with very large coryck seeds . . . 14. Carapa
Cells of ovary many-ovuled; fruit capsular with winged seeds . . . . . . . . 15. Chickrassia
Stamens quite separate; seeds many winged . . . 10. Cedrela

1. TURRAEA, Linn.

Shrubs (or trees). Leaves alternate, simple. Inflorescence axillary on short racemes. Flowers few (usually elongate, white) or small green. Calyx small with 4 or 5 teeth. Petals 4 or 5, elongate, narrow. Staminal-tube cylindric of 4 or 5 teeth with slender filaments from the top; anthers 4 to 10 with ligulate points or apiculate. Disc none or thin lining the base of the stamen-tube. Ovary 5- to 10- or 20-celled; style filiform. Stigma discoid or capitate. Capsule 5- or many-celled. Seeds 1 or 2 in a cell, 5 or more valved; valves coriaceous or woody. Seeds oblong curved, edges winged, wing reflexed like an aril. Species 20, Africa, tropical Asia and Australia.

(1) T. breviflora Ridl.

A glabrous shrub. Leaves thin, membranous lanceolate acuminate cuspidate, narrowed and cuneate at base; nerves about 10 pairs elevate beneath, 6'5 in. long, 2 in. wide; petioles 3 in. long. Flowers 3 to 4, green on a very short 1 in. long raceme shortly pedicelled. Sepals 5, very short lanceolate acute, pubescent. Petals 5, linear blunt, green, 25 in. long. Stamens-tube stout, cylindric, shorter than petals with rather long filaments alternating with the anthers which are 10, sessile on the top of the tube, elliptic terminating with a long process. Disc short, thin lining the tube-base. Style rather stout, hairy; ovary conic. Stigma pulvinate-capitate hairy. Hab. In woods. Not common, Singapore, Serangoon (Ridley); Selangor, Kanching on limestone rocks (Ridley); Ulu Selangor (Goodenough).

This plant is very unlike any of the Asiatic species, and only somewhat resembles some of the African ones in its very short flowers. It may be generically distinct, but till fruit is known it is inadvisable to separate it.

2. MELIA, Linn.

Trees. Leaves pinnate or 2- to 3-pinnate, toothed (or entire). Flowers panicked axillary. Calyx 5- to 6-lobed, imbricate. Petals 5 to 6 spathulate. Stamens-tube cylindric, dilate both ends, 10- to 12-toothed; anthers 10 to 12. Disc annular. Ovary 3- to 6-celled; ovules 2; style slender. Stigma capitate. Fruit a drupe. Species about 12, Indo-Malaya.

Big tree.
Leaflets nearly entire; petals concave; drupe 1 to 1'5 in. long . . . . . . . . . . . . (1) M. composita
Small trees or shrubs.
Leaflets always serrate; drupe 6 in. long.
Leaflets 3'5 in. long (or less); flowers 1 in. long . . . . (2) M. Azadirachta
Leaflets 1'75 in. long, ovate cuspidate, hardly oblique; flowers 3 in. long . . . . . . . . . . . . . (3) M. Azedarach


(2) **M. Azadirachta** Linn. *Sp. Pl.* ed. i. 385; *Hook. F.B.I.* i. 544.

Large or small tree. Leaves simply pinnate. Leaflets 9 to 15 lanceolate acuminate oblique serrate 1 to 3 in. long, 5 to 1½ in. wide. Panicles slender 6 to 7 in. long. Flowers white 1 in. long. Fruit oblong, 5 to 1½ in. long. *Hab.* Malacca (Griffith). The Neem tree, introduced, no doubt, from India.

(3) **M. Azedarach** Linn. *Sp. Pl.* ed. i. 384; *Hook. l.c.* 544; *Bot. Mag.* t. 1066.

Small tree. Leaves bipinnate; leaflets 3 to 12, ovate or lanceolate acuminate serrate slightly oblique, 5 to 3 in. long, 3 to 1 in. wide. Panicles small and lax. Flowers ¼ to ¾ in. long, lilac. Stamen-tube purple. Ovary 5-celled. Drupe globose 15 in. through, yellowish then brown. Cultivated in gardens, hardly established outside. *Distrib.* India.

**Excluded Species**

**M. excelsa** Jack, *Mal. Misc.* 112; *Hook. fil. l.c.* 544, is a *Chisocheton*.

### 3. SANDORICUM, Cav.

Big trees. Leaves trifoliolate coriaceous. Flowers in axillary panicles pentamersous imbricate. Calyx cup-shaped, tube adnate to the ovary base, lobes short. Petals oblong obtuse recurved. Stamens-tube cylindric, nearly as long as the petals, 10-toothed; anthers 10 or 8 included. Disc tubular embracing the ovary and base of the style. Ovary immersed in calyx-tube narrowed upwards to the columnar style, 5-celled; ovules 2 in each cell collateral. Stigmas 5 erect. Berry globose pericarp; leathery indehiscent 3- to 5-celled. Seeds as many, with a sweet white translucent aril. Species 7, Indo-Malayan.

Stigmas united, tips recurved . . . . (1) **S. nervosum**
Stigmas distinct; stamen-tube cylindric.

| Leaves thin ovate, pubescent, 4 to 8 in. long . . . . (2) **S. indicum** |
| Leaflets thick obovate, narrow to base, glabrous, 2 to 4 in. long . . . . (3) **S. emarginatum** |
| Leaflets stiff elliptic glabrous 2 to 5 in. long; stamen-tube ventricose at top . . . . (4) **S. Maingayi** |
Sandericum.] XXXV. MELIACEÆ. 385

(1) S. nervosum Bl. Bijdr. i. 165. S. radiatum King, l.c. 22.
Tree 80 ft. tall, 2 to 3 ft. through. Leaves 6 to 12 in. long; petioles 2 to 6 in. long; leaflets broadly ovate acute, base slightly cuneate, glabrous above when adult, hairy on midrib and 8 to 10 pairs of nerves elevate beneath, 6 to 8 in. long, 4 to 5 in. across; petiolules 2 to 5 in. long, terminal one 1·5 to 2·5 in. long. Panicles 3 to 4 in. long, few-flowered puberulous. Flowers 25 in. long. Calyx cupular, teeth broad sub-acute, puberulous. Petals narrow elliptic linear. Stamen-tube cylindrical white 3 in. long, pubescent outside and in. Style dilate at base. Stigma united, tips recurved. Fruit 2 to 3 in. through, flattened globose, light orange yellow. Hab. The Kechapi, common in cultivation, orchards, roadsides.

Blume’s description is too incomplete, and specimens of a totally different Javan plant in Herb. Kew attributed to Blume are labelled nervosum. Blume gives the native name as Ki Kechapi. Miquel, however, describes the plant (S. radiatum King) as Blume’s nervosum. The oldest name and first adequate description is Melia Koetjape Burman. There can be no doubt that Blume intended the well-known Kechapi fruit by his nervosum.

(2) S. indicum Cav. Diss. vii. 359, t. 202, 203; Roxb. Corom. Pl. iii. 50, 261; Hiern, in Hook. fil. F.B.I. i. 553; King, l.c. 23.
Tree 40 to 80 ft. tall, about 18 to 20 in. through. Leaves 9 to 18 in. long; petioles 3 to 4 in. long; leaflets ovate or rounded short acuminate, base rounded or sub-cuneate glabrescent above, pubescent or glabrous except the nerves 8 to 12 pairs beneath, 4 to 8 in. long, 2 to 4·75 in. wide; petiolules 3 to 4 in. long. Panicles 2 to 6 in. long, many-flowered, more or less tomentose. Calyx sub-glabrous. Petals yellowish white oblong linear obtuse. Stamen-tube white 2 in. long, sub-glabrous outside, hairy within. Stigmas erect not recurved. Fruit globose 3 in. through, yellow flushed red. The Sentol commonly cultivated, also called Setui in Lankawi. Hab. Villages and roadsides, all over the Malay Peninsula and islands. Use: The fruit is eaten by natives, and an excellent jelly has been made of the aril by Europeans.

(3) S. emarginatum Hiern, F.B.I. i. 553; King, l.c. 22.
Glabrous tree. Leaves 6 in. long; petioles 1·5 to 4 in. long; leaflets obvate to retuse coriaceous narrowed to base; nerves faint, 5 to 6 pairs, 2 to 4 in. long, 1·25 to 3 in. wide; petiolules 35 to 5 in. long, terminal one 1 to 1·5 in. long. Panicles 2 to 3 in. long. Flowers numerous. Calyx cup-shaped puberulous very obscurely lobed, pinkish. Petals linear-oblong obtuse, white. Stamen-tube thick cylindric. Berry 3-celled, green. Hab. Forests, not common. Singapore, Bukit Timah (Ridley). Malacca (Maingay). Distrib. Borneo.

(4) S. Maingayi Hiern, l.c. i. 554; King, l.c. 22.
Tree. Leaves 6 to 8 in. long; leaflets elliptic short acuminate coriaceous glabrous, narrowed at the base; nerves 6 to 8 pairs depressed above, bold beneath, 2 to 5 in. long, 1·5 to 3 in. wide; Fl.M.P., 1.
petioles .35 in. long, terminal one 1.25 in. long. Panicles 3 in. long, slightly puberulous. Flowers .35 to .45 in. long. Calyx cup-shaped almost entire, puberulous. Petals long elliptic glabrous. Staminal-tube thick cylindric, dilated upwards. Hab. Malacca (Maingay), only known from Maingay’s specimen.

4. MEGAPHYLLEA, Hemsl.


Leaves 6 to 7 ft. long . . . . . . (1) M. perakensis
Leaves 1 to 2.5 ft. long . . . . . . (2) M. annulata

(1) M. perakensis Hemsl. Ic. Pl. 1708; King, l.c. 24.

About 40 ft. tall. Leaves 6 to 7 ft. long; leaflets oblong, fleshy-coriaceous, sub-acute, base sub-cuneate truncate 12 to 15 in. long, 3 to 4 in. wide; petiolules .35 to .75 in. long; nerves 10 to 15 pairs. Panicle 16 to 20 in. long; rachis 4-angled. Flowers 1.25 in. across, 1 in. long, cream colour. Calyx puberulous with a thick lobed ring outside. Stamen-tube shorter than petals, pubescent inside only. Fruit globose-pyriform minutely tomentose, 3 in. through, brown. Hab. Dense hill-forests. Perak, Thaiping Hills (Kunstler).

(2) M. annulata Ridl. Chisocheton annulatus King, l.c. 31.

Tree. Leaves 18 to 30 in. long; rachis pubescent, base cuneate minutely pubescent all over; leaflets 4 to 7 pairs membranous oblong or elliptic-oblong, shortly acuminate; nerves 12 to 14 pairs oblique, prominent beneath, 9 in. long, 3 to 3.5 in. wide; petiolules .25 in. long. Panicles supra-axillary puberulous, about as long as the leaf; branches short, spike-like, few. Buds clubbed, .5 to .6 in. long. Calyx campanulate tomentose, covering the petals in bud, a thickened wavy band round the middle, 4 broad teeth. Petals 6 or more, the outer three silky outside, the inner ones glabrous. Stamens 12. Ovary conic pubescent, 5-celled. Hab. Dense forest at 2000 ft. altitude. Perak, Maxwell’s Hill (Curtis).

This appears to me certainly a Megaphyllea.

5. CHISOCHETON, Bl.

Trees or shrubs. Leaves equally pinnate; leaflets opposite more or less oblique. Flowers bisexual in extra-axillary (rarely axillary) panicles or spike-like racemes. Calyx cup-shaped or cylindric entire or 4- to 5-toothed. Petals 4 to 5 (or more) usually linear, at first cohering in a tube, then recurved. Stamens-tube tubular 4- to 12-lobed at top; anthers linear included or some-
what exert. Disc short and fleshy or tubular. Ovary 2- to 4-celled; style filiform, longer than stamens. Stigma capitate or cylindric. Capsule sub-globose often beaked, thickly coriaceous 2- to 4-celled. Seeds arillate. Species about 24, Indo-Malayan.

Inflorescence shorter than leaves, few-flowered;
fruit beaked.
Flowers 5 in. long, narrow . . . . . (1) C. spicatus
Flowers 9 in. long, thick . . . . . (2) C. pauciflorus

Inflorescence shorter than leaves, many-flowered, panicked.
Fruit very large, globose . . . . . (3) C. erythrocarpus
Inflorescence very long, spike-like.
Leaflets 7 in. long, glabrous; shrub or small tree
Leaflets over 1 ft. long, strongly reticulate hairy beneath.
Flowers 1/5 in. long in distant tufts; fruit glabrous . . . . . (4) C. penduliflorus
Flowers 1 in. long, more crowded; leaves and fruit densely red tomentose
Inflorescence elongate with short branches.
Flowers large, thick, silky . . . . . (5) C. princeps
Flowers slender not silky.
Leaflets 2 by 4 in.
Leaflets 5 to 6 in. long, 3 pairs hairy beneath; fruit hairy . . . . . (6) C. rubiginosus
Leaflets 5 to 6 in. long elliptic, 3 pairs sparingly hairy beneath; fruit glabrous . . . . . (7) C. macrothrysus
Leaflets narrow, 10 pairs or more glabrous . . . . . (8) C. divergens

(1) C. spicatus Hiern, in Hook. fil. F.B.I. i. 550; King, l.c. 26.
Tree 30 ft. tall. Branchlets and inflorescence tomentose. Leaves 8 to 12 in. long; leaflets 2 to 3 pairs, membranous, oblong-lanceolate to elliptic or ovate, above glabrous, beneath midribs and nerves 5 to 6 pairs puberulous, 2/5 to 5 in. long, 1/35 to 2 in. wide; petiolules 25 to 35 in. long. Panicles axillary 2 to 12 in. long. Flowers few white 5 in. long. Calyx cup-shaped tomentose nearly entire. Petals 5, white tomentose outside narrow elliptic. Fruit narrowed at both ends, dilate in the middle, spearhead-shaped grey tomentose, 2 in. long, 75 in. through. Seeds 2. Hab. Woods; Singapore, Bukit Timah. Malacca (Maingay). Dindings, Pangkor; Pahang, Rumpin River (Foxworthy). Penang, Moniot's Road (Curtis). Native name: Sentol Kera.

(2) C. pauciflorus King, l.c. 27.
Shrub to a 20-ft. tree. Leaves 5 to 15 in. long, thinly coriaceous; leaflets 2 or 3 pairs oblong-lanceolate acuminate, base cuneate, glabrous except the midrib, and 5 or 6 pairs of nerves sometimes pubescent, 2/5 to 9 in. long, 1 to 4 in. wide; petiolules 1 to 2 in. long. Racemes or panicles 1 to 3/5 in. long, 2- to 6-flowered. Flowers white 9 in. long. Calyx tubular usually entire tomentose. Petals 4 or 6, 8 in. long. Fruit fusiform beaked green tomentose 2 in. long. Hab. Jungles in low country. Singapore,

(3) C. erythrocarpus Hiern, l.c. i. 550; King, l.c. 31.
A big tree 80 ft. tall. Branchlets velvety tomentose. Leaves 12 to 15 in. long; leaflets 4 to 6 pairs coriaceous elliptic-oblong or broad ovate, shortly blunt acuminate, base cuneate or rounded, glabrous except midrib above, pubescent beneath; nerves 6 to 7 pairs, 2.5 to 5.5 in. long, 1.35 to 2 in. wide; petiolules 2 in. long. Panicles extra-axillary 4 in. long tomentose; branches short. Flowers 35 in. long. Calyx cylindric truncate tomentose. Petals elliptic silky outside. Stamen-tube shorter silky below, villous inside, teeth 5 or 6 emarginate. Stigma cylindric. Fruit sub-globose 2 in. through minutely tomentose blood-red. Seed exarillate 1 in. long orange red. Hab. Forests. Singapore, Pulan Ubin. Malacca (Maingay). Selandor. Native name: Rongga. Use: The timber is good. The seeds are said to be poisonous.

(4) C. penduliflorus Planch. in Hook. fil. F. B. I. i. 550; King, l.c. 28.
Shrub 6 or 8 ft. to 20 ft. tall. Branches, leaf-rachis and inflorescence velvety. Leaves 15 to 24 in. long; leaflets 5 pairs elliptic-ovate to oblancoulate shortly cuspidate base narrowed; nerves 15 to 18, pairs, above glabrous or hairy, midrib always hairy beneath, 3 to 9 in. long, 1.5 to 3 in. wide; petiolules less than 1 in. long. Panicles raceme-like 2 ft. long tomentose pendulous. Flowers dull pink in scattered clusters, 75 to 1 in. long, clavate in bud. Calyx short, hairy, tubular; mouth entire or lobed. Petals 5 linear-spathulate silky. Stamen-tube narrow, nearly glabrous. Fruit fusiform pubescent. Hab. Forests. Johor, Batu Pahat; Simpai (Kelsall). Malacca (Maingay); Machap. Tebung Road (Derry). Sungei Ujong (Cantley). Dindings, Gunong Tungul, Penang (Porter); Moniot's Road (Curtis).

var. Kunstleri. C. Kunstleri King, l.c. 27. Leaves larger. Panicle with the flowers crowded at the tip only. Calyx rather larger. Hab. Perak, Goping (Künstler). Native names: Medang Kasunko; Sangol Lotong hitam.

A rather variable plant in size of leaves and amount of pubescence. It has also sometimes infertile clavate flowers with a filiform base.

(5) C. princeps Hemsl. Ic. Pl. t. 1844; King, l.c. 29.
An unbranched tree with long pendulous leaves 9 to 10 ft. long, very like those of C. rubiginosus, but larger; leaflets elliptic-oblong coriaceous, 9 to 10 in. long; nerves 15 to 30 pairs. Panicles 3 ft. or more long; branches short and stout bearing a round head of flowers 3 in. through. Calyx 2 in. long, cup-shaped truncate tomentose, much smaller than in C. rubiginosus. Petals 5, linear spatulate silky outside white nearly 1.5 in. long. Stamen-tube shorter. Fruit 2.5 in. through sub-globular. Seeds 3 to 5, 1.75 in.

(6) C. rubiginosus King, l.c. 29.

Tree 20 to 60 ft. tall, 8 to 15 in. through. Leaves 2 to 3 ft. long; rachis pubescent; leaflets 4 to 8 pairs, coriaceous oblong blunt, base sub-cordate, glabrous except nerves above, densely tomentose beneath; nerves 12 to 18 pairs with reticulations very prominent beneath, 5 to 12 in. long, 2'5 to 4 in. wide nearly sessile. Panicle spike-like about 1'5 ft. long; branches very short. Flowers 1'25 to 1'5 in. long red-silvery. Calyx cup-shaped entire or toothed tomentose outside. Petals 7, 8, or 9 linear-sub-spathulate 1 in. long tomentose outside. Stamen-tube shorter. Fruit ovoid rugose densely tomentose brown 1'5 in. long. Hab. Dense forests. Perak, Thaiiping Hills (Kunstler).

(7) C. macrothyrsus King, l.c. 33.

Tree 20 to 40 ft. tall. Leaves 2 ft. long glabrous; leaflets 2 to 4 pairs, thin coriaceous elliptic-oblong, base cuneate; nerves 10 to 14 pairs prominent beneath, 3'5 to 9 in. long, 1'5 to 3'5 in. wide; petiolules 25 to 5 in. long. Panicles 18 in. to 2 ft. long, glabrous; branches distant, short. Flowers white 3'5 in. long very short and thick. Calyx tubular 1 in. long. Petals 5, elliptic blunt, tomentose outside. Stamen-tube shorter, teeth 14 silky; anthers 7 to 8. Ovary silky. Fruit globose 1'5 in. through. Hab. Thick forests. Selangor, Ulu Selangor. Perak, lower part of Thaiiping Hill (all collectors).

(8) C. macrophyllus King, l.c. 32.

Tree 50 to 60 ft. tall or much more. Leaves 5 to 6 ft. long; rachis flattened; leaflets many, membranous oblong shortly acuminate, base round glabrous; nerves 10 to 20 pairs elevate beneath, 5 to 13 in. long, 3'5 to 4 in. wide; petiolules 3 in. long. Panicles 2 to 3 ft. long narrow; branches short distant 1 to 3 in. long. Flowers slender 5 to 6 in. long dirty white. Calyx cupular pubescent entire or 4-toothed. Petals 4, much larger linear, tips spathulate, puberulous outside. Stamen-tube shorter adherent for half its length to petals, hairy outside near the mouth, villous within, lobes 8 linear 2- or 3-toothed. Fruit sub-globular, base narrowed 3 in. through; pedicel swollen 1 in. long. Hab. Forests. Singapore, Pulau Ubin. Selangor, Batu caves (Curtis). Penang, Pulau Betong (Curtis). Distrib. Java.

(9) C. glomeratus Hiern, l.c. i. 551; King, l.c. 30.

A big tree 70 ft. tall, 10 to 15 in. through. Branchlets puberulous. Leaves 12 to 18 in. long; petioles and rachis pubescent; leaflets 2 to 3 pairs thinly coriaceous glabrous except midrib above, hairy beneath, elliptic cuspidate, base rounded; nerves 9 to 11 pairs, prominent beneath, 4 to 6'5 in. long, 1'8 to 2'5 in. wide; petiolules 1 to 15 in. long. Panicles drooping supra-axillary 18 in. long (peduncle 6 in.); branches numerous 2 to 3 in. long.

(ii) C. laxiflorus King, l.c. 33.
Small tree. Leaves 12 in. long; leaflets elliptic 3 or 4 pairs; nerves 4 or 5 pairs, hairy beneath, 4½ in. long, 3 in. wide. Panicle large with long branches 5 in. long. Flowers slender 4 to 5 in. long. Staminal tube villous outside, mouth slightly waved. Fruit globose 1 in. through crimson, glabrous when ripe, pseudo-stalk short. Hab. Forests, Pahang, Telom. Perak, Batang Padang (Kunstler); Goping and Chanderiang (Kunstler). Penang (Curtis). Lankawi, Gunong Raya (Haniff); Telaya Tujok (Curtis).

This has the broad pubescent leaflets of C. glomeratus, but is widely panicked and the ripe fruit is glabrous.

(iii) C. divergens Bl. Bijdr. 169; King, l.c. 35. C. holocalyx Hiern, l.c. i. 551.
Tree 15 to 30 ft. tall. Leaves 9 to 18 in. long, glabrous; leaflets 10 to 13 pairs thinly coriaceous oblong or oblong-lanceolate acuminate, base narrowed unequal; nerves 10 to 14 pairs, 2½ to 6 in. long, 1½ to 1½75 in. wide, dark green. Panicles about 2 ft. long much-branched pyramidal, many-flowered. Flowers 25 in. long unisexual white fœtid. Calyx cupular puberulous mouth entire. Petals 4 oblong linear blunt glabrous narrow. Stamen-tube free glabrous, teeth 6 lanceolate. Ovary hairy. Fruit ovoid or pear-shaped with or without a stout pseudo-stalk, 2 in. long, 1 in. through, glabrous when ripe, scarlet. Seed 1, black with orange aril at the base. Hab. Common in woods, Singapore, Changi, Tanglin. Johor, Kwala Sembrong (Kelsall). Malacca, Batang Malacca (Holmberg); Selandor (Cantley). Pahang, Pekan. Perak, Goping and Thaiping (Kunstler).


var. b. patens. C. patens Bl. Bijdr. 169; King (in part), l.c. 34. C. fragrans Hiern, F.B.I. i. 551.

6. DYSOXYLUM, Bl.

Trees usually small or medium-sized. Leaves pinnate; leaflets opposite or alternate coriaceous or sub-coriaceous, base oblique. Flowers paniculate racemose or spicate bisexual white. Calyx 4- rarely 5-fid or sub-entire. Petals 4- (rarely 5) valvate or slightly
imbricate recurved. Stamen-tube cylindric, mouth dentate; anthers 6, 8, or 10, included or tips exsert. Disc tubular as long or longer than the ovary. Ovary 3- or 4-celled; ovules 2 in each cell; style as long as stamen-tube. Capsule globose or pear-shaped, with a pseudo-stalk; pericarp coriaceous white, yellow or red 1- to 4-celled. Seeds arillate. Species about 100, India, Malaya and Australia.

Flowers pentameric.
Small tree; leaflets small 5 in. long elliptic cuspidate; panicle short . . . . (1) D. arborescens

Flowers tetrameric.
Inflorescence panicled; panicles slender lax few-flowered.
Leaflets linear lanceolate flowers 6 in. long; tree . . . . (2) D. angustifolium
Leaflets oblong lanceolate caudate; flowers 15 in. long; shrub . . . . (3) D. dumosum
Panicle long, flowers in dense heads, all pubescent; leaflets oblique 6 in. long, pubescent . . . . (4) D. interruptum
Panicle with many spreading branches.
Leaves coriaceous nerveless; fruit 4 in. long pear-shaped; big tree . . . . (5) D. acutangulum
Leaflets thin; nerves conspicuously winged Nerves of leaflets not winged.

Panicles short.
Flowers 1 in. long; disc hairy . . . . (7) D. thyrsoidium
Disc glabrous; flowers 25 in. long silky in distant clusters . . . . (8) D. turbinatum
Flowers 2 in. long not silky; panicles elongate; branches spreading . . . . (9) D. costulatum
Flowers 5 in. long white silky; panicle rather short sometimes reduced to a raceme (var.) . . . . (10) D. macrothyrsium
Flowers 2 in. long glabrous; panicle large spreading; branches over 1 ft. long . . . . (11) D. pulchrum

Flowers in racemes on the trunk.
Leaflets oblique ovate; flowers 35 in. long; fruit glabrous . . . . . . (12) D. cauliflorum
Leaflets oblong lanceolate cuspidate; flowers 25 in. long; fruit tomentose . . . . (13) D. flavescens
Leaflets oblong 5 by 3 in.; flowers 15 in. long; fruit tomentose . . . . (14) D. densiflorum

Flowers in spikes on branches under 2 in. long.
Leaflets opposite or subopposite.
Disc 8- to 9-toothed exceeding ovary flowers 2 in. long . . . . (15) D. rugulosum
Disc 0 or very small; flowers 15 in. long (16) D. papillosum
Leaflets remote alternate . . . . (17) D. alternatum

Glabrous tree 20 to 30 ft. tall, 4 to 6 in. through. Leaves 6 to 9 in. long; leaflets 5 to 7 membranous elliptic caudate, base


A willow-like tree, flowers smelling of garlic.

(3) D. dumosum King, l.c. 39.

Shrub 3 to 6 ft. tall, glabrous except the puberulous shoots and inflorescence. Leaves 5 to 14 in. long; leaflets 4, 6 or 10 pairs, membranous, elliptic-lanceolate acuminate, base narrowed; nerves 7 or 8 pairs faint, 2'5 to 4'5 in. long, 7'5 to 1'45 in. wide; petiolules 2 in. long. Panicles 4 in. long with few short branches and few small greenish-yellow flowers 1'5 in. long. Calyx cupular, teeth small 4 or 5. Petals 4 broad oblong obtuse. Stamen-tube shorter cylindric glabrous, teeth 8. Ovary pilose. Fruit depressed-globular glabrous 5 in. through, 4-celled. Seeds 3 or 4 black. Hab. Dense forest, on hills about 1200 to 3000 ft. altitude. Johor, Gunong Pulai. Malacca, Mt. Ophir. Pahang, Rumpin River (Foxworthy). Perak, Ulu Kerling (Kunstler). Native name: Lingga Api.

(4) D. interruptum King, l.c. 40.

Tree 30 to 40 ft. tall, 6 to 8 in. through. Young parts ashy pubescent. Leaves 24 to 30 in. long; leaflets 10 pairs membranous, oblong to elliptic-obleng acuminate, base cuneate very oblique, above glabrous except midrib and nerves, beneath pubescent; nerves 18 to 24 pairs beneath elevate, hairy, 5 to 7 in. long, 2'25 to 2'75 in. wide; petiolules 1 to 2 in. long. Panicles supra-axillary,
hairy pubescent; branches few short, upper ones in twos and threes very short distant dense-flowered. Flowers ovoid pale yellow, 1 in. long. Calyx cupular pubescent, 4 or 5 acute teeth. Petals 4 elliptic sub-acute pubescent on both sides. Stamen-tube shorter cylindric glabrous, 8 teeth bifid. Ovary pilose. Hab. At 3000 ft. Rocky jungle, rare. Perak, Larut (Kunstler).

(5) *D. acutangulum* Mig. Fl. Ind. Bat. Supp. 196, 503; King, l.c. 41; Koorders l.c. Bogor. i. 11.

A lofty glabrous tree. Leaves 6 to 12 in. long with 3 or 4 pairs of coriaceous leaflets elliptic or ovate acute or acuminate, base cuneate unequal, pistular rugose when dry pale green; nerves invisible, 2'5 to 4'5 in. long, 1'25 to 2'2 in. wide; petiolules 2 in. long. Panicles 2'5 to 4 in. long puberulous. Flowers crowded 3'5 in. long, puberulous greenish white, scented of hyacinths. Calyx very shallow with 4 deep reflexed teeth. Petals 4 oblong sub-acute. Stamen-tube shorter cylindric, teeth acute 8. Ovary pubescent. Fruit ovoid 4 in. long scarlet orange; pericarp almost woody, inside 3-celled. Seed large black, aril large orange. Hab. Forests not rare, but somewhat inaccessible. Singapore, Changi. Malacca, Batang Malacca (Derry). Perak (Scortechini). Distrib. Bangka.

Native name: Pasak Lingga.

(6) *D. venulosum* King, l.c. 42.

Tree 50 to 80 ft. tall, 18 to 24 in. through. Branchlets and leaf-rachis puberulous. Leaves 12 to 18 in. long; leaflets 7 to 14 membranous alternate oblong acuminate, base narrowed oblique glabrous; nerves 13 to 15 pairs indistinct above slender elevate beneath, 5 to 7 in. long, 1'35 to 1'75 in. wide; petiolules 2'5 in. long. Panicles extra-axillary 6 to 8 in. long nearly glabrous; branches numerous short few-flowered. Flowers 2'5 in. long light yellow. Calyx cupular teeth 4 glabrous. Petals 4 oblong obtuse densely silky puberulous. Stamen-tube as long as petals cylindric glabrous irregularly bluntly toothed. Disc lobed at edge tubular covering the hoary pubescent ovary. Fruit ellipsoid 2'5 in. long. Seeds large 2 in. long. Hab. Forests, Pahang, Telok Mengkuang, Temerloh (Foxworthy). Perak, open bamboo forests, Ulu Bubong (Kunstler). Native name: Bebeke.

(7) *D. thyrsoidenum* Griff. in Hook. Fil. F.B.I. i. 547; King, l.c. 42.

A big tree 60 to 100 ft. tall, glabrous. Leaves 12 to 16 in. long; leaflets 6 to 8 coriaceous elliptic-oblong acuminate, base narrowed oblique; nerves 6 to 8 pairs prominent beneath, 4'5 to 8'5 in. long, 1'75 to 3 in. wide; petiolules 3 in. long. Panicles pyramidal numerous 6 in. long; branches spreading. Flowers numerous fragrant white 1'5 in. long; pedicels as long. Calyx cupular 4-toothed glabrous. Petals 3 times as long, 4 oblong obtuse glabrous. Stamen-tube cylindric glabrous outside, pubescent inside. Disc tubular hairy. Ovary sub-strigose. Fruit globose shortly narrowed at base, 1'5 to 1'75 in. through, flesh
colour; pericarp almost woody. Seeds 1 in. long, aril bright red. 


(8) **D. turbinatum** King, *l.c.* 43.

Small tree 12 to 18 ft. tall, 2 to 3 in. through. Leaves 10 to 16 in. long, glabrescent; leaflets 2 or 3 pairs thinly coriaceous glaucescent beneath, elliptic abruptly bluntly acuminate, base rounded or cuneate slightly oblique, glabrous except midrib and nerves slightly hairy; nerves 8 to 11 pairs, very bold beneath, 3 to 8 in. long, 1 to 3'5 in. wide; petiolules '35 in. long. Panicles supra-axillary 3 to 11 in. long, pubescent; branches few short with 5 to 10 flowers each. Flowers silvery white, '45 in. long. Calyx cupular short with 4 distinct teeth pubescent. Petals 4 linear-oblong silky pubescent outside, nearly glabrous within. Stamen-tube cylindric, teeth 8, puberulous outside. Disc glabrous mouth pilose, much longer than ovary. Ovary pilose. Fruit depressed-globular with a short pseudo-stalk scaly, 1'5 in. long. **Hab.** Woods south of the peninsula. Singapore, Bukit Timah. Johor, Kwala Sembrong (Kelsall). Malacca (Griffith). Selangor, Klang (Foxworthy).


A glabrous tree 20 to 50 ft. tall, 8 to 10 in. through. Leaves 9 to 14 in. long; leaflets sub-coriaceous 4 pairs elliptic-oblong cuspidate, base acute oblique; nerves 10 to 12 pairs bold beneath, 3'5 to 6 in. long, 1'5 to 2'75 in. wide; petiolules '3 in. long. Panicles axillary and terminal 8 in. long; branches raceme-like. Flowers '2 in. long white alliaceous. Calyx cup-shaped short 4-toothed. Petals 4, oblong obtuse puberulous outside. Staminial tube cylindric 8-toothed glabrous outside, villous within. Ovary glabrous. Fruit depressed-globular tapering to a pseudo-stalk 1'5 in. long, 4-celled; pericarp woody, red. **Hab.** Forests in the south. Singapore, Selitar. Johor, Castlewood. Pahang River. Malacca (Maingay, Griffith); Selandor and Merlimau (Cantley). Selangor, Dusun Tua. Perak, Ulu Bubong (Kunstler). *Distrib.* Sumatra. *Native names:* Chikeh; Kulin.


Tree 30 to 60 ft. tall, 6 to 20 in. through. Leaves 16 to 18 in. long; petioles and rachis puberulous; leaflets thinly coriaceous 3 to 4 pairs, oblong-lanceolate or elliptic acuminate, base cuneate oblique glabrous; nerves 8 to 11 pairs, prominent beneath, 3 to 9'5 in. long, 2 to 4'5 in. wide; petiolules '25 to '4 in. long. Panicles racemiform slender puberulous 4 to 7 in. long. Flowers '5 in. long, white. Calyx very short broad toothed puberulous cup-shaped. Petals 4 much longer, narrow oblong sub-acute silky. Stamen-

Fig. 40.—Dysoxylum cauliflorum.

var. microbotrys Ridl.; D. microbotrys King, l.c. 48.

A small tree, glabrous except the flowers. Leaves over a foot long; leaflets 11 or more alternate coriaceous oblong blunt acuminate, base cuneate nearly equilateral; nerves 11 pairs bold beneath, 8 to 9 in. long, 3 to 3.5 in. wide; petiolules 2 to 3 in. long. Panicles large over 12 in. long, scurfy; branches long spreading. Flowers

(12) D. cauliflorum Hiern, l.c. i. 549; King, l.c. 45. (Fig. 40, p. 396.)

Tree about 60 ft. tall, 2 ft. through. Leaves 15 to 24 in. long; rachis angled; leaflets 9 to 13 opposite and alternate, oblong-elliptic shortly acuminate, base cuneate or rounded very unequal, membranous glabrous; nerves 8 to 13 pairs sub-prominent beneath, 4 to 7 in. long, 1.75 to 2.75 in. wide; petiolules 2 to 3 in. long. Spikes 1 to 3 in. long, crowded on tubercles on the lower part of the trunk, tomentose. Flowers numerous cream colour scented of almonds 3 to 35 in. long. Calyx cupular pubescent nearly entire to 4-lobed. Petals narrow linear-oblong glabrous. Stamen-tube free nearly glabrous, silky inside; teeth 8 broad. Disc tubular longer than ovary, glabrous. Ovary and style pilose. Fruit ovoid apiculate smooth glabrous, splitting into 4 valves, red. Seeds plano-convex black, aril at top and bottom red. Hab. Common in forests, Singapore, Tanglin; Bukit Timah. Malacca, Selander. Perak, Larut, and Ulu Slim (Kunstler). Penang, Government Hill 1200 ft. altitude and Batu Feringhi (Curtis). Native names: Balun hijau; Guatak; Kuleun; Jarong.

var. elongatum. D. cuneatum Hiern, l.c. i. 549; King, l.c. 47.

Differs only in the fruiting stem elongating to 12 in. long and the fruit being less pointed. Malacca (Maingay). Only a single specimen.

(13) D. flavescens Hiern, l.c. i. 549; King, l.c. 49. D. Griffithii Hiern, l.c. ; King, l.c. 46.

A tree. Leaves 12 to 18 in. long, glabrous; leaflets 9 to 13 alternate membranous elliptic to oblong-lanceolate acuminate, base rounded or shortly cuneate slightly oblique; nerves numerous, very faint, midrib only prominent, 3 to 5 in. long, 1 to 2 in. wide; petiolules 1 to 25 in. long. Flowers crowded in short racemes below the leaves on the branches, 5 to 4 in. long rather thick, pubescent. Calyx very short nearly flat 4-toothed pubescent. Petals 4 pale yellow linear-oblong pubescent outside. Stamen-tube pubescent outside, teeth 8. Disc glabrous longer than the hairy tomentose ovary. Fruit obovoid 1.25 in. long, grey-tomentose. Hab. Thick forests, Singapore, Bukit Timah; Changi. Malacca (Maingay, Griffith). Penang Hill.


Tree 20 to 40 ft. tall, 6 to 12 in. through. Leaves 15 to 20 in. long; rachis angular puberulous; leaflets alternate, elliptic or oblong acuminate, base rounded or sub-cuneate unequal, glabrous (or hairy on the lower midrib); nerves 10 to 12 pairs, 4.5 to 7 in. long,
terminal leaflet longer and obovate; petiolules 15 in. long. Spikes in clusters from the trunk or the thick branches, 1 to 2 in. long. Flowers white, 4 in. long. Calyx cup-shaped, lobes rounded 4 hairy. Petals 4 oblong 3 times as long, pubescent outside. Stamen-tube cylindric glabrous, with 8 teeth. Disc cylindric longer than the silky ovary. Fruit obovoid minutely tomentose 1.5 in. long. Hab. Hill forests, Perak, Ulu Bubong (Kunstler); Gunong Batu Putih (Wray). Distrib. Java, Sumatra.

(15) D. rugulosum King, l.c. 49.

Small tree 15 to 25 ft. tall. Leaves 8 to 12 in. long; rachis angled; leaflets 2 to 4 pairs fleshy membranous glabrous oblong ob lanceolate acuminate or cuspidate, pale minutely wrinkled when dry, narrowed to the base, 4 to 8 in. long, 1.5 in. wide. Panicles supra-axillary 5 to 1.25 in. long, sometimes reduced to racemes. Flowers small puberulous cream colour. Calyx nearly flat with 4 short teeth pubescent. Petals 1 in. long, elliptic (or ovate) obtuse puberulous. Staminal-tube cylindric puberulous outside, glabrous inside 8- or 9-toothed. Disc little longer than the puberulous ovary. Fruit pyriform apiculate with many vertical ridges puberulous, 1.24 in. long, 8 in. through, red. Hab. Mountain forests, Selangor, Sempang Mines. Perak, Larut Hills (Kunstler).

This may perhaps prove to be a variety of D. venulosum King.

(16) D. papillosum King, l.c. 50.

Shrub 6 to 8 ft. tall. Branches tomentose. Leaves 12 to 18 in. long; rachis angled tomentose; leaflets 2 or 3 pairs, much resembling those of D. rugulosum, but nerves and midrib very prominent beneath and densely hairy, shape, size and texture identical. Flowers in short 75 to 1.25 in. spikes extra-axillary tomentose; buds globose with calyx covering petals densely tomentose. Petals 4 ovate appressed pubescent outside. Staminal-tube much shorter cylindric fleshy 8-toothed. Disc, if any, very small. Hab. Perak, Ulu Kal, 1200 to 1500 ft. altitude (Kunstler).

(17) D. alternatum Ridl.

Small glabrous tree, about 8 ft. tall. Leaves 18 in. long; petioles 4 in. long; leaflets quite alternate remote oblong-lanceolate rather thin, cuspidate acuminate oblique at base, base cuneate; nerves slender 8 pairs, 5 in. long, 1.5 in. wide; petiolules 1.5 in. long. Racemes very short 1 in. long on a branch. Fruit obovoid 1.5 in. long, red glabrous on a stout 75 in. peduncle. Hab. Pahang, below Wray’s Camp on Gunong Tahan at 3000 ft. altitude in thick forest (Ridley).

This is near D. rugulosum, but the leaflets are quite different in form, and quite remotely alternate, and the fruit is larger smooth, not ribbed. It also somewhat resembles D. Beccarianum Engl. of Borneo. I have seen no flowers.
7. AMOORA, Roxb.

Trees often large. Leaves usually imparipinnate; leaflets oblique. Flowers small, in axillary fascicles often unisexual in the same panicle. Calyx 3-lobed. Petals 3 short concave imbricate. Stamen-tube sub-globose or campanulate, entire or 6- to 10-toothed; anthers 6 or 10. Disc obsolete. Ovary sessile 3-celled, cells 1- or 2-ovuled. Stigma sessile. Fruit capsular, sub-globose; pericarp coriaceous or woody 3-celled and 3-seeded loculicidally 3-valved or indehiscent. Seeds with a coloured fleshy aril usually only partly covering the seed. Species about 25, Indo-Malaya, and 1 in Australia.

Stamens 6.
Leaflets lanceolate 8 in. long red-scurfy beneath. (1) A. rubiginosa
Leaflets not red-scurfy about 5 in. long.
   Leaflets oblong lanceolate caudate oblique; flowers 2 in. long. (2) A. Ridleyi
   Leaflets ovate lanceolate falcate blunt; flowers 1½ in. long.
   Leaflets lanceolate narrow 4 by 1·25 in.; flowers very small. (3) A. cucullata
   Leaflets lanceolate 2 by ½ in.; nerves very faint. (4) A. malaccensis
Stamens 10.
   Leaflets coriaceous 6 in. long; panicle 8 to 10 in. red-scurfy. (5) A. lanceolata
   Leaflets thin 4 in. long; panicles 1 to 2 in. long
   Leaflets thin 4 in. long; panicles lax 6 in. long (6) A. rubescens
   (7) A. Maingayi
   (8) A. decandra

(1) A. rubiginosa Hiern, l.c. i. 561; King, l.c. 54.
A superb tree 100 ft. tall, 2½ to 3 ft. through. Leaves 18 to 24 in. long; leaflets 8 to 10 pairs coriaceous glabrous above rusty orange-tomentose beneath, oblong or elliptic-oblong sub-acute, base cordate; nerves 20 to 24 pairs bold beneath, 5 to 9 in. long, 1½ to 2½ in. wide; petiolules 1½ in. long, thick. Panicles bisexual 6 to 14 in. long rusty-tomentose; branches 3 to 8 in. long few; branchlets short. Flowers ovoid 1½ in. long rose pink. Calyx campanulate 3-lobed tomentose. Petals 3 obovate round, glabrous. Stamen-tube ovoid; anthers 6. Fruit sub-globose apiculate 2 to 3 in. through red. Hab. Forests, low ground. Singapore, Chan Chu Kang. Johor, Tempayan River. Malacca (Maingay, Griffith). Perak, Larut (Kunstler).

(2) A. Ridleyi King, l.c. 56.
Tree 80 to 100 ft. tall, 2 to 3 ft. through. Leaves 18 to 24 in. long; leaflets 11 to 17, glabrous sub-coriaceous oblong to ovate-lanceolate caudate, base rounded or cuneate very unequal; nerves 8 to 13 pairs, 3½ to 6 in. long, 1½ to 2 in. wide; petiolules 2½ to 4 in. long. Panicles 18 in. long on long peduncles much branched stellate-pubescent; branchlets cymulose. Flowers 2 in. long ovoid. Calyx cupular tomentose, 3 broad lobes. Petals 3 fleshy

(3) **A. cucullata** Roxb. Corom. Pl. iii. 54, t. 258; King, l.c. 55.

A glabrous tree 30 to 40 ft. tall. Leaves imparipinnate to 12 to 15 in. long; petioles 3 in. long; leaflets 5 to 9 thinly coriaceous oblong elliptic sub-falcate obtuse, base very oblique; nerves numerous indistinct, midrib bold; petiolules 18 in. long. Male panicles to 12 in. long axillary lax, corymbose. Flowers 15 in. long obovoid yellow. Calyx cupular scaly, teeth 3 blunt. Petals 3 broad elliptic. Stamen-tube obovoid; anthers 6. Female flowers larger in few-flowered axillary racemes 2 in. long. Seeds 3 oblong trigonous black, aril orange covering more than half. Hab. Tidal rivers. Singapore, Selitar; Mandai (Burkill). Johor, Tebrau River. Distrib. India, Nepal, Burma, Borneo.


Tree. Branchlets red-pubescent. Leaves 9 to 12 in. long; rachis scarby puberulous; leaflets 11 to 13 opposite elliptic to elliptic-lanceolate acuminate, base cuneate, coriaceous glabrous; nerves 16 pairs very fine, 2 to 4.25 in. long, 75 to 1.8 in. wide; petiolules 1 to 2 in. long. Panicles axillary 6 to 8 in. long with ascending branches, scurfy pubescent. Male flowers 0.5 in. long. 3 or 4 on the tips of the branchlets sessile. Calyx campanulate, lobes short rounded pustular. Petals ovate obtuse. Stamen-tube nearly as long oblong globose, mouth large, lobes short rounded; anthers 6. Fruit globose 2 in. through densely velvety tomentose; pericarp woody thick. Hab. Malacca (Maingay), Ayer Panas. Rare.

(5) **A. lanceolata** Hiern, l.c. i. 560; King, l.c. 55.

Tree glabrous except shoots and flowers pubescent. Leaves 6 to 16 in. long; leaflets 17 sub-coriaceous narrowed oblong-lanceolate acuminate blunt, base sub-cuneate; nerves 25 pairs nearly invisible, 2 to 3 in. long, 6 to 7.5 in. wide; petiolules 2 in. long. Panicles 6 to 8 in. long much branched; branches 1 to 2 in. long. Male flowers very small less than 1 in. long ovoid. Calyx cupular teeth 3 pubescent. Petals 3 puberulous. Stamen-tube globular glabrous; anthers 6. Hab. Malacca (Maingay). Only known from Maingay’s collection.

(6) **A. rubescens** Hiern, l.c. i. 561; King, l.c. 57.

Tree 30 to 60 ft. tall, 8 to 12 in. through. Leaves 18 to 30 in. long glabrous; leaflets 13 to 15 coriaceous oblong acuminate obtuse rounded or narrowed hardly oblique at base; nerves 8 to 10 pairs, hardly prominent, 3 to 6 in. long, 1.35 to 2 in. wide; petiolules 25 to 4 in. long. Panicles axillary pubescent 6 to 10 in. long;

(7) A. Maingayi Hiern, l.c. i. 562. Aglaia Maingayi King, l.c. 79.

Tree 25 to 35 ft. tall, glabrous. Leaves 4 to 6 in. long; petioles 1.5 in. long; leaflets 4 or 5 alternate fleshy membranous, oblong-elliptic acuminate blunt, base cuneate glabrous; nerves 6 to 9 pairs, 2.5 to 3.5 in. long, 1.15 to 1.5 in. wide; petiolules 1 in. long. Panicles 1 or 2 from axil, 1.75 to 2 in. long, scaly. Flowers 1.5 in. across depressed globular. Calyx 4- or 5-lobed, lobes round scaly. Petals 4 or 5 ovate glabrous. Stamen-tube depressed-globose obscurely toothed; anthers 10. Ovary 3-celled 3-ovuled. Fruit obovoid 3-celled. Hab. Malacca (Maingay). Selangor, Weld's Hill, Kwala Lumpur (Foxworthy). Perak, Larut (Kunstler). Native name: Petutu.

A rare and little known tree. It only resembles an Aglaia, to which King referred it, in its scaly flowers.


Large tree. Leaves 12 in. long; petioles 2 in. long; leaflets 7 to 13, opposite oblong cuspidate, base narrowed (lower ones nearly ovate smaller), 4 in. long, 1.5 in. wide; nerves fine 12 pairs; petiolules 0.08 in. long or less. Panicles very lax 6 in. long; branches distant 2 in. long. Flowers globose in scattered pairs; pedicels 1 in. long. Sepals very short ovate acute. Petals 5, round 0.08 in. long; anthers 10. Fruit capsular 1.5 in. through. Hab. Malacca (Maingay). Distrib. Himalayas.

There is no note as to where exactly Maingay got his specimen, and it seems a very improbable distribution.

8. APHANAMIXIS, Bl.


Stamens 3; leaflets 10 in. long . . . . (1) A. sumatrana
Stamens 6; leaflets about 4 in. long . . . . (2) A. Rohituka


A small tree up to 20 ft. tall, glabrous. Leaves 20 to 30 in.
long; leaflets 9 to 13 elliptic-oblong or oblongate, sub-coriaceous obtuse, base cuneate; nerves 9 to 20 depressed above conspicuously inarching, 6 to 10 in. long, 2 to 3·75 in. wide. Male flowers ovoid 15 in. long scattered in panicles 12 in. long; branches about 7 to 10 in. long, pink. Sepals 5 round unequal, edges fimbriate pubescent. Petals 3 round concave. Stamen-tube globular; anthers 3. Female flowers on solitary spikes. Fruit spike 2·5 ft. long pendulous. Capsule oval round pink 1 in. through; pedicel thick 2 in. long. Seeds ovoid scarlet. Hab. Hill forests 3000 to 3400 ft. altitude. Perak, Gunong Batu Putih (Wray). Penang Hill, 3000 ft. altitude. Distrib. Sumatra.

(2) A. Rohituka Pierre, Fl. For. Cochinchine sub t. 334. Amoora Rohituka W. and A. Prod. i. 119; Hiern, l.c. i. 559; Bedd. Fl. Sylv. t. 132; King, l.c. 53.
Tree 30 to 70 ft. tall. Young parts slightly puberulous. Leaves 1 to 3 ft. long; leaflets 9 to 15, sub-coriaceous oblong to elliptic-oblong shortly acuminate, base narrowed oblique; nerves 2 to 5 pairs not conspicuously inarching, 3 to 9 in. long (usually small), 1·75 to 3·5 in. wide. Male panicle much branched 12 in. long. Flowers globular less than 15 in. long numerous. Sepals reniform pubescent entire. Petals 3 or bicicular. Stamen-tube globular; anthers 6. Female flowers larger. Spike 14 to 18 in. long. Fruit globular red 1 to 1·5 in. through 3-valved. Seed oblong, aril scarlet. Hab. Forests, south of the peninsula, very conspicuous in fruit. Singapore, Toas; Selitar; Bukit Mandai. Pahang, Tabong, Endau (Evans). Malacca, Alor Gajah (Griffith); base of Ophir. Selangor, Kwala Lumpur. Perak, Goping (Kunstler); Telom. Distrib. India, Cambodia, China, Andamans, Sumatra. Native names: Kasai Paya; Pasak Lingga Merak.

9. AGLAIA, Lour.

Trees often large, bushes or shrubs, glabrous, pubescent or scaly. Leaves pinnate. Flowers in panicles usually bisexual very small, more or less globose and yellow, numerous. Calyx 5-lobed imbricate in bud. Petals 5 imbricate short. Stamen-tube sub-globose, 5-toothed or nearly entire; anthers usually 5, rarely 4 or 10 included or partially exsert. Disc minute or 0. Ovary ovoid 1- to 3-celled with 1 or 2 ovules in each cell; style short. Fruit 1- or 2-celled and seeded indehiscent with a thin pericarp. Seed with a pulpy integument. Species about 70, chiefly Malayan, some Indian, Chinese and Australasian.

Aglaia odorata Lour. Fl. For. Cochinchine 173. A shrub with deep green leaves and very small fragrant yellow flowers, a native of China, is often cultivated by Chinese for its flowers, which are put in their tea to flavour it. Native names: Belangkas or Chulan.
Stamens 5 (sp. 1–24).
Leaves quite glabrous not scaly beneath.
Leaves trifoliolate broad elliptic.
Leaves 5-foliolate; flowers glabrous; leaflets narrow lanceolate 4 by 5 in.
Leaflets lanceolate 3 pairs; flowers puberulous, broad elliptic pale; panicle large, pale.
Leaflets narrow lanceolate 4 by 1.5 in.; 3 pairs.
Leaflets 8 lanceolate.
Leaflets 8 to 10, ovate cuneate.
Leaves glabrous but scaly, not tomentose beneath.
Flowers depressed globose 0.4 in. wide; pedicels as long.
Calyx teeth 4 to 5 long spreading.
Calyx teeth 5 orbicular; leaves narrow silvery beneath.
Leaflet-bases cordate broad sessile.
Leaflet-bases narrow petiolulate.
Flowers ovoid; pedicels shorter; flowers 0.08 in. long; calyx pubescent; lobes 5 broad ovate.
Flowers 0.08 in. long; calyx 4 broad round; teeth whitish tomentose; leaflets ovate to obovate, pale beneath.
Flowers 0.05 in. long; calyx sub-glabrous, lobes free nearly to base; leaflets yellowish shining beneath.
Leaves more or less pubescent beneath; midrib sometimes nerves scurfy pubescent only.
Leaflets oblong 18 by 5 in.; panicle lax; flowers very small.
Leaflets 3 by 1.5 in., elliptic acute; panicle strict; branches short.
Leaflets 8 by 3 in.; panicle short.
Leaves pubescent or hairy on back.
Leaflets large densely tomentose on back as is panicle.
Leaflets thinly red-hairy on back.
Leaflets oblong coriaceous 7 by 2.5 in.; panicle short.
Leaflets thin coriaceous oblong cuspidate 8 by 2 in.; panicle long; flowers densely crowded in spikes glabrous; tree 80 ft. tall.
Leaflets thinly coriaceous oblong acute 9 by 4 in.; panicle long; flowers hairy; shrub 8 ft. tall.
Leaflets 7 broad lanceolate acuminate both ends 8 by 3 in.; panicles shorter; flowers crowded; fruit globose red woolly.
Leaflets numerous lanceolate base broad 6 by 1.5 in.; fruit small woolly.
Leaflets 8 pairs narrow lanceolate; flowers very small; fruit thinly red-pubescent.
Leaves and branches on both sides densely red-hairy.

(1) A. oligophylla
(2) A. salicifolia
(3) A. leucophylla
(4) A. Scortechinii
(5) A. Kingiana
(6) A. glabrisflora
(7) A. cinerea
(8) A. odoratissima
(9) A. argentea
(10) A. spiendens
(11) A. Forbesii
(12) A. Kunstleri
(13) A. squamulosa
(14) A. membranifolia
(15) A. trichostemon
(16) A. humilis
(17) A. lanuginosa
(18) A. Curtisii
(19) A. Hiernii
(20) A. tenuicaulis
(21) A. cordata
(22) A. palembanica
(23) A. Griffithii
(24) A. rufibarbis
Stamens 7 to 9.

Panicles 2 in. long; stigma long narrow 3-grooved; ovary 3-celled. (25) A. macrostigma
Panicles 2'-5 to 6 in. long; stigma thick cylindric, bilobed; ovary 2-celled. (26) A. heteroclista

(1) A. oligophylla Miq. Fl. Ind. Bat. Supp. 507; King, l.c. 63; Koorders, f.c. Bogor i. t. 84.
A small tree 15 to 20 ft. tall, 4 to 6 in. through. Leaves 5 to 9 in. long, at first puberulous; leaflets 3 to 5, membranous, obovate-oblong or elliptic acute or shortly acuminate, base cuneate; nerves 5 to 6 pairs, 3 to 6 in. long, 1'-5 to 2'-5 in. wide; petiolules 4 to 5 in. long. Panicles axillary 1'-5 to 4 in. long, scurfy to glabrous. Flowers 0'-75 in. long, globular. Calyx cupular flat puberulous, teeth round concave 5. Petals longer orbicular; anthers 5 ovate. Fruit globular, grey brown tomentose 5 to 6 in. through, on stout 1 in. pedicels. Hab. Dense low forest, rare, Singapore (Wallich 4887). Perak, Larut (Kunstler). Distrib. Burma, Sumatra.

A shrub or small tree glabrous except inflorescence. Leaves 6 in. long; petioles 75 to 1'-5 in. long; leaflets 5 sub-sessile narrow lanceolate acuminate at both ends coriaceous; nerves 12 pairs, 4 in. long, 5 to 7'-5 in. wide. Panicle 6 in. long; branches slender few scaly and scurfy. Flowers 0'-05 in. long globose yellow; pedicels longer. Calyx 5-lobed, lobes scurfy. Petals oblong glabrous. Stamen-tube oblong. Fruit elliptic nearly 5 in. long. Hab. River-banks on the east coast. Pahang, banks of Tahan River. Kelantan River at Jeram Panjang. Native name: Tada Ikan.

(3) A. leucophylla King, l.c. 66.
Tree 40 to 60 ft. tall glabrous. Branchlets ashy when dry. Leaves 2 to 3 ft. long; leaflets 11 to 13 membranous, lower ones alternate, upper opposite, oblong-lanceolate to ovate acuminate, base cuneate, pale beneath; nerves 9 to 15 pairs, 6 to 12 in. long; petiolules 25 to 6 in. long. Panicles 18 in. long. Branchlets 1 in., lowest 8 in. long. Flowers 0'-05 to 0'-75 in. long, globular yellow. Calyx of 5 acute lobes puberulous. Petals much longer orbicular yellow. Stamen-tube turbinate; anthers 5 or 6. Fruit (young) turbinate ashy-tomentose. Hab. Rare. Dense wet jungle. Perak, Larut (Kunstler).

(4) A. Scortechinii King, l.c. 64.
Tree. Shoots, petioles, inflorescence minutely brown scaly. Leaves 6 to 12 in. long; leaflets 7 to 9 opposite membranous lanceolate or oblong-lanceolate acuminate, base cuneate; nerves 7 to 10 pairs indistinct, 3'-5 to 5 in. long, 11 to 13 in. wide; petiolules 1 to 3 in. long. Panicles 7 to 9 in. long spreading lax much-branched. Flowers numerous 0'-05 in. across on longer pedicels. Calyx with 5 orbicular lobes. Petals 5 larger ovate-orbicular. Stamen-tube
depressed campanulate; anthers 5.  


Tree 30 to 40 ft. tall, 10 to 15 in. through. Leaves quite glabrous; leaflets thin coriaceous opposite 4 or more pairs lanceolate acuminate, base very shortly cuneate and hardly oblique; nerves 12 pairs very faint both sides, 3 to 4 in. long, 1'5 in. wide; petiolules '4 to '5 in. long. Panicle 9 in. long, glabrous. Branches spreading, lowest 3 in. long. Branchlets '5 in. long. Flowers light yellow '05 in. long. Calyx narrowed to a stout pedicel, lobes 4 ovate round scurfy. Petals elliptic blunt. Stamen-tube ovoid shorter, mouth open; anthers 5 large exsert. Ovary hairy.  

Hab. Rare, dense jungle near limestone rocks. Perak, Goping (Kunstler). 

Resembles A. Ganggo Miq., but the leaves are not oblique at base and the inflorescence not scaly.

(6) A. glabriflora Hiern, in Hook. fil. F.B.I. i. 555; King, l.c. 63. 

A glabrous bush or treelet up to 25 ft. tall. Leaves 5 to 8 in. long; leaflets 8 to 10 alternate membranous deep shining green ovate caudate, base narrowed or lanceolate; nerves 4 pairs, 2 to 2'75 in. long, '75 to '25 in. wide; petiolules '15 to '2 in. long. Panicles '1'5 to 4 in. long spreading. Flowers '1 in. long waxy yellow. Calyx cupular with 5 broad teeth. Petals 5 longer ovate. Stamen-tube urceolate; anthers 5. Fruit ellipsoid blunt white puberulous 1- or 2-seeded.  

Hab. Common in the south, edges of woods, Singapore, Tanglin; Changi. Malacca, Mt. Ophir (Griffith); Merlimau; Sadanen (Derry). Perak, Ulu Bubong (Kunstler). 

Native names: Pasak bras-bras; Mulupus; Pasak Merah.

(7) A. cinerea King, l.c. 66. 

A shrub or treelet, 10 to 20 ft. tall, 2 to 3 in. through. Branchlets, petioles, rachis, inflorescence brown scaly. Leaves 9 to 12 in. long; leaflets 5 to 7 thinly coriaceous, pale beneath with few rusty scales alternate distant oblong or ovate acuminate, base cuneate; nerves 8 to 13 pairs, 2'5 to 6 in. long, 1 to 1'75 in. wide; petiolules '35 to '6 in. long. Panicles slender lax scurfy 5 to 7 in. long spreading. Flowers '04 in. long globular; pedicels longer. Calyx lobes 4 or 5 unequal blunt pubescent. Petals little longer. Stamen-tube shorter campanulate; anthers 5. Fruit pyriform with a long pseudo-stalk pubescent scaly, light grey.  


The plants from the Sempang Mines have much broader leaflets than the Perak ones, in fact quite ovate, and the panicle is more scurfy, but I cannot separate them specifically.


Tree 20 to 40 ft. tall. Branchlets, petioles, rachis, and inflorescence
brown scaly. Leaves 5 to 9 in. long; leaflets 5 to 7 oblong-lanceolate, or ovate, opposite thinly coriaceous bluntly acuminate, base cuneate, glabrous above, scaly beneath; nerves 6 to 9 pairs slender, 2 to 6 in. long, 1 to 2'5 in. wide; petiolules 2 in. long. Panicles 3 to 8 in. long. Branches spreading, dense-flowered. Flowers depressed globular 0'35 in. long, on pedicels as long. Calyx small, lobes 5 orbicular scaly. Petals 5 elliptic or obovate glabrous, much longer. Stamen-tube truncate campanulate. Fruit ovoid or sub-globose brown scaly. Hab. Common in forests and lowland woods. Singapore, Bukit Mandai; Reservoir Woods. Pahang, Pulau Tumian (Kloss); Labong Endau (Evans). Malacca (Maingay); Ching (Griffith). Negri Sembilan, Tampin. Selangor, Menuang Gasing (Kloss). Perak, Larut Hills (Kunstler); Temengoh. Province Wellesley, Tasek Gelugur. Penang, Pulau Betong and Government Hill (Curtis). Distrib. Java, Sumatra. Native names: Belankas hutan (lit. King-Crab tree, as the flowers resemble its eggs); Subulat jantan; Tumilang.

(9) A. argentea Bl. Bijdr. 170; King, l.c. 70; Koorders and Valeton, Ic. Bogor. i. t. 13.

A slender tree 10 to 20 ft. tall. Shoots, leaves except upper side and inflorescence covered with pale tomentum and silvery scales. Leaves 24 to 30 in. long; leaflets 7 to 11 alternate thinly coriaceous deep green above, brown or silvery beneath, oblong-lanceolate or elliptic acuminate, base cuneate or rounded; nerves 12 to 24 pairs elevate beneath, 5 to 9 (terminal 12 to 15) in. long, 2 to 5 in. wide; petiolules 2 in. long. Panicles very dense 3 to 5 in. (in fruit 8 in.) long or more; rachis thick. Flowers numerous sessile sub-globular, 0'8 in. long. Calyx deep cut into 5 round lobes, scaly. Petals twice as long orbicular glabrous. Stamen-tube globular; anthers 5. Fruit ovoid or obovoid rusty-pubescent and scaly brown, 8 to 1'25 in. long. Hab. Widely spread, but not common, in forests by rivers. Perak (Kunstler).


Tree 30 to 40 ft. tall, 3 to 5 in. through. Leaves 12 in. or more long with distant oblong leaflets 15 to 19 narrowed slightly at each end, smooth above, silvery beneath; nerves about 20 pairs, slender, slightly elevate beneath, hardly visible above, midrib strongly elevate beneath, 6 in. long, 1'75 in. wide; petiolules 1 in. long. Inflorescence shorter than the leaves. Flowers 15 in. long. Calyx short, lobes rounded scaly. Petals elliptic-lanceolate, glabrous. Staminal-tube globose. Fruit pear-shaped silvery grey. Hab.
Dense jungle. Perak, Kwala Dipang, on limestone hills 200 to 300 ft. altitude (Kunstler). Penang, Waterfall (Curtis). *Distrib.* South Java.

(11) *A. Forbesii* King, *l.c.* 68.

Tree 40 to 80 ft. tall, 15 to 20 in. through. Branchlets, petioles (angled) and rachis densely minutely tomentose. Leaves 12 to 15 in. long; leaflets 8 to 10 membranous alternate oblong to elliptic cuspitate, glabrous above, scurfy beneath; nerves prominent 10 to 13 pairs, 3'5 to 5'2 in. long, 1'5 to 2'5 in. wide; petiolules stout grooved 2 in. long. Panicles axillary stellate-tomentose, 4'5 to 9 in. long, spreading. Flowers 0'8 in. long cream colour ovoid; pedicels shorter. Calyx campanulate of 5 deep ovate lobes pubescent. Petals 5 twice as long orbicular or ovate-ovaricel glabrous. Stamen-tube shorter turbinate globular, teeth broad 5. Fruit ellipsoid or ovoid scurfy pubescent yellow 1 to 1'25 in. long, 9 to 9 in. through. *Hab.* Dense jungle from 300 to 1500 ft. altitude. Dindings, Pangkor (Curtis). Perak, Ulu Kal and Goping (Kunstler). *Distrib.* Sumatra.

(12) *A. Kunstleri* King, *l.c.* 69.

Tree 50 to 60 ft. tall, 10 to 20 in. through, spreading. Branches, petioles, etc., brown pubescent and scaly. Leaves light green, greenish yellow beneath, 18 to 25 in. long; leaflets 5 to 15 alternate sub-coriaceous oblong-lanceolate to elliptic long-acuminate, base cuneate or round, beneath pale minutely sparsely scaly; nerves 10 to 11 pairs slightly prominent beneath, 4'5 to 7'5 in. long, 1'75 to 2'75 in. wide. Panicles 3 to 9 in. long, much and shortly branched many-flowered. Flowers bright yellow 0'8 in. long, oblong-globular. Calyx cupular tapering at base, lobes 5 blunt. Petals broad elliptic blunt. Stamen-tube globose; anthers 5. Fruit globular, waxy white, or greyish green tomentose 8 in. through. *Hab.* Dense jungle rare, Perak, Ulu Bubong (Kunstler). Selangor, Semangkok Pass.

(13) *A. squamulosa* King, *l.c.* 68.

Tree 40 to 60 ft. tall, 8 to 12 in. through. Leaves 15 to 30 in. long; petioles and rachis scurfy; leaflets 11 to 15, alternate, coriaceous dark green above, silvery yellow grey covered with minute scales beneath, oblong narrowed to base; nerves bold beneath, 10 to 12 pairs, 4 to 10 in. long, 1'75 to 3'5 in. wide; petiolules stout 3'6 to 6 in. long. Panicles axillary much branched 10 to 12 in. long, lower branches 4 in. long. Flowers ovoid 0'5 in. long yellow. Calyx of 5 round lobes free nearly to base. Petals 5, round glabrous. Stamen-tube globose; anthers 5. Fruit (unripe) narrow elliptic densely scaly. *Hab.* Dense hill jungle, rare. Perak, Ulu Bubong and Ulu Kerling (Kunstler).

(14) *A. membranifolia* King, *l.c.* 75.

Tree 8 to 20 or 30 ft. tall, 1'4 in. through. Leaves 2 to 3 ft. long glossy deep green covered with minute harsh tomentum;
leaflets 7 to 11 thinly membranous elliptic-oblong acuminate, base cuneate, dark green glabrous above, purplish sparingly minutely stellate-pubescent beneath, midrib pubescent; nerves 20 to 30 pairs bold beneath, 9 to 15 in. long, 2'75 to 5'5 in. wide; petiolules 7 in. long. Panicles stellate-hairy over 2 ft. long; branches numerous spreading many-flowered long. Flowers 0.35 in. long, depressed globular sub-sessile light yellow. Calyx rotate, lobes 5 round pubescent. Petals broad ovate or round glabrous. Stamen-tube cupular glabrous; anthers 5. Fruit ovoid or ovoid-globose with a short pseudo-stalk minutely tomentose, 1 in. long, 75 in. through, light grey. Hab. Rocky jungles, Perak, Larut Hills 1000 to 1500 ft. altitude and Kinta, Gunong Malacca (Kunstler). 

Distrib. Sumatra.

(15) A. trichostemon C.DC. Mon. Phan. Meliaceae 608; King, l.c. 77. A. edulis Hiern, l.c. i. 556.


(16) A. humilis King, l.c. 69.

Shrub or treelet 8 to 10 ft. tall. Leaves 18 to 26 in. long; leaflets alternate coriaceous glabrous except midrib and nerves beneath pubescent, oblong acuminate, base unequal cuneate; nerves 11 to 20 pairs bold below, 4 to 9 in. long, 1'75 to 3'5 in. wide; petiolules 25 to 6 in. long. Panicle 3 to 6 in. long; branches very short few-flowered. Flowers globular 05 in. long. Calyx campanulate, teeth 5 rounded pubescent scaly outside. Petals elliptic. Stamen-tube obovoid globose; anthers 3. Fruit globular-obovoid 2-celled ashy pubescent. Hab. Selangor, Ulu Selangor (Kunstler). Perak (Wray).

(17) A. lanuginosa King, l.c. 71.

Tree 50 to 70 ft. tall, 15 to 20 in. through. Branches, rachis, inflorescence rusty-tomentose. Leaves 2 to 4 ft. long; leaflets coriaceous dark green above, soft velvety brown beneath; nerves 26 to 36 pairs bold beneath, 5 to 15 in. long, 2 to 3'5 in. wide; petiolules 25 to 4 in. long. Panicles 12 in. long; branches few short

(18) **A. Curtisii** *King, l.c. 71.*

Tree 60 to 80 ft. tall, 2 to 3 ft. through. Leaves 10 to 30 in. long; leaflets coriaceous 11 to 15, glabrous dark green above, brown tomentose beneath, sub-opposite oblong or elliptic acuminate; nerves 16 to 24 bold beneath, 6 to 9 in. long, 2 to 4 in. wide; petiolules 2 to 35 in. long. Panicles 6 to 8 in. long; branches few short erect, scurfy puberulous. Flowers reddish brown globose sessile over 1 in. through. Calyx lobes 4 round tomentose. Petals 5 glabrous. Stamen-tube sub-globular. Fruit pear-shaped rusty puberulous, 1'5 in. long, 1'25 in. wide. *Hab.* Forests, Dindings, Pangkor (Curtis). Perak, Batang Padang district (Kunstler).

(19) **A. Hiernii** *King, l.c. 74.*

Tree 80 to 100 ft. tall. Petioles and inflorescence densely shortly tomentose. Leaves 14 to 18 in. long; leaflets 7 to 9 opposite oblong or oblong-lanceolate acuminate, base cuneate sub-coriaceous above, glabrous except the hairy midrib and nerves, beneath sparsely red stellate-hairy (midrib densely hairy) and entirely scaly; nerves 13 to 22 pairs bold beneath, 4 to 6 in. (terminal one 7 in.) long, 1'75 to 2'25 in. wide; petiolules 1'5 in. long. Panicle 8 to 13 in. spreading. Flowers in dense, terminal spikes globular '04 in. through, sessile deep yellow glabrous. Calyx lobes 4 or 5 deep cut rounded. Petals round unequal. Stamen-tube cup-shaped wide-mouthed; anthers 5. *Hab.* Forests. Johor, Hulu Sembrong (Kelsall). Malacca (Maingay). Perak, Goping (Kunstler). *Native name:* Sapo Lilin.

This differs from *A. cordata* in its much larger size, stiffer, less hairy leaves and glabrous flowers.

(20) **A. tenuicaulis** *Hiern, l.c. i. 556; King, l.c. 76.*

Shrub or treelet 10 to 12 ft. tall, 2 to 3 in. through. Leaves 3 ft. long; petioles, rachis, branchlets and panicles densely rufous-tomentose; leaflets membranous oblong to elliptic acuminate or cuspidate, base cuneate, above glabrous, beneath red stellate-pubescent; nerves 15 to 20 pairs, 6 to 12 in. long, 2'5 to 4'5 in. wide; petiolules stout 3 to 3'5 in. long. Panicles 12 in. long; branches spreading dense-flowered. Flowers '05 in. long, globular; pedicels longer. Calyx pubescent outside, beneath cupular teeth 5 acute. Petals ovate glabrous. Stamen-tube globular; anthers 5. Fruit obovoid densely minutely rusty stellate-tomentose 4 in. long. *Hab.* Dense old jungle. Selangor, Kwala Lumpur. Dindings. Perak, Larut up to 2000 ft. altitude and near Ulu Kerling (Kunstler). Penang, Government Hill to 3000 ft. altitude (Maingay); Pulau Betong (Curtis). *Distrib.* Sumatra. *Native name:* Kasip Bukit.
(21) **A. cordata** Hiern, l.c. i. 557; King, l.c. 73.

Tree 20 to 30 ft. tall, 3 to 4 in. through, resembling *A. palembanica*, but leaves larger 7 to 15 in. long. Leaflets 7 to 9 with 10 to 14 pairs of nerves, 1.75 to 6 in. long, 1.75 to 2.25 in. wide. Panicles axillary; branches short dense, spike-like. Flowers 0.35 in. through sub-sessile. Fruit globular or ovoid, densely brown tomentose, 5 to 0.65 in. through. *Hab.* Common up to 1500 ft. altitude in forests. Singapore, Selitar. Malacca, Bukit Panchur; Jasin (Derry). Perak, Thaiiping; Temengoh. Penang Hill (Burkill and all collectors).

(22) **A. palembanica** Miq. Flor. Ind. Bat. Supp. 507; King, l.c. 72; Hiern, F.B.I. i. 557.

Shrub or tree up to 20 ft. tall. Shoots, petioles, rachis brown-tomentose. Leaves 4 to 9 in. long; leaflets 5 to 9 sub-opposite membranous oblong-lanceolate to ovate acuminate, base cuneate, terminal one longer and more narrowed at base, glabrous above, stellate-hairy beneath, midrib densely brown-velvety; nerves 6 to 11 pairs, 1.75 to 5 in. long, 0.65 to 1.75 in. wide; petiolules 1.15 in. long. Panicles 1.5 to 4 in. long; branches short. Flowers globular 0.25 in. across. Calyx-lobes 5 narrow acute tomentose outside. Petals obovate elliptic glabrous. Stamen-tube glabrous, mouth entire. Fruit ellipsoid 0.75 in. long, 0.6 in. wide brown-tomentose. *Hab.* In woods up to 2500 ft. altitude common, Singapore, Stagmount. Malacca, Batang Malacca (Derry). Selangor, Sepang. Perak, Sungkei (Burn-Murdoch); Relau Tujor (Wray); Maxwell’s Hill. Penang to 2000 ft. altitude. Lankawi, Gunong Raya (Haniff). *Distrib.* Bangka, Sumatra, Borneo.

(23) **A. Griffithii** Kurz, Journ. As. Soc. Beng. xlv. 146; King, l.c. 75.

Tree 30 to 50 ft. tall. Branchlets, petioles, inflorescence densely stellate-pubescent. Leaves 12 to 18 in. long; leaflets 13 to 19, opposite or sub-opposite narrow elliptic or oblong-lanceolate acuminate, base rounded or sub-cuneate, above glabrous except midrib, beneath sparsely stellate-pubescent pale, beneath midrib and 10 to 12 pairs of bold nerves tomentose, 2.5 to 5 in. long, 1 to 1.4 in. wide; petiolules 1.15 in. long. Flowers 0.25 in. wide. Calyx pubescent outside, lobes deep 5. Petals twice as long glabrous. Staminal-tube shorter glabrous; anthers 5. Fruit globose 0.4 in. through, sparsely pubescent brown. *Hab.* Forests, Malacca (Main-gay). Pahang, Rumpin (Watson); Perak, Larut Hills (Kunstler). Penang Hill and Muka Head (Curtis). *Native name:* Balun hijau.

King’s description of the fruit of this belongs to another species.


Big tree. Branches densely covered with red-stellate hairs.
Leaves 12 in. or more long; petioles 6 to 9 in. long, densely reddish-hairy; leaflets 14 pairs sessile oblong cupuliform membranous, hairy on both sides, densely on the midrib beneath, 4 to 6 in. long, 3 in. wide. Panicles 6 to 12 in. long, much-branched densely hairy. Flowers shortly pedicelled. Calyx lobes ovate acute with tufts of hairs longer than the smaller orbicular glabrous petals. Stamen-tube semi-globose; anthers 5. Malacca (Cantley). *Native name:* Tambu Gulong. *Use:* Timber used for beams. Fruit, sweet edible.

No specific locality is given by Cantley, and the plant has never been found again, striking as its appearance must be.

(25) **A. macrostigma** King, *l.c.* 78.

Tree 40 to 60 ft. tall, 8 to 12 in. through. Leaves 2½ to 4 ft. long; petioles very long and like rachis and inflorescence covered with scales; leaflets 15 to 17 opposite membranous elliptic to oblong acutely acuminate, base rounded glabrous; midrib and nerves 12 to 20 pairs beneath scaly, prominent, 5 to 10 in. long, 2 to 4 in. wide; petiolules 5 to 7 in. long. Panicle 12 in. long; branches stout many-flowered. Flowers obovoid 08 in. long; pedicels tomentose. Calyx cup-shaped with 4 broad teeth, rusty tomentose. Petals glabrous imbricate, 2 outer ones orbicular, 3 inner smaller elliptic. Stamen-tube cupular 8- to 10-toothed; anthers 7 or 8 exserted. Stigma large 3-angled. Fruit elliptic-obovoid with short pseudo-stalk, scaly 1½ in. long, 1 in. through. *Hab.* Mountain forests, Perak, Larut Hills 1000 to 1500 ft. altitude (Kunstler).

(26) **A. heteroclita** King, *l.c.* 78.

Tree 30 to 40 ft. tall, 5 to 7 in. through, glabrous except inflorescence and underside of leaves. Leaves 18 to 30 in. long; leaflets 8, 10 or 11 alternate thinly coriaceous light green, oblong to elliptic-oblong acuminate, base cuneate, a few rusty stellate scales beneath; nerves 12 to 16 pairs hardly elevate beneath, 4 to 7 in. long, 1½ to 2½ in. wide; petiolules 3½ to 7½ in. long. Panicles 2½ to 6 in. long; branches stout erect dense-flowered. Flowers 12½ in. long sub-globular on shorter thick pedicels waxy deep yellow. Calyx fleshy gland-dotted, corrugate, lobes 5 broad rounded. Petals 5 elliptic blunt. Stamen-tube globular-cylindric; anthers 7 or 8. Fruit pear-shaped apiculate scaly tomentose, 1 in. long, 1½ or 2-seeded. *Hab.* Mountain woods. Perak, Gunong Batu Putih (Wray); Ulu Kal (Kunstler).

10. **LANSIUM,** Jack.

Trees. Leaves pinnate; leaflets few coriaceous. Flowers bisexual small on spikes, racemes or panicles. Sepals round imbricate. Petals round concave imbricate. Stamen-tube globose, mouth entire or crenulate; anthers 10, usually in 2 rows. Disc
obsolete. Ovary globose 3- to 5-celled, cells 1- to 2-ovuled; style very short thick. Stigma 3- to 5-lobed. Fruit baccate 1- to 5-celled; cells 1- or 2-seeded. Seed oblong in a pulpy aril. Species 4, Indo-Malayan.

Leaflets 5 to 10 in. long; flowers nearly sessile, on stem and branches
Leaflets 4 to 5 in. long; flowers distinctly pedicelled on branches
Leaflets lanceolate blunt 2 to 3 in. long; flowers on slender axillary racemes

(1) **L. domesticum** Jack, *Trans. Linn. Soc.* xiv. 115, t. iv. fig. 1; *Hiern*, l.c. i. 558; *King*, l.c. 81.

Tree about 20 to 30 ft. tall. Bark pale. Leaves 12 to 18 in. long; leaflets alternate oblong elliptic or obovate, abruptly short acuminate, base narrowed, light shining green glabrous; nerves 10 pairs prominent beneath, 5 to 10 in. long, 2'75 to 4 in. wide; petiolules 5 in. long. Flowers yellow in pubescent spikes, long fascicled or solitary from the old wood sessile. Calyx fleshy puberulous, lobes 5 round. Petals glabrous. Stamen-tube sub-globose; anthers in 1 row. Ovary tomentose 5-celled. Berry oblong ovoid or globose, finely tomentose cream buff, 1 to 1'5 in. long; pericarp leathery. Seeds 1 or 2 thin, with several abortive ones embedded in a translucent sweet aril. There are two forms, *Langsat*, with usually oblong fruit and thin rind containing a milky latex, and the *Duku*, more globose with thick rind and no latex, cultivated only. *Hab.* The *Langsat* is cultivated, and wild in forests, Malacca, Selandor; Mt. Ophir woods. Selangor, Batu Caves; Bukit hitam; Ginting Bidai. Perak, Blanda Mabok (Wray). Penang. *Native name:* *Langsat* hutan. *Distrib.* Malay islands.

var. **pubescens** Koorders. Leaves, underside and flower rachis pubescent. Selangor, Kwoa Lumpur, Weld's Hill (Foxworthy).

(2) **L. pedicellatum** *Hiern*, l.c. i. 558; *King*, l.c. 82.

Tree. Branchlets scaly. Leaves 9 to 12 in. long; leaflets 3 or 5 alternate or sub-opposite thinly coriaceous elliptic shortly sharp acuminate, base cuneate oblique glabrous; nerves 8 to 10 pairs, 3 to 6 in. long, 1'5 to 2'5 in. wide; petiolules 15 to 25 in. long. Female flowers in racemes axillary 1 to 2 in. long. Flowers on pedicels 1 to 1'5 in. long. Ovary minutely tomentose 4-celled. Stigma sessile. Fruit young fleshy tomentose. *Hab.* Malacca (Maingay). A very dubious plant only once collected.

(3) **L. cinereum** *Hiern*, l.c. i. 550; *King*, l.c. 81.

Tree. Branchlets tawny-pubescent, eventually ashy. Leaves 3 to 5 in. long; leaflets 3 to 5 opposite sub-coriaceous elliptic-oblong cuspidate blunt, base acute glabrous; nerves numerous fine obscure, 2 to 3 in. long, 8 to 1'5 in. wide. Spikes 1'5 in. long, slender glabrous. Flowers distant few 1'5 in. long, sessile. Calyx cupular with 5 rounded teeth puberulous. Petals obovate glabrous;
anthers oblong mucronate. Ovary globose pubescent 5-celled. *Hab.* Malacca (Maingay), only once collected.

11. WALSURA, Roxb.

Trees. Leaves 1- to 9-foliolate; leaflets opposite glaucous beneath. Panicles axillary and terminal. Flowers small bisexual. Calyx short 5-lobed, imbricate in bud. Petals 5 ovate oblong. Filaments 10 or 8, linear free or connate in a tube; anthers terminal or inserted in a notch in the filament. Disc annular. Ovary short 2- or 3-celled, imbedded in the disc; ovules 2 in each cell; style short. Stigma capitate 2- or 3-toothed. Fruit baccate tomentose indehiscent 1- rarely 2-celled and seeded. Seed arillate. Species 12, Indo-Malayan.

Filaments united near base;
Leaflets 5 to 9; panicles short 2 to 3 in. long . . (1) W. multijuga
Leaflets 5; panicles 7 to 14 in. long.
Nerves 6 pairs
Nerves 8 to 10 pairs . . . . . . (2) W. villosa
Filaments united half-way.
Leaflets 2 pairs; panicles 12 to 14 in. long . . (4) W. tenuifolia

(1) W. multijuga King, l.c. 83.

Tree 15 to 30 ft. tall, 2 to 3 in. through. Branchlets, rachis, inflorescence puberulous. Leaves 5 to 10 in. long; leaflets 5 to 9 sub-coriaceous lanceolate to ovate acuminate, base narrowed or rounded oblique; nerves 5 to 6 pairs, 2'5 to 5 in. long, '75 to 1'5 in. wide; petiolules '15 to '2 in. long. Panicles umbellate cymose axillary and terminal; peduncles 1 to 2 in. long, heads 1 in. across. Flowers white '1 in. long; pedicels shorter. Calyx teeth broad spreading. Petals 5 broad elliptic obtuse. Stamens 10 pink; filaments united in a tube at the base, above free, glabrous outside. Ovary glabrous. Fruit ovoid or globose apiculate rusty-tomentose '5 in. long dark green velvety. *Hab.* Dense lowland forest. Malacca, Jus (Cantley). Perak, Larut and Ulu Bubong (Kunstler); Waterfall, Thaiping (Wray). *Native names:* Pasak Lingga Merah; Laka Laka Jantan. *Distrib.* Borneo.

(2) W. villosa Wall. Cat. 1264; Hiern, in Hook. fil. F.B.I. i. 564.


(3) W. neurodes Hiern, l.c. i. 564; King, l.c. 83.

Tree. Branchlets puberulous, otherwise glabrous. Leaves 6 to
8 in. long; leaflets 5, coriaceous glaucous beneath, elliptic-oblong shortly blunt acuminate, base cuneate or round; nerves 8 to 10 pairs elevate beneath, 2 to 4 in. long, 1 to 2 in. wide; petiolules ‘25 to ‘35 in. long. Panicles 7 to 12 in. long many. Flowers not numerous at tips of branches ‘15 in. long. Calyx teeth ovate. Petals puberulous outside elliptic. Stamens 10 pubescent slightly united below. Ovary pubescent. Fruit elliptic-ovoid, tip round, minutely puberulous ‘65 in. long. Hab. Malacca (Maingay, Griffith).


Tree, glabrous except the flowers. Leaves 5 in. long; leaflets opposite 2 pairs thin membranous, glaucous beneath, elliptic acuminate acute, base rounded or shortly cuneate; nerves about 8 pairs elevate beneath, reticulations fine conspicuous, 2 to 4 in. long, 1 to 1½ in. wide; petiolules ‘2 in. long. Panicles 12 to 14 in. long lax with distant branches 1½ in. long, glabrous below, scurfy above. Flowers few ‘2 in. long. Calyx minutely puberulous short, 5 acute lobes. Petals oblong obtuse puberulous outside, glabrous within. Stamens connate for half their length pubescent on both sides; filaments linear-subulate. Ovary cylindric glabrous; style stout shorter than the stamens. Disc thick fleshy annular. Hab. Forests. Rare, Perak, Kamuning (Ridley).

### 12. **HEYNEA**, Roxb.

Trees or shrubs. Leaves 5- to 11-foliolate; leaflets opposite. Panicles terminal and axillary corymbose pedunculate. Flowers small bisexual. Calyx 4- to 5-fid imbricate. Petals 4 or 5 oblong imbricate. Stamen-tube 8- to 10-fid, lobes linear bidentate; anthers between the teeth. Disc annular. Ovary immersed in disc 2- or 3-celled, ovules 2 in each cell; style short. Fruit capsular 1-celled, 2-valved. Seed 1, aril thin white. Species 1 to 3, Indo-Malaya.


Tree 15 to 20 ft. tall. Leaves 6 to 16 in. long; leaflets ovate to ovate-lanceolate acuminate, base round or cuneate, glaucous beneath or not; nerves 6 to 8 pairs, 2½ to 5½ in. long, ‘8 to 2½ in. wide; petiolules ‘15 to ‘45 in. long. Panicles glabrous 6 to 9 in. long; peduncle 4 to 6 in. long. Flowers white ‘15 in. long. Fruit ovoid beaked. Hab. Perak, Larut (Kunstler). Penang, Penara Bukit, and Balik Pulau (Curtis). var. **multijuga** (leaflets 11). Probably introduced only. Native name: Manchabei. Distrib. India, Sumatra.


Trees or shrubs with simple or pinnate leaves. Flowers bisexual small. Sepals 5. Petals 5 orbicular imbricate. Stamens 5; anthers lanceolate connivent into a cone sub-sessile in a fleshy
ring composed of the filaments and disc. Pistil adnate to the
disc; ovary hairy. Species 2 or 3, S. India, Malaya.


A large tree. Young parts ferruginously tomentose. Leaves
simple glabrous when adult, thinly coriaceous ovate to elliptic-
ovate sub-acute, base narrowed, 4 to 8 in. long, 2'5 to 4 in. wide;
petioles '25 to 1 in. long. Flowers 1 in. long greenish white in
racemes 2 or 3 axillary, tomentose 2 to 6 in. long. Sepals oblong
tomentose. Petals glabrous larger. **Hab.** Dense forests. Perak,
Ulu Batang Padang, near the Telom Valley (Ridley).


Glabrous littoral trees. Leaves 2- to 4- or 6-foliolate; leaflets
opposite coriaceous; nerves faint. Panicles lax, axillary cymose.
Flowers small white bisexual. Calyx 4-fid. Petals 4. Stamen-
tube urceolate-globose 8-dentate, teeth bipartite; anthers 8 included
alternating with teeth. Disc fleshy cup-shaped. Ovary 4-celled,
4-grooved; cells 2- to 8-ovuled; style short. Stigma discoid.
Fruit large globose 4-celled 6- to 12-seeded; pericarp leathery
brown dehiscing by 4 valves. Seeds large angular irregular, testa
thick soft spongy. Species 6, tropics.

Leaves obovate blunt narrowed to the base . . (1) **C. obovata**
Leaves ovate sub-acute broad at base . . (2) **C. moluccensis**

(1) **C. obovata** Bl. *Bijdr.* 170; **King**, *l.c.* 87.

Low tree. Leaves 3 to 6 in. long; leaflets bright green, 1 or 2
pairs obovate, 3 to 3'75 in. long, 1'5 to 2 in. wide; petiolules '2 to
35 in. long. Panicles 1'5 to 2'5 in. long stout. Flowers few '25 in.
long; pedicels '3 to '5 in. long. Calyx lobes rounded. Petals
white broad elliptic imbricate. Fruit the size of an orange. **Hab.**
Tidal rivers, common. Singapore, Pasir Panjang. Johor, Pulau
Kukub. Pahang. Selangor, Klang (Foxworthy). Province Welles-
ley (Brooks). *Distrib.* Bengal, Malay islands, Africa. **Native
name**: Nireh Bunga.

(2) **C. moluccensis** Lam. *Encycl. Method.* i. 621; **King**, *l.c.* 87.

Tree usually about 40 ft. tall, 1 to 2 ft. through with flaking
bark, much branched. Leaves 4 to 10 in. long; leaflets 2 pairs
coriaceous dark green ovate to ovate-oblong sub-acute, base broad,
2 to 4 in. long, 1'5 to 1'75 in. wide. Panicles 3 to 5 in. long slender
with spreading branches. Petals white rather broader than in
**obovata**. Fruit large globular brown, about 6 in. through or more.
**Hab.** Very common in all tidal forests and mangroves. Whole
**Native name** : Nireh Batu. **Use** : Timber very hard, as a rule too
short and bent for beams and hard to cut, valued as firewood.
Bark astringent, valued for dysentery.


(i) C. tabularis Juss. Mem. Mus. xix. 131, t. 22, f. 27; Wight, Ill. t. 56; King, l.c. 88.

Tall tree. Leaves 12 to 18 in. long; leaflets 10 to 16 ovate to oblong acute or acuminate, base rounded on one side, narrowed on the other, glabrous above, velvety beneath (var. velutina) or glabrous, 2 to 5 in. long, 1 to 2.5 in. wide; petiolules 1.5 to 3.5 in. long. Panicles 6 in. long pubescent. Flowers white 1.4 to 1.5 in. long pubescent. Capsule ovoid 1.75 in. long. Seeds 0.65 in. long. Hab. Malacca, Selandor (Cantley). Penang, Balik Pulau (Curtis). Possibly introduced from India. Distrib. India, China. Native names: Chenana Putih; Suntang; Suntang Putih. Use: Timber for building. Bark a decoction used for fever.

15. CEDRELA, Linn.

Tall tree. Leaves pinnate; leaflets numerous opposite or sub-opposite entire or serrate. Panicles sub-terminal. Flowers 5-merous white. Calyx short 5-lobed. Petals oval. Stamens 5 free on a thick 5-lobed disc. Ovary sessile on the disc 5-celled, 8 to 12 ovules in each cell in 2 rows; style filiform. Stigma discoid. Capsule thinly woody 5-celled, 5-valved. Seeds flat winged at each end. Species 16, tropics of both worlds.

(i) C. febrifuga Forst. Diss. Cedrel. 16; King, l.c. 89.

Tree 80 to 100 ft. tall, 2 to 3 ft. through. Leaves 15 to 24 in. long glabrous; leaflets 7 to 10 pairs oblique ovate-oblong membranous, base broad unequal; nerves 12 to 15 pairs, 3.5 to 4.25 in. long, 1.75 to 2 in. wide; petiolules 2 in. long. Panicles 12 to 18 in. long lax, glabrous. Flowers 2 in. across pubescent. Capsule 1 in. long, pale lenticellate. Seeds 0.6 to 0.7 in. long. Hab. Perak, Ulu Bubong, dense jungle (Kunstler). Penang (Curtis). Distrib. India, Java. Probably introduced from India by Tamils.

Order XXXVI. CHAILLETIACEÆ.

Shrubs or trees often scandent. Leaves simple alternate coriaceous. Stipules 2. Flowers small uni- or bi-sexual, white or yellow, in axillary rarely terminal cymes. Sepals 5 more or less connate at base imbricate. Petals 5, bilobed or notched. Stamens
5, sub-perigynous free or adnate to corolla; anthers oblong, connective often thickened at the back. Disc of 5 glands or scales or a 5-lobed cup. Ovary free pubescent or villous 2- or 3-celled; ovules anatropous, pendulous in pairs from the top of the cells; styles 1 to 3. Stigmas simple or capitate. Drupe pubescent or hispid oblong, transversely oblong or didymous compressed; epicarp dehiscent or not, 1- to 3-celled. Seeds pendulous; testa membranous albuminous. Tropics generally, 3 genera and about 40 species (King, Journ. As. Soc. Beng., lxiv. 90).

**CHAILLETIA, DC.**

Shrubs often climbing. Sepals unequal united at base, blunt. Petals 5 bilobed free, narrow. Stamens sometimes adnate to petals at base. Disc of 5 quadrate glands opposite the petals. Species about 30, chiefly American, some in Asia and Africa.

Shrub. Leaves quite glabrous; cymes globular very small; leaves thin elliptic
Climber. Leaves coriaceous ovate-elliptic; nerves prominent
Climber. Leaves coriaceous; cymes lax small; nerves faint
Climber. Midrib pubescent on back; leaves elliptic cuspidate, thin coriaceous
Climber. Panicles lax peduncled. Leaves lanceolate-oblong glabrous except midrib
Climber. Leaves oblong 3 in. long nearly glabrous
Climber. Leaves ovate-lanceolate broad 5 in. long tomentose beneath; cymes large
Shrub. Whole plant and large fruit rough hairy, erect

(1) **C. tenuifolia** King, l.c. 91.
Shrub 6 ft. tall to treelet 15 ft. tall. Leaves thin membranous wrinkled elliptic-lanceolate tapering to both ends glabrous; nerves 5 to 8 pairs bold beneath, 6 to 8 in. long, 2'25 to 2'75 in. wide; petioles strigose '15 in. long. Cymes globular '25 to '4 in. wide; pedicels '15 in. long strigose. Flowers '05 in. wide. Sepals elliptic obtuse, silky outside. Petals shorter broader, glabrous slightly bifid sub-acute. Stamens shorter silky; anthers oblong. Ovary ovoid silky. Fruit deeply 3-lobed '6 in. long, '75 in. wide, light yellow. *Hab.* Rare 300 to 2000 ft. altitude in rocky jungle. Perak, Larut Hills and Selama (Kunstler).

(2) **C. tesselata** King, Journ. Roy. As. Soc. Beng. lxv. 515.
Climber 10 to 15 ft. long, glabrous. Leaves coriaceous elliptic or elliptic-oblong, shortly abrupt-acuminate, base narrowed; nerves 6 to 7 pairs inarching far from edges, 4'5 to 5 in. long, 2'5 to 3 in. broad; petioles '4 in. long transversely rugose. Cymes in pairs much branched '5 to 1 in. across. Sepals oblong obtuse tomentose outside, glabrous inside. Petals glabrous obovate subacute deeply bifid, lobes oblanceolate. Stamens longer glabrous,
connective orbicular; anther-cells on edge. Ovary ovoid woolly. 
Hab. Perak, Trong (Wray).

(3) **C. Laurocerasus** PlANCH. In Hook. Fil. F.B.I. i. 572; King, l.e. Journ. As. Soc. Beng. lxiv. 93.

A scandent glabrous shrub, 30 to 40 ft. long. Leaves coriaceous elliptic blunt acuminated base narrowed, shining dark green; nerves 7 to 8 pairs, 3·5 to 4·5 in. long, 1·5 to 2·5 in. wide; petioles 1 in. long. Cymes globose few-flowered 3 in. through, pedunculate. Flowers 1·5 to 2 in. wide. Sepals hoary outside, glabrous inside, ovate or orbicular. Petals longer glabrous, cut half-way down

![Fig. 41.—Chailletia Laurocerasus.](image-url)


(4) **C. Helferiana** Kurz. Journ. As. Soc. Beng. xli. (2), 297; King, l.e. 92.

Scandent shrub 6 to 8 ft. long. Leaves thinly coriaceous elliptic abruptly acutely acuminated, base cuneate, glabrous, midribs strigose; nerves 7 or 8 pairs faint, 4 to 6 in. long, 1·25 to 2·25 in. wide; petioles 2·25 in. long strigose. Cymes 1·5 in. across; pedicels

(5) C. Hookeri King, l.c. 91.
A climber nearly glabrous. Leaves coriaceous oblong obtuse to oblong-lanceolate, base slightly narrowed blunt, glabrous except on the midrib, finely reticulate and shining on both sides; nerves 8 to 10 pairs, 4.5 to 6.5 in. long, 1.5 to 2 in. wide; petioles 5 to 7.5 in. long, strigose. Cymes in pairs dichotomous tomentose 1 to 2 in. across; peduncles 5 to 7.5 in. long. Flowers 1 in. long. Sepals oblong blunt silky-tomentose outside, glabrous inside. Petals glabrous shorter broader, deeply cut into 2 obovate over-lapping lobes. Stamens as long glabrous; anther-cells on the edge of connective. Hab. Very rare, forests. Perak (Scortechini). Penang (Porter, Wallich, 7443).

(6) C. sordida Ridl. C. deflexifolia var. sordida Hook. fil. F.B.I. i. 571.
Climbing shrub. Leaves elliptic narrowed at the base shortly acuminate, glabrous and shining above, except the pubescent midrib and 4 to 5 pairs of slender nerves, 2.75 to 4.5 in. long, 1.5 to 2 in. wide; petioles 1 in. long pubescent. Panicles in pairs axillary 1 in. long or less, scurfy puberulous, often sub-globose and nearly sessile when young. Sepals elliptic obtuse hairy. Petals yellow. Fruit obovoid dehiscing into 3 lobes at the tip, yellow tomentose 6 in. long. Hab. South of the peninsula. Singapore (Wallich 9016, Maingay). Bajau River. Johor, Kota Tinggi.

This has been confused with the next, but differs in its leaves being always much smaller and narrowly elliptic.

Climber 30 to 70 ft. long. Branchlets, underside of leaves, and cymes all tomentose. Leaves thinly coriaceous elliptic-ovate retuse, above glabrous; nerves 5 to 7 pairs, 4.5 to 6.5 in. long, 2.5 to 3.25 in. wide; petioles 3 to 4 in. long. Cymes often terminal dichotomous as much as 3 in. across; peduncles 1 to 1.25 in. long. Flowers 2.5 in. long white. Sepals oblong-lanceolate deflexed, tomentose outside, glabrous inside. Petals as long deeply cut into 2 lanceolate lobes. Stamens as long. Ovary depressed-globular. Fruit round reniform silky pitted 1 in. broad, green. Hab. Forests. Malacca, Sungei Baru; Merlimau. Negri Sembilan, Tampin
Chailletia.

Perak, Larut (Kunstler); Gunong Keledang. 


(8) C. Griffithii Hook. fil. F.B.I. i. 571; King, l.c. 82. C. setosa King, Journ. As. Soc. Beng. lxv. 515.

Slender shrub with bristly stems. Leaves membranous oblong-lanceolate acuminate, base cordate, above glabrous, midrib bristly, edges and nerves beneath bristly; nerves 9 to 11 pairs elevate beneath, 4 to 7 in. long, 1 to 2 in. wide. Cymes 4 in. long compact at first globose, bristly. Flowers campanulate white 25 in. across. Sepals ovate densely silky outside, pubescent inside. Petals glabrous obovate bifid as long as and broader than sepals. Stamens as long. Ovary ovoid silky. Fruit pyriform, densely hairy, 1-5 in. long, 75 in. wide. Hab. Forests, not rare. Malacca, Chabau (Griffith). Negri Sembilan, Gunong Angsi. Selangor, Batu Caves; Batang Berjuntai (Ridley). Perak, Goping (Kunstler); Ulu Bubong (Kunstler). Native names: Akar Putih Angin; Kerutot; Akar Putih Kambing.

By some mistake King gives this as a climber 15 to 20 ft. long. It is quite a small erect shrub. The C. setosa King of Ulu Bubong seems to me to be a form with stiffer and rather more hairy leaves.

Order XXXVII. OLACINEÆ.

Trees and shrubs, sometimes climbing. Leaves alternate rarely opposite simple exstipulate. Inflorescence cymose or racemose terminal or axillary. Flowers regular bi- or uni-sexual. Calyx small 4- or 5-toothed free or adherent to fruit. Petals 3 to 6 valvate or imbricate. Stamens 3 to 15 inserted with the petals; anthers 2-celled dehiscing longitudinally. Disc hypogynous, cup-shaped or none. Ovary free, 1- or imperfectly 2- to 5-celled; style simple or 0. Stigma 1 or rarely 2. Ovules 1 to 5 pendulous from a minute free central placenta or from side or apex of the ovarian cavity. Fruit drupaceous or dry indehiscent, 1- rarely 2-celled and seeded. Seed pendulous. Albumen fleshy. Species about 200, tropics of both hemispheres.

I exclude the section Opiliece (Cansjera and Lepionurus) referred to the neighbourhood of Santalaceae. The rest of the order really consists of an assemblage of plants characterised mainly by the pendulous ovule. It is usual now to keep the Icacineæ as a separate order. I have, to save space, kept all the sections under Olacineæ except Cardiopterideæ, which is put under Gamopetalæ near Convolvulaceæ. Bracea, King is Sarcosperma (Sapotaceæ). (King, Journ. As. Soc. Beng. lxiv. 94.)
XXXVII. **OLACINEÆ.**

i. **Olacaceæ.** Trees or shrubs; flowers small usually white; stamens twice as many, or as many as petals and opposite them; ovary 2- to 5-celled, at last 1-celled at tip.

Ovary superior.
- Stamens 3 to 5 free
- Stamens 4 in a tube; calyx in fruit forming a large coloured disc
- Tree; stamens 12 to 15; flowers in a long raceme; fruit a simple drupe
- Trees; stamens 10; fruit capsular; leaves opposite
- Spiny shrub; stamens 8 to 10 free; fruit a drupe; leaves alternate
- Big tree; stamens 10 attached to petals; fruit a drupe
- Stamens 6 in concavities of petals
- Ovary inferior or partly inferior; stamens 5

1. **Olax**
2. **Harmandia**
3. **Ochanostachys**
4. **Ctenolophon**
5. **Ximenia**
6. **Scorodocarpus**
7. **Anacolosa**
8. **Strombosia**

ii. **Icacinæ.** Trees or shrubs; flowers white or green, unisexual or bisexual; stamens as many as petals and alternate with them; ovary rarely 2-celled; fruit a drupe.

Ovary and fruit 1-celled.
- Tree unisexual; sepals 5 distinct; flowers in short spikes
- Shrubs unisexual; calyx cup-shaped 4-toothed; flowers cymose
- Trees low; flowers bisexual rather large
- Ovary and fruit 2-celled; shrub; flowers bisexual; racemose corolla gamopetalous

9. **Platea**
10. **Gomphandra**
11. **Stemonurus**
12. **Gonocaryum**

iii. **Phytocreneæ.** Climbing shrubs, unisexual or bisexual 4- to 5-merous, parts imbricate; ovary 1-celled; ovules 2.

Monochlamydeous.
- Flowers 4-merous large lianes; flowers in racemed heads; fruit, head very large, bristly
- Flowers 5-merous slender climber; fruit not bristly

Dichlamydeous.
- Flowers unisexual; cymose panicled; fruit a drupe
- Flowers unisexual in long cymes; fruit linear-oblong
- Flowers bisexual; ovary half immersed in disc; fruit pericarp splitting in 4 valves red; seed dark blue

13. **Phytocrene**
14. **Miquelia**
15. **Iodes**
16. **Lophopyxis**
17. **Erythropalum**
18. **Cantleya**

1. **OLAX,** Linn.

Shrubs or trees sometimes scandent and thorny. Leaves alternate. Racemes axillary simple or branched, short. Calyx minute cup-shaped truncate accrescent. Petals 4 to 5 hypogynous valvate connate. Fertile stamens 3 opposite the petal-edges attached to base. Staminodes 5 or 6 opposite petals. Ovary free, usually surrounded by a cup-shaped disc, 1-celled above, 3-celled below; ovules 3 linear; style simple; stigma 3-lobed. Drupe half
covered by the accrescent calyx; stone crustaceous 1-celled, 1-seeded. Species 20 to 30, Old World Tropics.

Scandent armed; flowers 2 in. long . . . . (1) O. scandens
Erect unarmed; flowers 5 in. long . . . . (2) O. imbricata

(1) O. scandens Roxb. Fl. Ind. i. 163; Corom. Pl. ii. t. 102; Hook. fil. l.c. 575. O. Wightiana Wall. Cat. 6774.


(2) O. imbricata Roxb. Fl. Ind. i. 164; Hook. fil. F.B.I. i. 577; King, l.e. 98.


2. HARMANDIA, Pierre.


(1) H. Kunstleri King, l.e. 100.

Tree 60 to 80 ft. tall, 2 to 3 ft. through. Leaves ovate-lanceolate or lanceolate acute, base cuneate; nerves 6 pairs indistinct, 2'5 to 3'5 in. long, 1 to 2 in. wide; petioles 25 in. long. Racemes 2 in. long. Flowers 15 in. long green. Calyx 4-toothed. Fruit 1'25 in. long, 6 in. wide. Calyx 3 or 4 in. wide fleshy undulate pink. Hab. Rare. Forests. Malacca, Tebing (Derry); Ayer Panas. Selangor,
Batu Caves. Perak, Batang Padang and Goping (Künstler). Native name: Mempudu Tanah.

3. OCHANOSTACHYS, Mast.

Tree. Leaves alternate thinly coriaceous. Flowers small numerous on slender branched axillary spikes. Calyx cup-shaped 4- or 5-toothed. Petals 4 or 5 valvate. Stamens 12 to 15 hypogynous; filaments subulate. Disc hypogynous annular. Ovules free hemispheric 1-celled above, incompletely 3-celled below; style short. Fruit drupaceous milky. Species 1 or 2, Malay Peninsula and Borneo.

(1) O. amentacea Masters, in Hook fil. F.B.I. i. 579; King, l.c. 100.

Tree 30 to 60 ft. tall, 12 in. through straight. Bark flaky. Leaves elliptic-oblong bluntly acuminate, base narrowed glabrous; nerves
5 pairs bold beneath, 3 to 5 in. long, 1'5 to 2'5 in. wide; petioles '5 to '75 in. long. Spikes 2 to 3 in. long puberulous. Flowers sub-sessile green under 1 in. long. Petals ovate acute. Fruit oblong 1'5 in. long fleshy, milky, light green. Hab. Common in forests from Singapore to Penang. Distrib. Borneo. Native name: Petaling. Use: Valuable building timber, though not very large.

4. CTENOLEPHON, Oliv.


Inflorescent pale tomentose; flowers 2 to '25 in. long. (1) C. parvifolius Inflorescence rusty; flowers 4 in. long . . . . . . . . . . . . (2) C. grandifolius

(1) C. parvifolius Oliv. Trans. Linn. Soc. xxviii. 516, t. 43; Masters, l.c. i. 577; King, l.c. 106.


(2) C. grandifolius Oliv. l.c. 517, t. 43, figs. 8 to 10; Masters, l.c. i. 577; King, l.c.e.

Leaves oblong 3'5 to 7 in. long, 1'5 to 2'5 in. across; petioles 5 in. long. Branches of panicle stouter. Flowers 4 in. long, reddish tomentose. Hab. Forests, rare. Perhaps only a variety of the last. Malacca (Maingay). Penang, Muka Head (Curtis). Distrib. Borneo.

5. XIMENIA, Linn.

Shrub or low branching tree, spiny. Leaves alternate coriaceous elliptic-obovate. Flowers racemose usually bisexual, white.
Calyx cupular 4- or 5-toothed not accrescent. Petals 4 to 5 oblong hairy inside. Stamens 8 to 10 hypogynous; anthers linear. Staminodes none. Ovary superior 4-celled; ovules solitary; style columnar. Stigma simple. Drupe ovoid, 1-seeded. Species 4 or 5, southern tropics.


6. **SCORODOCARPUS,** Becc.

Big tree. All parts with an odour of onions when crushed. Leaves alternate glabrous coriaceous. Calyx small cupular 4-crenate. Petals 4 or 5 white, valvate, woolly inside. Stamens 8 to 10; filaments shorter than linear anthers. Ovary ovoid 4- or 5-celled; ovules 4 or 5; style long. Fruit globose green 1-celled; epicarp thin fleshy; endocarp crustaceous. Seed 1 globular. Species 1, Malay Peninsula, Borneo.


Tree about 60 to 70 ft. tall. Leaves elliptic-oblong acute dark shining green 5 to 6 in. long, 2'5 to 3 in. wide; petioles '75 in. long. Racemes 1 to 2 in. long puberulous. Petals '3 to '35 in. long. Fruit 2 in. through. *Hab.* Forests in the south. Singapore (Wallich) (*Schmidelia foetidissima,* Wall. *Cat.* 8064); Tanglin. Johor, Kota Tinggi; Gunong Pulai. Pahang, Kwala Baloh (Sanger-Davies); Kwantan. Perak, Larut Hills; Pondok Tanjong (Kunstler). *Distrib.* Borneo. *Native name:* Kulim. *Use:* A first-class timber, deep red in colour.

7. **ANACOLOSA,** Bl.

Glabrous shrubs or trees, habit of *Strombosia.* Leaves alternate thickly membranous or coriaceous. Cymes axillary. Calyx cup-shaped 5- to 7-toothed not accrescent. Petals 5 to 7 oblong valvate with the stamens on a hypogynous or perigynous disc. Stamens concealed in petals and adnate to their bases. Ovary imperfectly 2- to 3-celled below, 1-celled above; ovules 2 or 3 pendulous, placenta central; style cylindric. Stigma lobed. Fruit drupe-like with disc persistent at tip and calyx at base, stone crustaceous. Seed 1. Species 5 or 6, Indo-Malayan.

Shrub or tree. Branches whitish. Leaves coriaceous oblong-lanceolate, base and tip sub-acute; nerves 5 to 6 pairs prominent beneath, 6 to 7 in. long, 2'25 to 3 in. wide; petioles 3 in. long. Flowers in dense axillary cyms; rachis thick 2 in. long. Pedicels 2 in. long pubescent. Calyx with 6 minute teeth. Petals 1 in. long, oblong; anthers hairy. *Hab.* Malacca (Maingay) only once collected.

### 8. STROMBOSIA, Bl.

Trees medium size or shrubs. Leaves alternate, inflorescence cymose axillary. Flowers bisexual. Calyx a shallow cup more or less 5-lobed inferior. Petals 5 hairy inside. Stamens 5 opposite and adnate to base of petals; staminodes 0. Ovary superior or partly inferior, imperfectly 4- or 5-celled; ovules 4 or 5 pendulous from central placenta; style simple. Disc lobed perigynous. Fruit a drupe terminated by the remains of calyx and style; stone crustaceous. Species 6, Indo-Malayan.

Flowers in pedicelled few-flowered cyms. (1) **S. javanica**

Flowers in sessile many-flowered fascicles.

Leaves ovate to oblong; petals 2 in. long. (2) **S. multiflora**

Leaves round; petals 15 in. long. (3) **S. rotundifolia**


A tree 20 to 30 ft. tall, glabrous. Leaves thinly coriaceous oblong or elliptic acuminate, base rounded; nerves 5 or 6 pairs, 4 to 7 in. long, 1'65 to 2'65 in. wide; petioles 6 to 1 in. long. Cyms few-flowered 5 in. long. Calyx flat shortly 5-lobed. Petals oblong obtuse hairy at tip. Ovary elongate tapering to the short style. Fruit oblong-ovate 8 in. long, 6 in. through. *Hab.* Forests, Malacca (Maingay). Johor, Pulau Tinggi (Burkill). Selangor, Ulu Gombak. Perak, Waterloo (Curtis); Ulu Bubong (Künstler). Penang (Wallich). *Distrib.* Tenasserim, Sumatra and Java.

(2) **S. multiflora** King, *l.c.* 102.

Glabrous tree 50 to 100 ft. tall, 2 to 3 ft. through. Leaves coriaceous ovate to oblong-ovate acute, base rounded, edge undulate; nerves 5 to 8 pairs rather prominent beneath, 2'5 to 4 in. long, 1'5 to 2 in. wide; petioles 35 in. long. Flowers numerous dense fascicled 2 in. long, white. Calyx cup-shaped, lobes broad round. Petals oblong blunt, tips incurred pubescent. Ovary sub-globular; style long, *Hab.* Dense forests on low hills. Perak, Batang Padang (Künstler). Penang (Curtis).

(3) **S. rotundifolia** King, *l.c.* 103. Anacolosa Maingayi *Masters, l.c.* i. 580.

Large shrub. Leaves rather thickly coriaceous ovate rounded blunt, base round; nerves 6 or 7 pairs, 2 to 4 in. long, 2 to 2'5 in.

Like S. multiflora, but a shrub, with few very small flowers and stiffer more leathery leaves.

9. PLATEA, Bl.


(1) P. latifolia Bl. Bijdr. 646. Pl. excelsa King, l.c. iii. not of Blume.

A tall tree to 100 ft. high. Leaves thinly coriaceous ellipt or oblong acuminate, base shortly narrowed sparsely puberulous on both surfaces at length glabrescent; nerves 7 pairs, reticulations minute distinct, 4'5 to 7 in. long, 1'75 to 3'5 in. wide; petioles '5 to '75 in. long. Male flowers not known. Females in short axillary 7- or 8-flowered cymes '5 in. long. Sepals less than '1 in. long ovate pubescent. Petals 0. Ovary cylindric puberulous. Fruit orange and yellow ellipsoid, 1 to 1'3 in. long; stone bony with 2 or 3 furrows. Seed much narrowed at tip. Hab. Hill forests. Perak, Larut (Kunstler). Penang, Government Hill and by the spout (Curtis). Distrib. Java.

10. GOMPHANDRA, Wall.

Shrubs, rarely small trees. Leaves alternate. Flowers usually unisexual. Calyx minute cupular, 4- or 5-toothed. Petals 4 or 5 sometimes partly united white (sometimes absent in females). Stamens 4 or 5 alternate; filaments thick flattened hollowed in front usually hairy; anthers small pendulous from apices, bilobed. Disc thick annular, or none. Male flowers, ovary rudimentary sunk in disc. Stigma minute. Female flowers, ovary long cylindric; ovules 2. Stigma discoid 1- (rarely 2)-celled. Drupe elongate; pericarp thin; endocarp leathery. Species 12, Asiatic tropics.

Leaves large obovate-oblong, 7 by 2 in. sub-coriaceous; nerves prominent
Leaves lanceolate cuspidate 5 by 1'75 in. long, thin membranous; nerves slender
Leaves narrow lanceolate acuminate 4 by 1'25 in. thin; cymes umbellate densely pubescent
Leaves elliptic short cuspidate 4 in. long sub-coriaceous; cymes glabrous

(1) G. nyssifolia
(2) G. penangiana
(3) G. ophirensis
(4) G. affinis
Leaves elliptic 3 to 5 in. long stiff; cymes short; flowers rather large. (5) *G. lanceolata*

Leaves ovate-rhomboid narrowed to base 2'5 to 3 in. long stiff; cymes compact. (6) *G. Maingayi*

Leaves willow-like 3 in. long, 25 in. wide; nerves few and faint; cymes compact. (7) *G. salicifolia*

Leaves ovate acuminate 3 in. long thin; branches and midrib pubescent; flowers very small. (8) *G. pubescens*

Leaves broad elliptic acuminate blunt 5 by 2 in.; cymes lax spreading; branches slender. (9) *G. gracilis* var. gracillima

(1) *G. nyssifolia* King, l.c. 114.

Tree 15 to 50 ft. tall, 8 to 10 in. through. Leaves coriaceous elliptic-ovate abruptly acuminate, base cuneate; nerves 6 pairs hardly inarching, 3'5 to 5'5 in. long, 2 to 2'5 in. wide; petioles 3'3 in. long. Cymes axillary single or 2 together 4 in. long. Flowers sessile 4 to 6, white 2 in. long (male flowers not known). Females, petals 5, puberulous outside. Ovary as long puberulous. Stigma discoid large. Fruit ellipsoid, narrowed at base 8 in. long, 35 in. through. *Hab.* Mountain forests 3000 to 4000 ft. altitude, not common. Perak, Thaiping Hills (Kunstler); Temegoh (Ridley).

(2) *G. penangiana* Wall. Cat. 7304; Masters, in *Hook. fil. F.B.I.* i. 507; King, l.c. 113.

Shrub glabrous 4 to 8 ft. tall. Leaves membranous oblong or oblong-lanceolate long-acuminate, base shortly narrowed, 4 to 6 in. long, 2 in. wide; nerves 8 to 10 pairs elevate beneath, glabrous except the puberulous nerves on the back; petioles 1 in. long. Cymes small 5 to 1 in. long, puberulous. Flowers small tetramerous under 1 in. long. *Hab.* Penang (Wallich); Telok Bahang (Curtis).

Very near a narrow-leaved form of *G. affinis* Masters, but there are more nerves on the narrower leaf, and the texture is thinner.

(3) *G. ophirensis* Ridley. Lasianthera lanceolata Masters, l.c. i. 585, not *G. lanceolata* King.

Branches slender. Leaves thin membranous lanceolate acuminate, base narrowed blunt; nerves distant 7 pairs, 4 in. long, 1'5 in. wide; petioles 5 in. long. Cymes umbellate on a long extra-axillary sub-terminal peduncle 1'5 in. long; branches about 4 whorled, 4 in. long; branchlets short sub-divided again. All densely pubescent. Flowers small bisexual. Calyx cup-shaped 5-toothed. Petals 4 to 5 lanceolate. Stamens 4 to 5 pilose below and at back of anther. *Hab.* Malacca, Mt. Ophir (Griffith).

Perfectly distinct from the plants associated with this by King under his *G. lanceolata*.

(4) *G. affinis* Masters, l.c. i. 586.

Shrub about 8 ft. tall. Leaves glabrous membranous lanceolate or oblong or ovate-lanceolate, base narrowed, 2'5 to 8 in. long, 6 to 3 in. wide; nerves 7 pairs; petioles 3 in. long. Cymes
axillary or extra-axillary '5 in. long or less, few and short-branched, slightly puberulous. Calyx 4- to 5-toothed. Corolla '1 in. long, 4- or 5-lobed; filaments hairy on the back. Stigma large discoid. Fruit fusiform blunt '4 in. long, '2 in. through ribbed. Hab. Woods in the lower country. Singapore, Chan Chu Kang; Bukit Timah. Johor, Gunong Pulai. Malacca (Griffith). Selangor, Dusun Tua. Perak, Kal (Kunstler).

var. floribunda Ridl.

Cymes with peduncle '1 in. long. Branches '1 in. long di- or trichotomous with many shortly pedicelled tetramerous flowers nearly '1 in. long. Hab. Selangor, Weld's Hill; Rawang (Ridley). Distrib. Moulmein.

(5) G. lanceolata King, l.c. 112.

A shrub 5 to 10 ft. tall, slender. Leaves sub-coriaceous lanceolate to oblong-lanceolate acuminate, base cuneate, glabrous above, sparsely puberulous beneath; nerves 5 to 8 pairs, conspicuous beneath 2 to 4 in. long, '5 to '15 in. wide; petioles '15 to '3 in. long. Cymes axillary and terminal; peduncles very short, '1 to '1 in. long trichotomous. Cymules 3- to 10-flowered. Flowers sessile '1 in. long. Calyx cupular 3- or 4-toothed. Petals 4 ob lanceolate white villous inside. Filaments flat tapering to each end with a tuft of white hairs at tip. Fruit ellipsoid narrowed at the ends '4 in. long. Hab. Hill forests. Pahang, Kwala Tembling. Negri Sembilan, Gunong Angsi. Selangor, Gunong Mengkuang Lebah (Robinson); Weld's Hill; Kwala Lumpur; Perak, Ulu Bubong (Kunstler). Native names: Chemperai Ayam; Chemparai Hitam; Sebasah Payah.

As King's species included more than one, I have retained the name for the Perak plants which he identified with Master's Lasianthera lanceolata, and for the varieties below.

var. angustifolia King, l.c. 113.

Leaves oblong lanceolate 2 to 4 in. long, '4 to '7 in. wide, more fleshy. Flowers larger '15 in. long. King's variety as represented by a plant from Scortechini. Hab. Mountain forests common. Pahang, Gunong Tahan. Selangor, Sempang Mines; Bukit Kutu. Perak, Gunong Kerbau at 4000 ft. altitude (Robinson); Bujong Malacca. Penang, Western Hill 3000 ft. altitude.

var. triplinervis King, l.c. 113.

Like the last, but with only three nerves, 2 basal nerves and midrib, with very faint nerves from the midrib. Traces of this form of nervation occur on some plants of the last variety. Hab. Perak (Scortechini).

var. ovalifolia Ridl.

Leaves ovate rounded or shortly narrowed at the broad base, acuminate 3-7 in. long, '15 in. wide; petioles stout '2 in. long. Flowers '2 in. long. Hab. Selangor, Gunong Mengkuang Lebah at 5000 ft. altitude (Robinson).
Shrub 4 to 6 ft. tall. Young parts puberulous. Leaves coriaceous lanceolate to ovate acuminate, base narrowed, drying dark brown, glabrous above, puberulous beneath; nerves 5 or 6 pairs prominent beneath, 2 to 3½ in. long, '9 to 1'2 in. wide; petioles '25 in. long. Peduncle '2 in. long. Cymules 1- or 2-flowered. Flowers 4 or 5 sessile '15 in. long. Calyx tomentose, teeth 4 or 5 shallow. Petals 5 oblong; filaments with a tuft of hair at tip. *Hab.* Hill woods, 3000 to 5000 ft. altitude. Penang, top of Government Hill (Maingay).  

Leaves broad elliptic minutely pustular and pubescent beneath, midrib densely pubescent; branchlets red tomentose. *Hab.* Pahang, Gunong Tahan (Ridley).  

Though very much more pubescent than the Penang plant, it seems better to treat this as a variety.  

Small tree with wiry branches, glabrous except cyme. Leaves narrow linear acuminate, base very shortly narrowed, coriaceous, midrib prominent; nerves invisible above, beneath 4 or 5 pairs very short and inconspicuous forming rather conspicuous loops, 3 in. long, '3 in. wide; petioles '15 in. long. Cymes terminal compact; branches very short; peduncle '2 in. long puberulous. Flowers crowded glabrous. Calyx very small. Petals 4 oblong '15 in. long. Stamens 4; filaments broad long-hairy below and with a tuft of hairs at the top. *Hab.* Penang, West Hill (Curtis) at 2500 ft. altitude.  

(8) **G. pubescens** Ridl. *l.c.* 176.  
Shrub with wiry branches pubescent. Leaves lanceolate caudate, blunt, base shortly cuneate, sub-coriaceous; nerves basal pair running from near base along the edge; nerves from midrib 6 pairs, midrib pubescent, 3 to 5 in. long, 1 in. wide; petioles '15 in. long pubescent. Cymes extra-axillary compact '5 in. long; peduncles '25 in. long, pubescent. Flowers very small. Calyx lobes large ovate cuspidate glabrous at base. Petals 4 very short oblong, tip incurved. Stamens very short; filaments obtuse very short; anthers small with a short process at the back. *Hab.* Thick woods. Selangor, Weld’s Hill, Kwala Lumpur (Ridley).  

This is remarkable for its very small flowers.  

(9) **G. gracilis** King, *l.c.* 115.  
Shrub 10 to 18 ft. or tree up to 40 ft. tall. Leaves thickly membranous elliptic or lanceolate cuspidate acute or blunt glabrous, edges wavy; nerves 5 to 8 pairs elevate beneath, 3 to 6 in. long, 1 to 2 in. wide; petioles '25 to 1 in. long. Peduncles slender 1'5 to

var. gracillima Ridl.

Tree with slender hanging branches. Leaves lanceolate acuminate, 2 in. long, 5 in. wide; petioles 2 in. long. Cymes with peduncles 5 in. long. Hab. Dense jungle. Perak, Chanderiang (Kunstler).

This tree varies very much in the size and form of leaves. The long lax cyme and the imperfectly 2-celled fruit are peculiar in the genus.

11. STEMONURUS, Bl.

Trees or large shrubs. Leaves alternate coriaceous. Flowers bisexual white in stalked axillary cymes. Calyx cupular small 4- or 5-lobed. Petals 5, tip inflexed. Stamens 5 hypogynous alternate with petals; filaments flat with a tuft of long hair at the back; anthers bilobed. Disc cup-shaped hypogynous. Ovary ovoid 1-celled; ovules 2; style subulate. Drupe large fleshy fibrous outside; stone woody within. Species about 10, Malayan.

Leaves 10 by 4 in.; cymes scorpioid 3 in. long (1) S. secundiflorus
Leaves elliptic acute 4 by 2 in.; cymes under 1 in. wide, compact (2) S. capitatus
Leaves obovate obtuse 2 to 5 by 1 in.; cymes, peduncle 5 in. long, head 2 in. wide (3) S. umbellatus

(1) S. secundiflorus Bl. Bijdr. 649; Beccari, Malesia I. i. t. iv. 16, 17. Lasianthera secundiflora Miq. Fl. Ind. Bat. i. (1), 792; King, l.c. II7.

Tree 50 to 70 ft. tall, 10 to 15 in. through. Leaves stiffly coriaceous elliptic to ovate-elliptic acuminate or blunt, base narrowed or rounded; nerves 10 pairs; nervules nearly as prominent, 5 to 10 in. long, 2-25 to 4 in. wide; petioles 5 to 75 in. long, stout. Peduncle 1 to 5 in. long, with an umbel of 5 or 6 scorpioid secund cymes 1-5 in. long. Flowers 2 in. long, sessile. Calyx puberulous. Petals glabrous with a conic inflexed process below the tip. Stamens with a tuft of white hair as long as themselves. Fruit ellipsoid acute greyish green, or white, 2 to 5 in. long, 1 in. through, base tapering. Hab. River-banks and low swampy woods. Singapore, Selitar; Bukit Mandai. Johor, Sedenak; Kota Tinggi. Selangor, Ulu Selangor. Perak, Larut (Kunstler); Asam Kumbang (Wray), Dindings, Pangkor (Curtis). Distrib. Sumatra, Java.
(2) S. capitatus Beccari, Malesia i. (1), 114, pl. xv. figs. 7 to 11. Lasianthera malaccensis Masters, P.B.I. 1. 584; King, l.c. 118.

Tree 30 to 40 ft. tall. Leaves coriaceous elliptic-oblong acuminate narrowed to base; nerves 10 pairs, 3 to 4.5 in. long, 1 to 2 in. wide; petioles 3 to 4 in. long. Cymes 6 in. long with 3 short branches, pubescent, each bearing 2 or 3 sessile flowers 1 in. long. Calyx teeth acute puberulous. Petals 3 or 4 times as long. Hab. Forests. Johor, Sedenah. Malacca (Maingay). Perak, Ulu Slim (Kunstler). Penang, Muka Head (Curtis). Lankawi, Gunong Raya (Haniff).

(3) S. umbellatus Beccari, Malesia i. (1), 115, pl. xv. figs. 5 and 6. Lasianthera umbellata King, l.c. 117.

Glabrous tree 50 to 120 ft. tall, 15 to 20 in. through. Leaves obovate-obcuneate obtuse; nerves 7 to 9 pairs, 2.5 to 3.5 in. long, 1 to 2 in. wide; petioles 3 to 7 in. long. Cymes umbellate; peduncles 7.5 to 1 in. long; pedicels 1 in. long with 2 to 4 sessile flowers 1.5 in. long at the top. Calyx pubescent. Petals elliptic twice as long, puberulous outside. Anther-connectives densely silky hairy. Disc thin enwrapping only the ovary base. Hab. Forests. Malacca, Bukit Sadaen (Derry). Perak, Thaiping Hills 3000 to 3500 ft. altitude (Kunstler). Distrib. Java, Sumatra, Borneo.

12. GONOCARYUM, Miq.

Shrubs or small trees. Leaves alternate coriaceous. Flowers small in axillary spikes. Sepals free 5 ovate imbricate. Corolla gamopetalous tubular, teeth short acute 5. Stamens 5 alternate with the corolla-lobes; filaments adnate to corolla except at tips. Ovary ellipsoid on a minute annular disc, 2-celled; ovule 1; style short. Drupe dry woody, 4- or 5-ridged, 1-celled, 1-seeded. Species about 4, Burmese and Malayian.

Leaves oblong; spikes glabrous  :  :  : (1) G. longe-racemosum
Leaves ovate; spikes pubescent :  :  : (2) G. crassifolium

(1) G. longe-racemosum King, l.c. 120.

A shrub with pale bark about 8 to 10 ft. tall, with drooping branches. Leaves elliptic-oblong acuminate, base narrowed; nerves 4 pairs, prominent, 5 to 10 in. long, 2.25 to 3.5 in. wide; petioles 3 to 5 in. long. Spikes glabrous pendulous from the branches, 6 in. or more long. Flowers 2 in. long bluish green or purplish blue, sessile scattered. Sepals puberulous. Fruit green obovoid 4- or 5-ridged, shortly beaked, narrowed to the broad base, 1.5 to 2 in. long, '5 to 1 in. through; mesocarp woody. Hab. Dry lowland woods. Singapore, Garden Jungle; Changi (Hullet). Johor, Kwala Sembrong (Kelsall). Malacca, Brisu; Batang Malacca (Derry). Selangor, Batu Caves; Kajang; Ulu Gombak (Ridley). Perak near Gunong Bubu (Kunstler). Native name: Toioh.
Shrub. Leaves coriaceous glabrous ovate acuminate to oblong, base broad or very shortly cuneate; nerves 5 pairs elevate beneath, midrib strongly elevate, 7 in. long, 3'5 in. wide; petioles yellow thick '75 in. long. Spikes slender 2 to 4 in an axil, 2 to 2'2 in. long, pubescent. Flowers male '05 in. long sessile. Calyx cupulate 5-lobed pubescent. Petals 5 oblong thick with incurved tip, nearly free; anthers red nearly sessile. Ovary (abortive) pilose. Hab. Rare in mountains in forest about 3000 ft. altitude. Selangor, Sempang Mines (Ridley).

13. PHYTOCRENE, Wall.

Long climbing shrubs, usually hairy. Leaves alternate entire or palmately lobed. Flowers unisexual, males in globose clusters on long branching spikes or panicles, females in large globose pedunculate heads, males with an involucre of 3 to 5 pieces. Perianth of 4 pieces free or united below valvate. Stamens as many, alternate. Female flowers, no involucre, perianth as in male. Staminodes minute or none. Pistil sessile r-celled villous. Ovules 2 from apex of cavity; style thick. Stigma capitate. Drupes wedge-shaped numerous in a large globose brisly head; stones hard r-celled, r-seeded, pitted outside. Species 8, Indo-Malayan.

Bracts inconspicuous or filiform.
Leaves entire
Leaves ovate often 3-lobed
Leaves palmate 5-lobed
Bracts long plumed

(1) P. oblonga Wall. Pl. As. Rar. iii. 12; Hook. fil. F.B.I. i. 592; King, l.c. 122.

Stem more slender than Ph. bracteata Wall., not prickly. Leaves oblong or oblong-lanceolate acuminate, base narrowed, above glabrous, beneath densely hairy; nerves from midrib 9 pairs prominent beneath, 4'5 to 9 in. long, 2 to 3'5 in. wide; petioles '6 to 1 in. long. Male flowers in a dark brown spike 1 to 2 in. long. Bracts of umbellules much shorter than the flowers. Fruit head as big as a cricket-ball; drupes cuneate ovoid covered with stiff bristles, 1'5 in. long, 75 in. wide. Hab. Lowland country. Malacca, Ayer Panas (Griffith). Perak, Larut (Kunstler). Penang, Telok Bahang (Curtis).


Stem 1 in. through, prickly and hairy when young. Leaves broad ovate-cordate, often 3-lobed, acute, smooth above; nerves pubescent beneath softly pale tomentose; nerves from base 7, reticulations conspicuous beneath, 4 to 8 in. long, 3 to 5'5 in. wide; petioles tomentose hairy 1'25 to 3 in. long. Male panicles bracteate
4 to 8 in. long, '75 to 1·25 in. through, dense hairy. Flowers sessile
‗05 in. across. Bracts of pedicels of umbellules filiform '4 to '5 in.
long. Drupes ovoid-oblong tapering to each end densely yellow
bristly '5 in. long, in capitula as big as a man's head. Hab. Low-
land woods and hedges. Singapore, Cluny Road; Bukit Timah.

(3) P. palmata Wall. Pl. As. Rar. iii. 12; Hook. fil. F.B.I.
i. 592; King, l.c. 123.
Stem prickly and red-hairy. Leaves reniform palmate deeply
5-lobed, above glabrous, beneath densely red-hairy; nerves 5 to 7
palmate, 7 to 12 in. or more long and as wide; petioles 3 to 5 in.
long red-hairy. Male panicles 2·5 to 13 in. long, umbellules ebracte-
ate. Drupes ellipsoid-ovoid acute densely yellow bristly '5 to
2 in. long, in heads 3 to 4 in. through. Hab. Malacca (Griffith);
Hills (Kunstler). Penang, Government Hill (Curtis); Balik Pulau.
Native name: Akar Pisang-Pisang Buluh.

(4) P. trichura Ridl.
Very big long woody climber. Leaves unknown. Male panicles
on bare stem sessile 8 in. long, 1·5 in. through, dense, dichotomously
branched; branches slender flexuous pubescent with distant globose
short-pedicelled or sessile heads of flowers '25 in. apart and '2 in.
through; bracts terminated by a brush of long reddish hairs,
'5 in. long. Flowers sessile glabrous. Sepals 5 obcuneate campanu-
late, apex rounded fringed with hairs. Petals 4 oblong blunt.
Stamens 3 longer; anthers elliptic; filaments slender. Pistil
white-hairy. Hab. Very rare in dense forest ascending to the tops
of lofty trees. Perak, Batang Padang valley near Telom (Ridley).

Leaves of this plant were quite unprocurable owing to its lofty height,
but the large squirrel-tail plume (bract) in the end of the raceme of heads
makes it quite distinct. It is nearest to P. bracteata Wall.

14. MIQUELIA, Meissn.

Climbing shrubs. Leaves alternate. Flowers unisexual, males
pedicellate in umbels, females sessile in solitary heads. Males
pedicelled; perianth 5-merous, lobes oblong or lanceolate valvate.
Stamens as many and alternate; filaments short; anthers linear
oblong. Females perianth deeply 4-lobed, lobes lanceolate. Ovary
1, compressed 1-celled; ovules 2. Stigma discoid. Drupe oblong
compressed.

(1) M. caudata King, l.c. 124.
Slender climber, 10 to 20 ft. long. Leaves membranous oblong-
lanceolate acuminate, base narrowed, glabrous above, puberulous
beneath; nerves 5 or 6 pairs, 5 to 8 in. long, 1·5 to 2 in. wide;
petioles '5 to '65 in. long. Male umbels 65 to 1 in. long; pedicels
'15 to '2 in. long. Flowers '15 in. across, puberulous white. Anthers

Fl.M.P., 1.

15. IODES, Bl.

Slender climbing shrubs, with tendrils. Leaves opposite. Inflorescence cymose axillary or extra-axillary, lower peduncles often cirrhose. Flowers unisexual small white. Males, calyx minute, cup-shaped 4- or 5-toothed. Corolla 4- or 5-lobed valvate. Stamens hypogynous, alternate; anthers basifixed. Females, corolla lobes connate below. Stamens 0. Ovary 1-celled; ovules 2. Stigma sessile discoid. Drupe 1-seeded. Species 8, Indo-Malaya, Africa.

Flowers 4-merous.
Leaves ovate reticulate . . . . . (1) *I. reticulata*
Flowers 5-merous.
Calyx cupular with short teeth; leaves ovate not reticulate . . . . . (2) *I. velutina*
Calyx deeply cut into lanceolate lobes; leaves ovate; cymes long much-branched . . . . . (3) *I. ovalis*
Leaves oblong; cymes small . . . . . (4) *I. oblonga*

(1) *I. reticulata* King, l.c. 126.
Climber 20 to 30 ft. long with a broad line of tomentum on one side. Leaves thinly coriaceous elliptic or broadly ovate sharply acuminate, base rounded, glabrous above, soft hairy beneath; nerves 4 or 5 pairs, depressed above, prominent beneath, as are reticulations, 2 to 5 in. long, 1·3 to 2·5 in. across; petioles '4 to '6 in. long. Tendrils pubescent. Cymes 1 to 2 in. long, peduncled slender lax branched pubescent. Male flowers '05 in. long, 4-merous. Calyx with 4 acute lobes pilose outside. Corolla with 4 ovate lobes pilose outside, light brown. Stamens shorter; anthers ovate. Females larger, ovary tomentose. Drupe elliptic narrowed to base velvety; endocarp 4-angled, 1·2 in. long, 7·5 in. across. *Hab.* Open jungle. Perak, Goping (Kunstler); Ayer Larut (Wray).

(2) *I. velutina* King, l.c. 127.
Puberulous climber. Leaves coriaceous ovate acute, base rounded, sparsely pilose above, densely whitish velvety beneath, reticulations not elevate; nerves 4 pairs, 2·5 to 3·75 in. long, 1·35 to 2·25 in. wide; petioles '36 to '6 in. long. Cymes short pubescent few-flowered, tendrils pubescent. Male flowers '1 in. wide; pedicels short. Calyx 5-toothed. Corolla twice as long, teeth oblong adpressed-pilose outside. Drupes elongate obovoid 4-angled when dry, ashy tomentose, 1·25 in. long, 5 in. through; endocarp bony 8-angled. *Hab.* Woods and hedges. Singapore, Bukit Timah.


Climber 30 to 60 ft. long, slender tomentose. Leaves subcoriaceous ovate or round acute, base round glabrescent above; nerves above and on under-surface tomentose, 4 or 5 pairs bold; 2'5 to 5'5 in. long, 1'75 to 3'25 in. wide. Cymes 6 to 8 in. long, much-branched tomentose. Male flowers '15 in. long, pale yellow; pedicels '1 to '2 in. long. Calyx villous discoid 3- to 6-toothed. Corolla 5 or 6 times as long, lobes 5 acuminate strigose outside. Stamens short. Females, ovary tomentose. Drupe ovoid compressed tomentose '75 in. long, '5 in. wide; endocarp rugose. Hab. Woods. Johor, Sungei Tebrau. Malacca (Griffith). Perak, Kamuning (Curtis); Larut (Kunstler); Hermitage Hill; Changkat Mentri (Kloss). Distrib. Tenasserim, Sumatra.

(4) I. oblonga Planch. in Hook. fil. F.B.I. i. 597; King, l.c. 128.

Stiff pubescent climber. Leaves membranous oblong to oblong-lanceolate, glabrous above except pilose nerves, beneath pilose; nerves 7 or 8 pairs, 3 to 4'5 in. long, 1 to 1'6 in. wide; petioles '3 to '4 in. long. Cymes short 1 in. long pilose. Male flowers '05 in. long white. Calyx of 5 deep lanceolate lobes. Corolla tomentose outside. Fruit scarlet. Hab. Borders of woods. Singapore, Bidadari; Garden Jungle; Changi. Johor, Kwnala Kahang (Kelsall). Province Wellesley, Bukit Juru. Penang (Wallich); Waterfall (Curtis).

16. LOPHOPYXIS, Hook. fil.


Climber 100 ft. long, 3 to 5 in. through. Leaves acuminate glabrous 6 in. long, 2'5 in. wide; petioles '2 in. long. Cymes tomentose 6 to 7 in. long; branches few, 3 in. long. Flowers '05 in. long in small distant heads, white. Fruit '4 in. long tomentose. Hab. Dense jungle. Malacca (Maingay). Perak, Ulu Kerling (Kunstler).
17. ERYTHROPALUM, Bl.

Climbing glabrous shrubs with axillary tendrils. Leaves alternate entire 3- to 5-nerved at base. Cymes slender peduncled dichotomous. Flowers small yellow bisexual. Calyx 5-toothed, tube adherent to fruit. Petals perigynous 5 short. Stamens 5 opposite petals; filaments short; anthers ovate. Disc large fleshy 5-lobed. Ovary half immersed i-celled; ovules 1 to 3 pendulous from apex; style short. Fruit crowned by persistent calyx and disc oblong i-celled; pericarp red thin sub-coriaceous, splitting and reflexed into 3 to 5 segments. Seed solitary, deep blue, albumen large. Species 2 or 3, Malayan.


Leaves membranous elliptic or oblong-lanceolate acuminate, base rounded sub-peltate; basal nerves 3 to 5 pairs, laterals 4 pairs faint, 3 to 6 in. long, 175 to 375 in. wide; petioles '75 to 1'75 in. long. Cymes '75 to 2'75 in. across; peduncles 1 to 3 in. long very slender; pedicels '3 in. long. Flowers under '1 in. across green; disc yellow. Fruit '75 in. long, red outside, yellow inside. Seed deep blue. Hab. Forests. Singapore, Garden Jungle; Reservoir Woods. Malacca (Maingay); Hulu Chembong (Derry). Pahang, Kwantan (Foxworthy). Perak, Goping (Kunstler); Thaiping Hills (Curtis). Dindings, Simpil. Penang, Balik Pulau (Curtis); Waterfall. Distrib. India, Burma, Java. Native name: Kulim Akar.

**Doubtful Plant**

18. CANTLEYA, Ridl.


(1) *C. johorica* Ridl.

Leaves elliptic acuminate, base cuneate; nerves 10 pairs very indistinct, 2'7 in. long, 1'4 in. wide; petioles '3 in. long. Cymes when fully developed '75 to 1 in. long, pale pubescent; branches '5 in. long pubescent. Calyx pubescent. Johor (Cantley). Native name: Daru Daru.

I cannot find any genus to fit this plant, which seems, however, to be most nearly allied to Gomphandra. The specimens are very incomplete. Cantley labels it as Kayu Daru-Daru, a highly valued timber, of what species is not known. It should be sought for again.
Order XXXVIII. Ilicineæ

Trees or shrubs with alternate coriaceous leaves. Flowers small white yellowish or pink on axillary cymes, fascicles or rarely racemes. Sepals 4 or 5 rounded connate at base often unequal. Petals 5 or 6 connate at base, rarely quite free, larger rounded. Stamens 5 shorter or longer than the petals adnate to them; filaments subulate; anthers small. Ovary in female flower 2- to 12-celled; ovules 1 or 2; style 0 or very short. Stigma capitate. Drupe globose small of 2 to 16 pyrenes. Genera 3, species 220, tropics and temperate zone. Petals connate at base; stamens as many; ovary 4- to 6-locular. Species about 150, whole world.

1. Ilex, Linn.

Flowers of both sexes in simple racemes.
Flowers in axillary fascicles; leaves 1 to 2 in.
Leaves 5 in. long obovate.
Leaves 5 in. long ovate acute serrate at top.
Leaves 3 by 1.5 to 2 in. very coriaceous entire elliptic to obovate.
Leaves elliptic acuminate 5 by 2.25 in. entire; flowers large.
Leaves elliptic acuminate undulate thin 4 by 1.25 in.; flowers rather small.
Leaves elliptic crenulate thick 7 by 3 in.; fruits 4 in. through.
Flowers in peduncled cymes.
Peduncles short 1 to 2 in. long.
Leaves elliptic blunt very coriaceous pale beneath entire 2 by 1 in.
Leaves elliptic blunt, entire very coriaceous 5 by 3 in.
Leaves elliptic blunt-cuspidate entire 3 by 1.5 in.
Leaves thin coriaceous elliptic entire 6 by 2.5 in.
Peduncle 5 in. long; pedicels as long 3-flowered; leaves lanceolate; nerves depressed above 3 by 0.75 in.
Peduncle, 6 in. long slender; branches 2 with short branchlets; leaves rather thin elliptic-lanceolate, 5 by 1.25 in.
Cymes panicked many-flowered umbelled; pyrenes 5 or 6; leaves ovate-elliptic cuspidate stiff.
Pyrenes 5; cymes lax; flowers and fruit small.
Cymes compact; flowers and fruit larger.

(1) I. malaccensis Loesener Monogr. Aquifol. 432. I. spicata Hook. fil. F.B.I. i. 508; King, l.c. 134, not of Blume.

Shrub 10 to 18 ft. tall. Leaves coriaceous elliptic caudate-
acuminate, base rounded or short cuneate; nerves faint 7 to 12 pairs, 3'5 to 6 in. long, 1'5 to 2 in. wide; petioles '2 in. long. Racemes '75 to 1'5 in. long puberulous. Flowers under '1 in. long; pedicels '1 in. long. Petals oblong connate at base. Stamens longer. Females smaller than males. Drupes '15 in. long ovoid; pyrenes ro to 16. Hab. Lowlands, rare. Malacca (Maingay). Perak, Larut (Kunstler).

(2) **I. triflora** Bl. Bijdr. 1150; Loesen. l.c. 344. I. Griffithii Hook. fil. F.B.I. i. 601; King, l.c. 135.

A pubescent bush 3 to 15 ft. tall. Leaves coriaceous elliptic acute serrulate, base narrowed, glabrous above except midrib, pubescent beneath; nerves 8 pairs, 1 to 1'25 in. long, '5 to 1'3 in. wide; petioles '15 to '25 in. long. Flowers 4-merous pink, fascicled or females sometimes solitary '2 in. across or less; pedicels longer. Calyx cup-shaped, lobes ciliolate. Petals oblong connate at base. Ovary globose. Stigma sessile. Drupe globose '15 in. through, black; pyrenes 4; pedicel '35 to '6 in. long. Hab. High mountains 3000 to 6600 ft. altitude, common. Malacca, Mt. Ophir. Pahang, Gunong Tahan (Robinson). Gunong Berumbun, Telorn. Selangor, Gunong Semangkok. Perak, Hermitage Hill (Curtis); Thaiiping Hills 4000 to 5000 ft. altitude (Kunstler); Gunong Batu Putih (Wray); Gunong Inas (Wray). Kedah Peak (Low). Distrib. Indo-Malaya, Cochin-China, China.

A variable shrub; the common form appears to be the var. **Lobbiana** Loesener. The var. **Kurziana** Loesener is more ashy-tomentose on the leaves. It occurs on Gunong Bubu.

var. **longifolia** Ridl.

Leaves nearly glabrous oblong acuminate, base sub-cuneate shortly, edge crenulate 2'5 in. long, 1'2 in. wide; petioles '1 in. long. Cymes female 4- to 5-flowered; peduncle '2 in. long; pedicel '3 in. long, pubescent. Flower '2 in. across. Calyx glabrous short toothed. Petals round pink. Hab. Perak, Hermitage Hill (Curtis 1340); Maxwell's Hill.


Shrub much-branched. Leaves thickly coriaceous elliptic to obovate blunt or retuse; nerves invisible, '75 in. long, '5 in. wide; petioles '1 in. long. Panicles or racemes shorter than leaves, pubescent. Sepals 4 ovate or orbicular pubescent. Petals 4 ovate connate at base. Stamens 3; filaments thick. Ovary conic. Hab. Rare on high mountains. Selangor, Guncng Mengkuang Lebah (Robinson).


Pubescent shrub densely leafy. Leaves elliptic acute serrate, base shortly narrowed '75 in. long, '4 in. wide, glabrous, dotted beneath; petioles '1 in. long puberulous. Flowers 2 to 4 on thick axillary peduncles. Pedicels '1 in. long. Sepals 4 ovate blunt
pubescent. Petals 4 ovate oblong blunt. Stamens 4 shorter. 
Hab. High mountains, rare. Perak, Gunong Kerbau 6600 ft. altitude (Robinson).

(5) **I. epiphytica** King, l.c. 134.

Shrub with stout branches. Leaves coriaceous glabrous oval or elliptic quite obtuse entire, base narrowed blunt; nerves 5 to 6 pairs, slender, 2 to 3 in. long, 1 to 2 '75 in. wide; petioles '15 in. long. Flowers white fascicled 5 to 12, '2 in. across; pedicels '2 in. long. Calyx teeth 5 to 7 ovate blunt imbricate, edges pubescent. Petals 6 oblong free. Stamens much shorter 6. Ovary tapering to style. Stigma discoid. Drupe ovoid '2 to '25 in. long; pyrenes trigonous 6 or 7. Hab. High mountains 3000 to 6600 ft. altitude. Malacca, top of Mt. Ophir (Hullett). Pahang, Gunong Tahan. Selangor, Gunong Mengkuang Lebah (Robinson). Perak, Gunong Bubu 5000 ft. altitude (Kunstler); Gunong Kerbau (Robinson).


(7) **I. glomerata** King, l.c. 135; Loesener, l.c. 325.

Tree 30 to 35 ft. tall, 4 to 6 in. through, glabrous. Leaves thinly coriaceous oblong or elliptic acuminate, edge wavy, base cuneate; nerves 6 or 7 pairs invisible above, faint below, 3 to 4 '5 in. long, 1 '3 to 1 '75 in. wide; petioles '3 to '4 in. long. Flowers male '2 in. across pale yellow, fascicled 6 to 12 together; pedicels '15 in. long. Calyx minute, teeth round 4. Petals 4 ovate connate at base. Stamens longer; filaments subulate; anthers ovoid short. Hab. Mountain forests. Perak, Larut Hills 3500 to 4000 ft. altitude (Kunstler). Distrib. Tenasserim.


A shrub with stout branches. Leaves stiff coriaceous elliptic minutely apiculate, base narrowed, crenate, shining green, midrib channelled above, strongly elevate and keeled beneath; nerves 8 pairs, elevate beneath, as are secondary nerves and reticulations, 7 in. long, 3 in. wide; petioles '75 in. long. Flowers unknown. Fruit on a peduncle '1 in. long axillary with 5 or 6 flowers; pedicels '4 in. long; berry '4 in. long oblong globose, sepals connate of 4 short blunt lobes. Stigma flat 4-lobed. Pyrenes 4, backs round '25 in. long, '15 in. through. Hab. Mountains, local. Pahang, Gunong Tahan (Ridley). In fruit only.


Shrub. Leaves elliptic blunt or sub-acute coriaceous, base rounded; nerves invisible above, faint 4 to 5 pairs, beneath;
glaucescent 2 to 2.5 in. long, 1 to 1.25 in. wide; petioles 1.5 in. long. Cymes 3.5 in. long; branches 6. Flowers 8 sub-umbellate; pedicels 1 in. long. Sepals 5 edges ciliate. Petals 5 oblong almost free. Stamens 5. Ovary conic. Berry globose 1.5 in. long; pyrenes 4. Hab. High mountains, Pahang, Gunong Tahan, 5500 ft. altitude (Ridley).

(10) I. sclerophylla Hook. fil. F.B.I. i. 606; King, l.c. 137.
Leaves thickly coriaceous elliptic-oblong blunt narrowed at base; nerves about 6 pairs slender elevate, beneath glaucous, 5 to 6 in. long, 2.5 in. wide; petioles 5 in. long very thick. Cymes, female 1 in. long sparingly branched; peduncles stout. Calyx 5 ciliate lobes. Petals minute free. Ovary ovoid truncate. Hab. Malacca, Mount Ophir (Maingay).

Only known from a scrap, and not since found on Mount Ophir. Possibly a state of I. hypoglaucu Loesen. of Bangka and Sumatra.

Tree with white bark. Leaves stiff coriaceous elliptic shortly apiculate blunt, base cuneate entire, midrib sunk above, strongly elevate beneath; nerves 9 pairs, slender not very conspicuous inarching, reticulations invisible, 3.5 to 4 in. long, 1.25 to 1.5 in. wide; petioles 3 in. long. Flowers very small in peduncled sub-terminal cymes; peduncles 1.5 in. long or less puberulous. Fruit sub-globose 2 in. through on pedicel, as long, and on a peduncle 3 in. long. Calyx lobes round 4. Pyrenes about 10. Hab. Kedah Peak at 3000 ft. altitude (Robinson and Kloss). Distrib. Borneo.

I have only fruit of this, and take the description of the flowers from Borneo specimens, which in vegetative organs this plant very closely resembles. It also is near I. eugeniæfolia Pierre of Cochin-China, but the leaves are more coriaceous.

(12) I. Maingayi Hook. fil. F.B.I. i. 605; King, l.c. 135; Loesen. Monogr. l.c. Aquifol. 426.
A glabrous tree 20 to 80 ft. tall. Branchlets dark. Leaves coriaceous elliptic to oblongate-oblong sub-acuminate, base narrowed, sub-glaucous beneath; nerves 10 to 12 pairs faint, 4 to 5.5 in. long, 1.35 to 2 in. wide; petioles 4 to 6.5 in. long. Male flowers less than 1 in. across, in peduncled umbellate cymes 1.25 in. long. Male, calyx lobes 4 rounded glabrous. Petals 4 broad oblong. Stamens longer. Females in short racemes. Sepals, petals, stamens 6. Drupes ovoid or globular greenish yellow 2 to 2.5 in. through, grooved when dry; pyrenes 4 to 6 trigonous. Hab. In woods. Singapore, Bukit Mandai. Selangor, Kwala Lumpur (Foxworthy). Perak, Goping, Limestone Hills (Kunstler). Penang (Maingay); Government Hill.

Spreading tree about 30 ft. tall. Leaves dark green thin coriaceous ovate entire obtuse, base round, 2 to 3 in. long, 1.5 to 2 in.
wide; nerves 4 or 5 pairs; petioles 25 in. long. Cymes peduncled 5-flowered. Flowers white or rose. Calyx lobes 4 or 5 glabrous rounded. Petals connate at base. Stamens 4; filaments short. Fruit globose 25 in. long. 

_Hab._ Woods on high mountains by streams, Pahang, Gunong Tahan at 5500 ft. altitude (Ridley).


Tree. Branches slender. Leaves coriaceous lanceolate-acumin-ate, shortly narrowed at base; nerves prominent beneath inarching 15 in. from edge, 7 pairs, midrib sunk above, prominent beneath, 4.75 to 7 in. long, 1.25 to 2 in. wide; petioles 28 in. long. Panicles in terminal axils, 3 to 4.5 in. long; branches distant few, 1.25 in. long, dichotomous at the ends with a few flowers in small pubescent cymes at the tips; pedicels pubescent very short. Sepals triangular-ovate pubescent. Petals 4 rounded 0.024 in. long, free nearly to base. Stamens 4 as long. Pistil conic; style short. 

_Hab._ Penang, Waterfall (Fox).
(15) **I. venulosa** Hook. fil. F.B.I. i. 602; Loesen. l.c. 90. var. nervulosa Loesen. l.c.

Glabrous tree. Leaves oval to elliptic or ovate-elliptic coriaceous abruptly caudate-acuminate, base very shortly cuneate, pale beneath; nerves slender numerous much reticulate. Umbel-lules peduncled 1'5 to 2 in. long, simple or panicled. Flowers numerous greenish white '1 in. across; pedicels '25 in. long. Males 4-merous. Petals connate. Stamens short. Females, umbels shorter stouter, 5- or 6-merous. Drupe red globose 2'5 to 3 mm. through; pyrenes 5 or 6. Hab. Singapore, Woodlands (Beccari). Distrib. of type from India, Burma. I have seen no specimen from the Malay Peninsula.

(16) **I. cymosa** Bl. Bijdr. 1149; Hook. fil. F.B.I. i. 605; King, l.c. 136. I. singaporiana Wall Cat. 6526 (Fig. 43, p. 441).


(17) **I. macrophylla** Wall. Cat. 4331; Hook. fil. F.B.I. i. 605; King, l.c. 136; Loesen. l.c. 84.

Glabrous tree about 60 ft. tall. Leaves elliptic-oblong obtuse sub-coriaceous, base narrowed; nerves 12 pairs visible beneath, 4 to 7 in. long, 2 to 2'5 in. wide; petioles '5 in. long. Cymes 1'25 in. long; peduncle long; branches several. Flowers in heads at the ends white '15 in. across 4- or 6-merous. Petals oblong blunt connate at base in males, free in females. Stamens longer. Drupe sub-globular '2 in. through red; pyrenes 8. Hab. Common on roadides and in woods. Singapore, Bukit Timah; Changi. Malacca, Ayer Panas (Griffith); Bukit Bruang. Province Wellesley, Permatang Bertam. Penang, Chalet; Penara Bukit (Curtis). Distrib. Mergui. Native names: Medang Tulok; Timah Timah Bulan; Gading.
Order XXXIX. CELASTRINEÆ.

Trees or bushes, or lianes, sometimes spiny. Leaves opposite rarely alternate coriaceous often serrate. Flowers generally cymose small, usually bisexual. Calyx small 4- or 5-lobed. Petals 4 or 5 insert below disc imbricate. Stamens 4 or 5 (except Hippocrates and Salacia 3 only). Disc usually large and conspicuous. Ovary sessile on disc or immersed in it, 3- or 5-celled; style short or none; ovules 2 to 4 in each cell anatropous, rarely pendulous or many attached to axis. Stigma triangular. Fruit capsular, baccate or a drupe or samaroid. Seed often arillate, sometimes winged. Species 500, whole world (King, Journ. As. Soc. Beng. Ixv. 339).

Stamens 4 or 5; filaments slender.
Fruit dehiscent; leaves generally opposite.
Ovules 2 in a cell.
   Petals connate .................................................. 1. Microtropis
   Petals free, clawed ............................................. 2. Euonymus
   Ovules solitary; petals bifoveolate .......................... 3. Glyptopetalum
   Ovules 4 or more in a cell; seeds winged in large capsule; trees ................................................. 4. Lophopetalum
   Disc free from ovary; stamens insert on edge; capsule 3-celled ......................................................... 5. Celastrus
   Disc confluent with ovary; stamens from beneath it; capsule 3-celled ....................................................... 6. Gymnosporia
   Ovary free, with tuft of hairs at top; styles 2; capsule entire or 2-lobed; trees ........................................... 7. Kurrimia
   Drupe unilocular 1 or 2 seeds ................................ 8. Pleurostylis
   Fruit a dry compressed indehiscent drupe 1 or 2 seeds ................................................................. 9. Elæodendron
   Fruit a berry; seeds 3 or 4 .................................... 10. Perrottetia
   Stamens 3; filaments broad flat. ................................. 11. Hippocrates
  Climbers; fruit flat dehiscent; seed winged ................. 12. Salacia

1. MICROTROPIS, Wall.

Glabrous trees or shrubs. Leaves opposite, entire. Flowers in sessile clusters or pedunculate, cymes axillary or supra-axillary small sometimes unisexual. Sepals 4 or 5 imbricate. Petals 4 or 5 connate at base or erect. Stamens 5, insert on disc or corolla. Disc 0 or small. Ovary free ovoid 2- or 3-celled; ovules 2 in each cell; style very short or 0. Stigma minute. Capsule ovoid or oblong coriaceous 2-valved, 1-seeded, dehiscing on one side and falling, leaving the red pulpy arillate seed still attached. Species about 12, India, Ceylon, Java.

Cymes sessile condensed under \( \frac{1}{2} \) in. long .......................... (r) M. elliptica
Cymes and peduncles 1 in. long or less.
   Leaves thin coriaceous oblong-lanceolate acuminate .... (2) M. discolor
   Leaves coriaceous ovate-lanceolate blunt ................... (3) M. ophirensis
   Cymes on long thin peduncles, 3- to 5-flowered; peduncles \( \frac{3}{4} \) in. long; petals ovate ................................. (4) M. bivalvis
Cymes many-flowered; peduncles 3 in. long; petals oblong. Cymes stout much branched 3 in. long; petals round.

(5) **M. filiformis**

(6) **M. valida**

(1) **M. elliptica** King, l.c. 340.

Shrub or small tree. Leaves thinly coriaceous elliptic cuspidate-acuminate acute, base connate; nerves 6 pairs, 4'5 to 5 in. long, r'85 to 2'5 in. wide; petioles 3 in. long. Cymes axillary 2 in. long, with 6 to 8 white flowers '25 in. across sessile. Sepals 4 or 5 reniform toothed. Petals 4 or 5 larger sub-rotund. Stamens 4 or 5; filaments connate half-way. Ovary 2-celled. Fruit ovoid beaked tapering at base, '6 to '7 in. long; peduncle '2 in. long. **Hab.** Forests to 2000 ft. altitude. Perak, Larut (Kunstler). Penang, Moniot's Road, West Hill (Curtis).

(2) **M. discolor** Wall. Cat. 4337; King, l.c. 341; Lawson, in Hook. fil. F.B.I. i. 614.

Shrub or small tree. Leaves thinly coriaceous oblong-lanceolate much acuminate base acute; nerves 4 or 5 pairs, 3'5 to 4'5 in. long, r to r'75 in. wide; petioles '25 to '3 in. long. Cymes '5 to '75 in. long, extra-axillary spreading 8- to 10-flowered. Flowers '7 in. long sub-sessile. Sepals reniform, edge ciliate. Petals much larger oblong-ovate. Stamens 5; filaments short on a hypogynous disc. Fruit sub-globular '3 in. long. **Hab.** Forests, local. Penang, damp ravines, West Hill 2000 ft. altitude (Curtis). **Distrib.** Himalayas, Burma.


Tree. Leaves lanceolate or ovate-lanceolate blunt, base narrowed, coriaceous 2 or 3 in. long, r to 5 in. wide; nerves 7 or 8 pairs; petioles '15 to '25 in. long. Cymes short; peduncles r in. or less. Flowers few, white. Sepals scale-like, edge toothed. Petals ovate sub-acute. Stamens attached to peduncles; filaments short. Fruit '75 in. long elliptic, base narrowed, beaked. **Hab.** Malacca, Mount Ophir. Rare about 3000 to 4000 ft. altitude.

(4) **M. bivalvis** Wall. Cat. 4340; King, l.c. 342.

Shrub or small tree 10 ft. tall. Stem '5 in. through. Leaves coriaceous oblong-lanceolate acuminate, base shortly narrowed; nerves 5 or 6 pairs, 2'5 to 3'5 in. long, r to r'75 in. wide; petioles '25 in. long. Cymes extra-axillary r to r'5 in. long; petioles filiform '5 to '75 in. long. Flowers 3 to 5 in a cyme, '25 in. across; pedicels '2 to '3 in. long. Sepals reniform, edges crenulate. Petals larger ovate round, base narrow. Stamens 5; filaments dilate and connate half-way. **Disc** 0. Fruit ellipsoid '5 in. long, r- or 2-celled and r- or 2-seeded. Seed with a bright red pulpy aril. **Hab.** Penang Hill (Maingay, Curtis, etc.).

(5) **M. filiformis** King, l.c. 343. **M. bivalvis** Lawson, l.c. i. 614 (part).

Shrub or small tree 10 to 15 ft. tall. Leaves coriaceous elliptic acuminate, base cuneate; nerves 5 to 8 pairs indistinct, 4'5 to
7 in. long, 1·5 to 2·75 in. wide; petioles 3 to 4 in. long. Cymes axillary or extra-axillary on filiform peduncles 1·25 to 3 in. long, divericate many-flowered. Flowers 3 in. across greenish yellow. Sepals reniform, puberulous. Petals much longer oblong blunt, puberulous connate at base. Stamens shorter than petals, attached at base to corolla-tube. Disc none. Fruit ovoid pointed 5 in. long. 


(6) **Microtropis.**


Branches stout. Leaves thickly coriaceous elliptic acuminate shining acute, base cuneate, 3·5 to 6 in. long, 1·5 to 3 in. wide; nerves 6 to 8 pairs fine; nervules as large, reticulations conspicuous on both sides; petioles thick grooved 5 in. long. Cymes stout 3 in. long; peduncles 1·5 in. long. Bracts ovate acute 1 in. long, 3 to each flower. Flowers 3 clustered on the top of each cyme-branchlet, 4 in. across; branches 5 in. long; branchlets 2 in. long sessile. Sepals 4 imbricate rounded in 2 unequal pairs glabrous, edges thinner, inner ones the larger, coriaceous. Petals 4 connate below, short broad rounded. Stamens 4 broad inserted on the tube. Pistillode truncate. 

**Hab.** Perak, Hermitage Hill (Curtis).

2. **EUONYMUS, L.**

Small trees or shrubs, glabrous. Leaves opposite. Calyx 4- or 5-fld. Petals 4 or 5. Stamens 4 or 5 inserted on the disc; anthers broad, 2-celled. Disc large fleshy 4- or 5-lobed. Ovary sunk in disc 3- to 5-celled; ovules 2 in each cell; style short or 0. Stigma 3- to 5-lobed. Capsule pyriform 3- to 5-celled, 3- to 5-lobed or angled, coriaceous, cells 1- or 2-seeded. Seeds covered by a coloured aril. Species 80, tropical and sub-tropical Asia, Europe, and North America.

- Flowers in fascicles of 2 or 3; petals fimbriate. (1) **E. javanicus**
- Flowers in lax 10- to 20-flowered cymes; petals not fimbriate. (2) **E. Wrayi**
- Flowers in lax cymes and 15 in. across; petals oblong toothed. (3) **E. rufulus**


Glabrous shrub, from 6 to 20 ft. tall. Leaves thinly coriaceous oblong-lanceolate to elliptic oblong, base connate; nerves 5 to 6 pairs, 4 to 6 in. long, 1·35 to 2·5 in. wide; petioles 3 to 5 in. long. Flowers in fascicles of 2 or 3, or in 2- or 3-flowered cymes. Peduncles 5 in. long, 5 in. across. Sepals 5 round. Petals oblong fimbriate greenish white. Stamens 5; ovary conic. Fruit pyriform deep

(2) *E. Wrayi* King, l.c. 343.
Small tree. Stem 4 to 6 in. through. Leaves as in *E. javanicus.* Cymes axillary or terminal spreading; peduncles 1'5 to 3 in. long; branches filiform 1'5 in. or less. Flowers '25 in. across. Sepals large 5. Petals 5, little larger, round clawed, edge undulate, green veined crimson. Ovary sunk in disc. Fruit pyriform 5-lobed '75 in. long red. *Hab.* Mountains up to 5000 ft. altitude. Pahang, Kota Glanggi, limestone rocks; Telom. Selangor, Gunong Mengkuang Lebah (Robinson). Perak, Gunong Batu Putih (Wray); Gunong Inas (Yapp); Gunong Kerbau (Robinson). Kedah, Gunong Bintang (Kloss).

Small tree. Leaves coriaceous elliptic, blunt-acuminate at both ends; nerves about 5 pairs, invisible above, obscure beneath, midrib elevate both sides, 1'5 to 4 in. long, 5 to 75 in. wide; petioles '25 in. long, thick. Cymes 8 in. long very slender. Peduncles '4 in. long; pedicels as long. Flowers '15 in. across dull red. Sepals orbicular. Petals broader than long, rounded-oblong denticulate punctate. Stamens very short; filaments tapering upwards. *Hab.* Pahang, Gunong Tahan at 5000 ft. altitude (Robinson).

3. **GLYPTOPETALUM,** Thw.


Leaves bullate entire, 6 to 12 in. long . . . (1) *G. quadrangulare*
Leaves smooth serrate, 2'5 to 3'5 in. long . . . (2) *G. Scortechinii*

(1) *G. quadrangulare* Prain, *in King,* l.c. 245.
Shrub 2 to 15 ft. tall. Branchlets angled and winged. Leaves thinly coriaceous elliptic to oblong acuminate bullate; nerves 10 to 12 pairs depressed above, reticulations large conspicuous, 6 to 12 in. long, 2'5 to 5 in. wide; petioles 3 to 6 in. long. Cymes slender 3 in. long few-branched lax. Flowers few 3 in. across. Sepals reniform. Petals round reniform clawed, on the edge of a 4-lobed disc; anthers reniform. Fruit rounded 4-angled 4 to
4. LOPHOPETALUM, Wight.

Trees often large. Leaves opposite or alternate coriaceous. Cymes usually spreading many-flowered. Flowers small to medium. Sepals 5 rounded short. Petals 5 continuous with disc, upper surface often crested or covered with fleshy villi. Stamens 5, inserted on the top of a disc. Disc large conspicuous often lobed. Ovary immersed in the disc 3- or 4-celled; ovules 4 or more in each cell; style short. Capsule large oblong, 3- to 4-angled, 3- to 4-celled. Seeds long winged. Species about 20, Indo-Malayan.

Leaves oblong 4 to 5 in. long.
Disc without processes.
 Sepals blunt ovate; flowers '25 in. wide . . (1) L. pachyphyllum
 Sepals deltoid round; flowers '3 in. wide . . (2) L. fimbriatum
 Leaves 4 to 5 in. long; flowers '2 in. wide . (3) L. subobovatum
Disc with numerous processes; flowers '25 in.
 Leaves elliptic 4 by 2 in.; umbels 1 to 5 in. long, peduncled; petals orbicular . . (4) L. Scortechinii
 Leaves elliptic 4 by 1'75 in.; petals oblong fimbriate . . (5) L. oblongum
 Leaves elliptic-oblong 3 by 1'5 in. . . (6) L. fusescens
 Leaves lanceolate '25 by '75 in.; flowers very small '1 in. wide . . (7) L. oblongifolium
 Leaves not crested; disc cupular; stamens insert on edge; ovary immersed in disc (§ Kokoona).

Leaves elliptic-ovate 5 by '75 in. . . (8) L. pedunculatum
Leaves stiffly coriaceous 4 by 1'5 in. elliptic . (9) L. intermedium
Leaves elliptic acuminate '25 by 1'75 in. . . (10) L. pallidum
 Very doubtful; flowers in a spicate panicle . (11) L. reflexum

(12) L. coriacea
(13) L. Maingayi
(14) L. littoralis
(15) L. dubium
(1) **L. pachyphyllum** King, l.c. 348.

Tree 80 to 100 ft. tall, 2 to 3 ft. through. Leaves very thick coriaceous elliptic-oblong light green, bluish beneath; nerves 7 or 8 pairs, 4 to 5'5 in. long, 1'6 to 2'75 in. wide; petioles '5 to '75 in. long. Cymes 3 to 4 in. across, 7 in. long. Flowers '75 in. across on '5 in. pedicels. Calyx and disc hardly lobed, round. Petals yellow attached to edge of the deep red disc. *Hab.* Forests, Malacca (Maingay). Perak, Larut Hills 800 to 1500 ft. altitude (Kunstler).

(2) **L. fimbriatum** Wight Ill. i. 1708; Lawson, in Hook. fil. F.B.I. i. 615; King, l.c. 349.


(3) **L. subobovatum** King, l.c. 349.

Medium-sized tree. Leaves coriaceous obovate obtuse shortly cuspate blunt, much narrowed to base; nerves 6 pairs, 2'5 to 4 in. long, 1'4 to 2 in. wide; petioles '35 to '45 in. long. Panicles axillary 4 to 5 in. long; branches 1'5 in. spreading. Flowers '3 in. in diameter. Calyx teeth deltoid. Petals ovate obtuse, keeled and wrinkled above. Disc entire. *Hab.* Penang, Cooly lines, Government Hill, 1200 ft. altitude (Curtis).

(4) **L. Scortechinii** King, l.c. 350.

Tree 60 to 80 ft. tall, 15 to 20 in. through. Leaves coriaceous elliptic to obovate, blunt or sub-acute, base narrowed; nerves 5 pairs, 3'5 to 4'5 in. long, 1'75 to 2'25 in. wide; petioles '4 to '5 in. long. Panicles axillary cymose 2'5 to 4 in. long, spreading; branches 1'5 in. long. Flowers rather crowded at branch ends '25 in. across yellow. Calyx lobes ovate obtuse. Petals deltoid, round smooth. Disc thin. *Hab.* Perak, Larut Hills 500 to 1000 ft. altitude (Kunstler).

(5) **L. oblongum** King, l.c. 350.

Tree 50 ft. tall. Leaves coriaceous oblong, shortly cuspate, base cuneate; nerves 7 or 8 pairs, 3'5 to 4'5 in. long, 1'5 to 1'8 in. wide. Panicles 3 to 3'5 in. long; branches lax. Flowers '3 in. across; pedicels '1 in. long. Sepals deltoid round. Petals longer, oblong with a fimbriate crest above. Fruit woody, 5 in. long, 1'5 in. wide. Seeds 2'5 in. long. *Hab.* Penang, Waterfall (Curtis). Lankawi, Kesap (Haniff).


Tree. Leaves coriaceous oblong shortly acuminate, base rounded; nerves 16 to 18 in pairs, 4 to 8 in. long, 2'5 to 3 in. wide; petioles '8 to 1'25 in. long. Panicles axillary and terminal.

(7) **L. oblongifolium** King, l.c. 351.

Tree 80 to 100 ft. tall. Leaves coriaceous, oblong acuminate, base narrowed; nerves 8 or 9 pairs, 4'5 to 6 in. long, 1'75 to 2'25 in. wide; petioles '5 to '65 in. long. Panicles axillary terminal 4 in. long rather stout, many-flowered; branches 1 in. long. Flowers '25 in. across. Calyx flat; teeth 5 sub-reniform. Petals ovate-elliptic, edges lacinate or not, a broad-based fleshy appendage and some hairs on the upper surface. Disc covered with short bristles. Hab. Perak (Scortechini). No locality given. Distrib. Sumatra.


Tree 40 to 50 ft. tall. Leaves thinly coriaceous, elliptic, base rounded, tip shortly acuminate; nerves 8 pairs, 4 to 5 in. long, 1'75 to 1'5 in. wide; petioles '25 in. long. Panicles 2 in. long; branches few. Pedicels '15 in. long. Calyx lobes short ovate. Petals oblong, tip fimbriate, white, with transverse crest of processes near the base. Disc thick. Ovary free from disc trigonous. Hab. Lankawi, Kesap (Haniff).

(10) **L. pallidum** Lawson, in Hook. fil. F.B.I. i. 615.

Glabrous tree. Leaves elliptic-oblong, pale when dry; nerves fine 8 to 10 pairs, nervules nearly as prominent, 2'5 to 3 in. long, 1'1 to 1'3 in. wide; petioles '3 in. long. Cymes '5 to '75 in. long. Flowers '25 in. across, 6 to 8 in a cyme. Calyx and disc round entire. Petals round deltoid papillose above. Disc flat with many hair-like processes. Hab. Lowland woods. Malacca (Maingay, Derry).

var. Curtisii Ridl. L. Curtisii King, l.c. 351.


(11) **L. reflexum** Lawson, l.c. i. 616; King, l.c. 352.

Tree 40 to 50 ft. tall. Leaves thinly coriaceous lanceolate acuminate narrowed to base; nerves 4 or 5 pairs, 2'25 to 3'25 in. F.M.P., 1.
XXXIX. CELASTRINEÆ. [Lophopetalum.


(12) L. coriacea Ridl. Kokooka coriacea King, l.c. 347.

Tree 30 to 40 ft. tall, 12 to 18 in. through. Leaves coriaceous ovate-oblong sub-acute, base cuneate, lighter beneath; nerves 6 or 7 pairs, 4'5 to 5 in. long, 2 to 3 in. wide; petioles '5 to '6 in. long. Panicles axillary 4 to 5 in. long, peduncled; branches lax 1'5 in. few-flowered. Flowers pale yellow '3 in. wide; pedicels shorter. Calyx cupular, short-toothed. Petals ovate thick, centre ridged. Stamens insert on the inner edge of the 5-lobed disc; anthers large cordate long-appendaged. Ovary ovoid free from the disc. Hab. Perak, Lariv (Kunstler).

(13) L. Maingayi Ridl. Kokooka Scortechinii King, l.c. 347.


(14) L. littoralis Ridl. Kokooka littoralis King, l.c. 346; Lawson, F.B.I. 1. 617.

A tall tree. Leaves thinly coriaceous ovate acute, base rounded; nerves 8 to 10 pairs, 3 to 4 in. long, 2 to 2'5 in. wide; petioles '8 to 1 in. long. Panicles axillary and terminal 4 to 6 in. long; branchlets spreading cymose. Flowers '1 in. across; pedicels '1 in. long. Calyx lobes sub-acute. Disc orbicular. Fruit broadly 3-winged, 4'5 in. long, 1'5 in. wide. Seeds 1'5 to 2 in. long. Hab. A tall tree always growing in the water (Lawson), rare. Singapore (Lobb). Malacca (Maingay).

L. dubium Lawson, l.c. 1. 616.


I do not think this is a Lophopetalum at all, the specimen is very poor. Maingay suggests Rutaceæ.

5. CELASTRUS, Linn.

Ovary not immersed 2- to 4-celled; ovules 2 in each cell; style short. Stigma 3-lobed. Capsule sub-globose or ovoid, valves 3. Seeds 1- to 6-arillate. Species about 20, tropical Asia, Australia, China, Japan, N. America.

Leaves membranous; flowers in terminal panicles . (1) **C. paniculata**
Leaves coriaceous; flowers in axillary racemes . (2) **C. malayensis**

(1) **C. paniculata** Willd. Sp. Pl. i. 1125; Lawson, in Hook. fil. F.B.I. i. 617.


Glabrous woody climber 40 to 50 ft. long. Branches black. Leaves coriaceous elliptic to ovate acute or acuminate, serrate or nearly entire, base shortly cuneate; nerves 5 or 6 pairs prominent, 3'5 to 4'5 in. long, 1'5 to 1'7 in. wide; petioles 2 to 25 in. long. Racemes several from one axil 2 in. long. Flowers 1 in. across, white. Calyx obscurely lobed. Petals very small oblong. Fruits on pedicels 2 in. long, 3-valved orange, valves ovoid 3 in. long and as wide. Seed 1 aril red. Hab. In hilly country in forests. Pahang, Sungei Jelai (Machado); Telom. Perak, Gunong Batu Putih (Wray); Maxwell's Hill. Penang Hill, Penara Bukit (Curtis). Patani, Tomoh (Machado). Kedah, Alor Sta. Native names: Gurugun; Akar Serapoh.

**6. GYMNOSPORIA,** Wight.

Shrubs or treelets often spiny. Leaves alternate. Flowers in small dichotomous cymes. Calyx 4- to 5-cleft. Petals 4 or 5. Stamens 4 or 5 insert beneath a broad flat disc. Ovary confluent with disc 2- or 3-celled; ovules 2 in each cell; style short 2- or 3-lobed. Capsule ovoid. Seeds 1 or 2 in each cell, aril more or less covering the seed. Species 55. Dry warm regions. Old World.

(1) **G. Curtisii** King, l.c. 353.

Scandent shrub glabrous. Leaves coriaceous, ovate-elliptic sub-acute crenate, base narrowed; nerves 10 to 15 pairs faint, 4 to 6 in. long, 2'25 to 3 in. wide; petioles 4 to 5 in. long. Cymes 5 to 7 in. long, fascicled on the ends of nude branches. Flowers 15 in. long; pedicels much longer. Sepals 5 semi-orbicular. Petals 5 oblong blunt. Stamens 5 shorter. Disc entire. Fruit ovoid 3-angled, 3-valved. Hab. Lankawi (Curtis).
7. **KURRIMIA**, Wall.

Big trees. Leaves opposite coriaceous entire large; petioles slender. Flowers small in panicles or racemes. Calyx 5-fid. Petals 5. Stamens 5 from edge of disc. Disc lobed. Ovary puberulous at base with tuft of hairs at tip; ovules 2 in a cell; styles filiform 2. Stigmas small capitate. Capsule entire or bilobed dehiscing by 2 valves. Seed arillate. Species 3 or 4, Indo-Malayan.

Flowers red, racemose; fruit not bifid . . . (1) **K. pulcherrima**
Flowers green, panicked; fruit bifid . . . (2) **K. paniculata**

(1) **K. pulcherrima** Wall. Cat. 4334; Lawson, in Hook. fil. F.B.I. i. 622; King, l.c. 354. K. Maingayi Lawson, l.c. 622.

Tree 40 to 70 ft. tall. Leaves oblong acuminate, base rounded; nerves 12 pairs, 6 to 8 in. long, 1'75 to 3'25 in. wide; petioles 8 in. long. Racemes several in an axil. Flowers red 1'15 in. across. Sepals elliptic. Petals elliptic round. Disc obscurely lobed. Capsule crimson, narrow ellipsoid narrowed to tip 1 to 1'5 in. long. Seed 6 to 8 in. long white. **Hab.** Lowland woods. Singapore, Tanglin; Bukit Mandai. Malacca, Ayer Panas; Sungei Hudang (Derry). Negri Sembilan, Petasih (Foxworthy). Perak, Hermitage (Curtis). Penang, Penara Bukit. **Native names:** Medang Gidap; Boko-Boko; Medang Tijoh.

(2) **K. paniculata** Wall. Cat. 4336; Lawson l.c. i. 622; King, l.c. 355.

Tree 30 to 60 ft. tall, much branched. Leaves deep shining green, elliptic-oblong 8 in. long, 3'25 in. wide; nerves 24 pairs; petioles 1 to 3 in. long. Panicles 12 in. long spreading. Flowers 1'15 in. wide pale yellow. Sepals and petals oblong obtuse, puberulous. Disc 4-lobed. Fruit cordate flattened laterally, bilobed at the top olivaceous yellow flushed pink at the base, 1'75 in. across dehiscing across the top. Seeds 1 to 3, usually 2, covered with a sweet pulpy red aril. **Hab.** Lowland woods, common. Singapore, Johor, Malacca, Selangor, Perak, Pahang, Penang. Kedah to Southern Siam. **Native names:** Bunak; Biko-Biko.

8. **PLEUROSTYLIS**, Wight.

Pleurostylis.]

XXXIX. CELASTRINEÆ.

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(i) **P. Wightii** Wight and Arnott Prodr. 157; Wight Ic. 155; Lawson, l.c. i. 617.

Leaves elliptic to lanceolate obtuse, narrowed at both ends, glaucous beneath; nerves numerous fine, 2·5 in. long, 1 in. wide; petioles 1·1 in. long. Cyme 1- or 2-flowered, 1·1 in. long. Fruit ellipsoid 2 in. long. *Hab.* Woods in the north. Penang, Batu Feringhi (Curtis). Lankawi (Curtis). *Distrib.* Mascarene isles and S. India.

(Fig. 44.—Elaeodendron subrotundum.)


Trees or shrubs. Leaves opposite crenate or entire. Flowers small in axillary branching cymes. Calyx 4- or 5-cleft. Petals 4 or 5 spreading. Disc cupular. Stamens 4 or 5; anthers sub-globose. Ovary continuous with disc, 2- to 4- or 5-celled; ovules 2 in a cell; style very short. Drupe 1- or 2-celled indehiscent, cells 1- or 2-seeded. Species 40, all tropics.

(i) **E. subrotundum** King, l.c. 356.

Small stout tree 20 to 30 ft. tall. Leaves coriaceous ovate or
sub-rotund blunt, base shortly narrowed; nerves 6 or 7 pairs, 2 to 2.5 in. long, 1/2 to 1.8 in. wide; petioles 1/3 to 1.5 in. long. Cymes axillary and terminal 1.5 to 2.5 in. long, much-branched. Flowers numerous 1/2 in. across yellowish white; pedicels longer. Calyx cupular 4- or 5-lobed. Petals 4 or 5 oblong blunt. Disc cupular thin. Stamens 4 or 5 on outer edge of disc. Ovary 2-celled. Drupe pear-shaped 1/4 in. long, 1/25 in. wide in widest part, brown woody 1-celled. Hab. Common on sea-shores and in sandy woods behind the mangroves. Singapore, Serangoon; Kranji; Tanjong Katong. Johor coasts. Pahang near Pekan. Selangor, Port Swettenham (Burkill). Perak, Krian (Burgers). Distrib. Borneo.

10. **PERROTTETIA, H.B.K.**

Shrubs. Leaves alternate ovate-oblong acuminate serrulate. Cymes short axillary. Flowers very small. Calyx cupular 3-lobed. Petals 5 valvate. Stamens 5 inserted on disc edge; filaments subulate; anthers sub-globose. Disc sub-lobed. Ovary half-immersed 3- to 4-locular. Stigma sub-sessile or style short. Berry small globose 2- to 4-celled, 2-seeded. Species 10, Malayan 4, the others Polynesian and American.


11. **HIPPOCRATEA, Linn.**

Scandent shrubs. Leaves opposite. Flowers white or yellow, small in axillary cymes. Calyx of 5 lobes or free. Petals 5 larger. Stamens 3; filaments recurved lying in grooves of the ovary. Disc flat. Ovary 3-celled; ovules 2 to 10 in 2 series in each cell; style very short. Fruit of 2 or 3 flattened carpels dehiscent. Seeds compressed winged below. Species 90, tropics generally.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
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<td>Panicles and flowers red tomentose</td>
<td>(1) <strong>H. ferruginea</strong></td>
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<tr>
<td>Panicles and flowers glabrous; flowers yellow 1 in. across; leaves entire</td>
<td>(2) <strong>H. macrantha</strong></td>
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<td>Panicles puberulous; leaves crenate; flowers yellow 1 in. wide</td>
<td>(3) <strong>H. nigricaulis</strong></td>
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<tr>
<td>Panicles glabrous; leaves crenulate; flowers 0.5 in. across white</td>
<td>(4) <strong>H. indica</strong></td>
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(1) **H. ferruginea** King, l.c. 357. Salacia Griffithii Lawson, in Hook. fil. F.B.I. i. 628; King, l.c. 364.

Leaves coriaceous elliptic-oblong sub-acute, base rounded or sub-acute crenulate; nerves 5 pairs, 3'25 to 5'5 in. long, 2 to 2'25 in. wide; petioles '3 to '4 in. long. Panicles axillary 3 to 5 in. long, spreading lax, ferruginous pubescent. Flowers '2 in. across, greenish brown. Sepals round rusty-tomentose outside. Disc large, edge wavy thick. Ovary sub-globose, 3-lobed. Rare in forests. Penang, Western Hill (Curtis). Distrib. Koh Samui, Peninsula, Siam.


Stem brown smooth. Leaves coriaceous elliptic acuminate or blunt entire, light green, base rounded or shortly narrowed; nerves about 7 pairs, reticulations large conspicuous beneath, 5 in. long, 3 in. wide; petioles '1 in. long. Panicles 2 in. long; branches many stout. Flowers '45 in. across yellow star-like; pedicels '2 in. long glabrous. Calyx short blunt-lobed. Petals lanceolate coriaceous pubescent outside, hairy on the upper part inside. Disc large hairy outside, 5-lobed. Capsule elliptic of 2 flat boat-like carpels thin, woody 2'8 in. long, and each '6 in. wide, lanceolate narrowed to tip. Seed 1'75 in. long, flat sub-spathulate. Hab. River-banks, not rare. Singapore, Sungei Pandan; Selitar, Johor, Tebrau River; Kota Tinggi. Muar, Sungei Pauh (Fox). Pahang, Sungei Chenei (Fox). Distrib. Borneo to Philippines. Native names: Akar Bintang; Gambir Ayer.


(4) **H. indica** Willd. Sp. Pl. i. 193; King, l.c. 359.

A large climber. Leaves membranous elliptic acuminate minutely crenulate, blunt at both ends to lanceolate; nerves slender 6 pairs, 2'25 to 3 in. long, 1 to 1'5 in. wide; petioles 2 in. long. Panicles 1 to 3 in. wide. Flowers numerous very small white '05 in. across. Calyx lobes triangular hairy. Petals oblong obtuse. Carpels 2 oblong blunt striate 2 in. long. Seeds 2 in each. Hab. Open

**EXCLUDED**

H. MAINGAYI Lawson, l.c. i. 635, is a Lophopetalum.

12. **SALACIA**, Linn.

Climbing or scrambling shrubs or treelets. Leaves opposite rarely alternate. Flowers small in fascicles or small cymes in leaf-axils. Calyx 5-lobed. Petals 5 imbricate. Stamens 3 continuous with the disc. Ovary conic immersed in disc 3-celled; ovules 3 to 8 in a cell; style very short. Fruit baccate red or orange 1- to 3-celled. Seed imbedded in white pulp large angular. Species about 130, tropics generally.

Leaves alternate.
Leaves opposite.

Flowers in pedunculate cymes, very short.
Flowers campanuloid.
Flowers with spreading petals.
Flowers in panicked cymes, 1'5 in. long.
Flowers fascicled on axillary tubercles.

Flowers 3'5 to 4'5 in. long.
Leaves 6 to 12 in. long coriaceous.

Leaves 10 to 12 in a fascicle.

Flowers 3 to 6 on a tubercle.
Leaves broad shining, oblong to lanceolate; nerves inconspicuous.

Leaves elliptic; nerves conspicuous, 4'5 by 3 in.

Flowers 1'25 in. wide.
Leaves elliptic to lanceolate, 3 in. long.

Leaves oblong, 4 by 1'75 in.

Flowers 1 to 1'75 in. wide.
Leaves oblong, 7 in. long.

Leaves elliptic, 3'5 in. long; flowers on long slender pedicels.

Leaves elliptic, cuspidate, 2'5 by 1'25 in.; pedicels short.

Leaves elliptic, cuspidate 3 by 1'5 in.; pedicels '15 in. long.

Flowers solitary or in pairs, not on tubercles.

(1) **S. viminea** Wall. Cat. 7267; Lawson, in Hook. fil. F.B.I. i. 627; King, l.c. 362.

Slender climber. Leaves membranous, usually alternate, lanceolate acuminate both ends; nerves 5 to 7 pairs very faint, 2'5 to 4 in. long, '8 to 1'5 in. wide; petioles '8 to 1'5 in. long. Flowers '15 in. across, yellow; pedicels thin, '3 in. long, solitary or 2 to 3 together on small tubercles. Calyx flat, lobes triangular. Petals 5, round or ovate. Disc very convex. Stamens 3, filaments flat, triangular. Fruit globose red, 4 in. through. **Hab.** Forests, Singa-

(2) **S. campanuloidea** *King, l.c. 363.*

Woody climber 50 ft. long. Leaves thinly coriaceous ovate to elliptic-oblong, crenulate bluntly cuspidate, narrowed to base; nerves 6 to 8 pairs faint, 3 to 4⅓ in. long, 1⅓5 to 2 in. wide; petioles 3 to 4 in. long. Cymes few-flowered very short solitary. Flowers greenish yellow, campanulate 15 to 2 in. long. Pedicels as long or longer. Calyx lobes transversely oblong. Petals obovate-elliptic glaucous campanulate. Disc conical. Ovary immersed. Fruit sub-globose or pyriform 1⅓ to 2 in. through, reddish yellow. *Hab.* Climbing on tree-trunks in forests, 800 ft. altitude. Perak, Goping and Ulu Bubong (Kunstler).

(3) **S. perakensis** *King, l.c. 364.*

Climber. Leaves elliptic blunt acuminate; nerves 4 to 5 pairs, 2 to 2⅜ in. long, 1 to 1⅓5 in. wide; petioles 2 in. long. Cymes 3 to 4⅓5 in. across on peduncles 3 to 7⅓5 in. long, 5- to 8-flowered. Flowers 1½ in. long; pedicels longer. Calyx of 5 round lobes. Petals erect oblong puberulous much longer. Disc cylindric. Anthers 3 sessile on disc. Ovary immersed. *Hab.* Perak (Scortechini). I have not seen this plant.


Young branches much lenticellate sometimes. Very distinct in its long panicled cymes. It has long ago disappeared from this one locality.

(5) **S. Scortechinii** *King, l.c. 364.*

Stout climber. Leaves coriaceous, oblong to elliptic sub-acute, base narrowed or rounded not reticulate below; nerves 6 to 8 slightly prominent beneath, 6 to 10 in. long, 2½ to 3½ in. wide; petioles 6 to 7½ in. long. Flowers 3½ in. across, 10 to 12 on axillary tubercles. Pedicels 3½ to 4 in. long. Calyx lobes reniform. Petals orbicular. Disc convex. Stamen-filaments triangular. Ovary flat immersed. *Hab.* Perak (Scortechini). Possibly only a form of *S. grandiflora.*
(6) **S. grandiflora** Kurz. *Journ. As. Soc. Beng.* xli. 300; *Lawson, l.c.* i. 626. **S. longifolia** Lawson, *l.c.*

A large more or less sarmentose shrub with pale bark. Leaves coriaceous, deep shining green, oblong-elliptic to oblong-lanceolate, base narrowed or rounded; nerves 7 to 9 pairs, 5 to 6 in. long, 2-25 to 3-25 in. wide; petioles 5 in. long. Flowers glabrous pearly white 25 in. across, in groups of 3 to 6 or more on short axillary

This plant is very variable in the form of its leaf, and it varies from a distinctly scandent stout shrub to a small straggling tree. The large pearly
flowers and brilliant fruit are well-marked points of difference from any other species.

(7) **S. latifolia** Wall. Cat. 4222.

Climber. Leaves coriaceous elliptic or rounded blunt, edge undulate base, rounded or shortly cuneate; nerves 4 to 8 pairs slightly prominent beneath, 3 to 6 in. long, 2 to 2'5 in. wide; petioles '5 in. long. Flowers '4 in. across in fascicles of 6 or 8 from axillary tubercles; pedicels slender '5 in. long. Calyx lobes rounded reniform. Petals much larger, obovate blunt. Stamens, filaments flat long. Fruit globose 1 in. through. Seeds '75 in. long. *Hab.* Singapore (Wallich), Johor, Sedenah. Dindings, Tanjong Hantu; Pangkor (Scortechini). *Distrib.* Andamans, Nicobars, Tenasserim.

Perhaps only a form of *S. prinoides*.

(8) **S. prinoides** DC. Prodr. i. 571; Lawson, l.c. i. 626; King, l.c. 366.

Climbing shrub or bush. Leaves opposite, coriaceous, pale beneath or not, elliptic-oblong cuspidate, edges crenulate waved or entire, base cuneate; nerves 5 or 6 pairs, '75 to 3'5 in. long, 1 to 1'5 in. wide; petioles '15 to '25 in. long. Flowers '25 in. across brown, 3 to 6 or more on small tubercles in the axils; pedicels slender '25 to '35 in. long. Calyx lobes rounded. Petals cordate obtuse, base clawed. Disc convex. Stamens 3. Fruit ovoid-globular '5 in. long, 1-celled, 1-seeded. *Hab.* Borders of woods. Singapore, Bukit Timah Road. Malacca (Maingay). Perak (Scortechini). *Distrib.* Indo-Malaya.

var. **macrophylla** King. *S. macrophylla* Bl. Bijdr. 221.

Leaves broad elliptic acuminate narrowed at base, 4 to 5 in. long, '75 to 2'75 in. wide. *Hab.* Perak, Larut, open jungle (Kunstler, Wray).

(9) **S. verrucosa** Wight, Ill. i. 134; Lawson, l.c. i. 628. S. polyantha Korth. Flora xxxi. 379; King, l.c. 367.


(10) **S. flavescens** Kurz. Journ. As. Soc. Beng. xli. 300; Lawson, l.c. i. 627; King, l.c. 368. S. ovalis Lawson, l.c. 627. S. Lawsoni King, l.c. 369.

A scandent or sarmentose shrub or bush. Leaves opposite coriaceous bright green when dry oblong sub-acute, base rounded entire; nerves 6 to 9 pairs inarching far from edge, finely reticulate,
4 to 7 in. long, 1'25 to 2'5 in. wide; petioles 2 in. long thick. Flowers orange or cherry red, 1'5 in. across in axillary clusters, numerous, with numerous pale ovate bracts at base; pedicels slender 2 in. long. Calyx-lobes ovate rugose acute. Petals twice as long elliptic. Disc lower rim thin wavy, upper part fleshy confluent with ovary. Stamens 3; filaments triangular. Fruit globular, 1'5 to 2 in. through, orange with sweet white pulp round the seeds. Forests and open country common. Leaves variable in size. var. dumosa King, is only a mountain or open country state. Hab. Singapore, Tanglin; Pulau Dammar; Bukit Timah. Johor, Gunong Pulai. Selangor or Batu Caves. Pahang, Tahan River. Dindings. Perak, Ulu Kerling and Ulu Bubong (Kunstler). Province Wellesley, Krian. Penang, Government Hill (Curtis) to 1500 ft. altitude. Adang islands, Pulau Rawei, Kedah, Yan. Lankawi, Kwah (Curtis). Kelantan, Chaning Woods. Distrib. Tenasserim. Native names: Katimpong; Sedang.

(i1) S. Kunstleri King, l.c. 368.
Scandent shrub. Leaves thin coriaceous entire oblong lanceolate narrowed to base; nerves 7 pairs, 3'5 to 5'5 in. long, 1'75 to 2'3 in. wide; petioles 1'5 in. long. Flowers 1'5 in. across, on long slender pedicels 5 in. long, in fascicles of 3 to 6 on axillary tubercles, greenish yellow. Calyx lobes ovate- orbicular, edges ciliate. Petals oblong- orbicular. Disc thin annular. Filaments triangular. Hab. Not common in forests. Perak, Goping (Kunstler). Kelantan, Chaning Woods (Ridley).

Very near S. verrucosa, but the leaves quite entire and pedicels much longer.

(i2) S. Wrayi King, l.c. 367.
Stout climber. Leaves membranous broad elliptic cuspidate rounded or narrowed at base, below pale; nerves 6 or 7 pairs, 1'7 to 2'5 in. long, 1 to 1'35 in. wide; petioles 3 to 4 in. long. Flowers 1'5 in. across in small cymes on a short 1 in. long peduncle; pedicels 1'5 in. long slender. Calyx lobes reniform ovate. Petals broadly oblong blunt. Disc cupular; filaments stout slightly flattened. Ovary 3-angled. Fruit globular 2 in. through orange corrugate; pedicel stout 3 in. long. Hab. Perak, Kota (Wray).

Very near S. Maingayi, but the flowers are smaller and the inflorescence peduncled.

(i3) S. rubra Lawson, l.c. i. 627.
Climbing shrub. Leaves elliptic cuspidate narrowed to base coriaceous; nerves 5 to 6 faint opposite, 3'5 in. long, 2 in. wide; petioles 2 in. long. Flowers 1'5 in. across in fascicles of 5 or 6; pedicels 2 in. long. Calyx-lobes short blunt rugose. Petals lanceolate obtuse rather fleshy keeled on the back. Stamens 3 from the top of the disc; filaments short linear; anthers rounded elliptic. Disc tall thick. Ovary quite immersed. Fruit about

Somewhat like S. Wrayi, but the leaves larger and the pedicels longer.

(14) **S. Maingayi** Lawson, *l.c.* i. 626; King, *l.c.* 363. **S. Lobii** Lawson, *l.c.*

Climber 6 to 15 ft. long. Branches minutely warty. Leaves coriaceous ovate-elliptic cuspidate, base rounded; nerves prominent beneath, 5 to 7 pairs, 2½ to 4½ in. long, 1½ to 2½ in. wide; petioles ½ to ¾ in. long. Flowers 1 or 2 in axils ¼ in. across, greenish yellow; pedicels ½ in. long. Calyx lobes reniform. Petals oblong rounded. Disc deep glabrous. Stamens 3 attached to upper part of disc; filaments triangular. Ovary sunk in disc. Style none. Hab. Open jungle, hills, Perak, Larut Hills (Kunstler). Penang Hill (Maingay, Curtis).

**S. Lobii** Laws. appears to be a form of this with more oblong leaves and longer pedicels.

**ORDER XL. RHAMNEÆ.**

Climbing shrubs, bushes, or small trees, often spiny. Leaves alternate rarely opposite, usually coriaceous, often tri-nerved and usually crenate or serrate. Flowers usually bisexual small green or yellowish in cymes axillary, or in false panicles. Calyx 4- or 5-lobed, lobes triangular. Petals 4 or 5 on the throat of the calyx tube, hooded or lobed, very small. Stamens 4 or 5 opposite petals. Disc filling or lining the calyx tube. Ovary free or immersed in the disc, 3- rarely 2- or 4-celled; ovules one in a cell; style simple or 2- to 4-cleft. Fruit a capsule, samara or drupe, 3- or 1- to 4-celled, free or half enclosed in the calyx tube. Species about 420, whole world.

Fruit superior drupaceous.

1. **Zizyphus**
   - Spiny trees or shrubs; disc 5- to 10-lobed
   - Slender climber, not spiny; disc cup-shaped lining tube
   - Shrub or tree, unarmed; disc thin lining tube
   - Fruit half inferior dry; shrubs unarmed.
   - Fruit capsular 3-celled; 3 seeds; bush or tree erect
   - Fruit winged 1-celled; seed 1; climbers
   - Fruit indehiscent sub-globose with one narrow wing
   - Fruit dehiscent oblong or ovate lanceolate flat
   - Fruit inferior 3-winged

2. **Sageretia**
3. **Oreorhamnus**
4. **Colubrina**
5. **Ventilago**
6. **Smythea**
7. **Gouania**


Small trees, bushes or climbing shrubs with stipular straight or hooked prickles. Leaves alternate tri-nerved coriaceous. Flowers
fascicled or cymose. Calyx 5-fid keeled inside, tube obconic. Petals 5 cucullate. Disc 5- to 10-lobed, edge free. Stamens 5; ovary sunk in disc and confluent at base 2- to 4-celled; styles 2 to 4. Fruit a drupe; stone 1- to 4-celled, 1- to 4-seeded. Species 60, temperate regions of both worlds, tropical Asia and America.

*Z. Jujuba Lam.*, the Jujube, Bidara of the Malays, a small tree with the leaves buff tomentose beneath, occurs in gardens chiefly in Malacca; it seldom fruits elsewhere.

Leaves pubescent beneath.

Spiny bush; leaves 1.5 to 2 in. long; fruit glabrous.

Climbers.

Leaves oblong thickly pubescent 5 by 2.5 in. long; fruit red-woolly 1 in. long. (1) *Z. õenoplia*

Leaves ovate cuspitate pubescent on nerves only, 2.5 by 1 in. long; fruit glabrous, small. (2) *Z. Kunstleri*

Leaves hairy above, .5 in. long, ovate acuminate. (3) *Z. elegans*

Leaves quite glabrous.

Leaves ovate acuminate 2 in. long; cymes axillary. (4) *Z. pernettyoides*

Leaves large oblong. (5) *Z. Horsfieldii*

Cymes in thyrsoid panicles; fruit tomentose.

Cymes axillary; drupe glabrous. (6) *Z. calophylla*

(7) *Z. affinis*

(1) *Z. õenoplia* Mill. Gard. Dict. No. 3; *Hook. fil. F.B.I.* i. 634; *King, l.c. 373.*


(2) *Z. Kunstleri* *King, l.c. 373.*

Climbing shrub, stout thorny. Shoots pubescent. Leaves coriaceous elliptic-oblong, sub-acute or blunt acuminate finely serrate, base rounded above, glabrous except nerves beneath, sparsely or densely tomentose, 4 to 6 in. long, 2 to 3 in. wide; petioles .15 to 2 in. long. Cymes 5- to 8-flowered, branched dense; peduncle .5 in. long, thick, densely tomentose. Flowers .25 in. across densely tomentose outside. Drupe ovoid, densely red-
tomentose, brown, 1 to 1.5 in. long, '75 in. through. Hab. Forests in low country, Johor, Castlewood. Province Wellesley (Kunstler).

(3) Z. elegans Wall. Cat. 4233; King, l.c. 374.

Slender climbing shrub, hairy. Leaves ovate acuminate blunt, membranous, minutely serrate, base rounded, glabrous above; nerves 3 or 4 pairs, hairy beneath; nervules faint, 2 to 3 in. long, '75 to 1.25 in. wide; petioles '25 to '35 in. long. Cymes '6 in. long, pubescent dichotomous, spreading. Flowers '1 in. across, white, pubescent outside. Drupe sub-globular compressed '3 in. across. Hab. Open woods and river-banks, Singapore (Wallich). Pahang, Tahan River. Malacca, Ayer Panas; Batu Tiga (Good-enough). Perak, Goping (Kunstler). Distrib. Sumatra.

(4) Z. pernettoides, Ridl.


(5) Z. Horsfieldii Mig. Fl. Ind. Bat. i. 643; King, l.c. 376.

Slender liane sparingly puberulous. Leaves ovate-elliptic to lanceolate, acuminate, base shortly narrowed, glabrous, thinly coriaceous; nerves 3, 2 outer with prominent laterals running to margin, 2.5 to 3 in. long, 1 to 1.75 in. wide; petioles '3 to '5 in. long. Cymes '4 in. long branched, pubescent or nearly glabrous. Drupe flattened, globose, minutely puberulous. Hab. Forests, not common. Singapore, Bukit Timah. Malacca (Maingay). Distrib. Java, Borneo.

(6) Z. calophylla Wall. Cat. 4230 and in Roxb. Fl. Ind. ii. 366; Hook. fil. F.B.I. i. 636; King, l.c. 374.

Powerful thorny climber. Leaves coriaceous glabrous shining light green elliptic to oblong, blunt cuspidate minutely crenate or not, base rounded; nerves 3 prominent, transverse; nervules very fine, 3 to 5 in. long, 1.5 to 2.5 in. wide; petioles '25 in. long. Cymes dense '2 in. across in axillary and terminal panicles, densely tomentose. Flowers '1 in. across, green. Drupe ovoid to globose, minutely brown tomentose, '6 in. long. Hab. Forests, common. Singapore, Garden Jungle; Selitar. Johor, Batu Pahat. Pahang, Sungei Chenei (Fox). Malacca (Griffith), Merlimau (Derry). Negri Sembilan, Seremban (Cantley). Selangor, Kwala Lumpur;

(7) Z. affinis Hemsl. Ic. Pl. t. 1544.

Strong climber resembling Z. calophylla, but quite glabrous. Leaves more acuminate, crenulate. Cymes 1 to 1·25 in. long, glabrous. Flowers green, nearly glabrous, 1 in. long; peduncle 5 in. long. Fruit ovoid glabrous 75 in. long, greenish brown, velvety. Hab. Forests. Perak, Changkat Serdang (Wray); Thaiping Hills to 1500 ft. altitude (Kunstler). Lankawi islands.

2. SAGERETIA, Brgn.

Straggling or climbing shrubs (sometimes armed). Leaves sub-opposite usually serrate or crenulate. Flowers very small sessile on terminal leafless parts of branches spicate or panicled. Calyx 5-lobed, tube hemispherical, lobes acute keeled inside. Petals 5 clawed and hooded. Stamens 5 as long. Disc cup-shaped lining the tube, edge 5-lobed. Ovary free from disc but sunk in it, 3-celled; styles 3-grooved. Stigmas 3. Fruit globose, 3-celled, 3-seeded indehiscent. Species 12, India, China, Java, N. America.

(1) S. parviflora Don, Gen. Syst. ii. 29.

Climber slender 30 to 50 ft. long. Branches black. Leaves ovate-lanceolate acuminate crenulate coriaceous glabrous smooth; nerves slender 5 pairs, 2 in. long, 1 in. wide; petioles 0·5 in. long. Spikes pubescent 2 in. long. Flowers very small sessile in small fascicles glabrous pale yellow. Fruit turbinate globose black. Hab. Open jungle on limestone hills, climbing over trees and bushes. Perak, Kwala Dipang (Kunstler). Distrib. India, Java.

3. OREORHAMNUS, Ridl.

Shrub or tree, buds red-hairy. Leaves thinly coriaceous glabrous, lanceolate acuminate shortly at both ends, serrate; nerves 6 pairs raised beneath, sunk above, reticulations fine conspicuous, petiolar. Flowers very small in pairs in upper axils, pubescent. Calyx campanulate 5-lobed. Petals in mouth of calyx very small spathulate bilobed enwrapping anther. Stamens 5; filaments short slider from top of disc; anthers ellipsoid, opposite petals. Ovary 3-lobed hairy; ovules 1 in each cell; styles short cylindric 3. Disc very thin lining the calyx tube. Fruit unknown. Species 1, Malay Peninsula.

(1) O. serrulata Ridl. Journ. F.M.S. Mus. xi. 32.

Leaves 3 in. long, 1 in. wide alternate; petioles hairy when young, 5 in. long. Calyx 1·5 in. long hairy outside, lobes triangular acute. Petals much shorter, spathulate bilobed clawed 5. Stamens
from edge of the thin disc. *Hab.* Kedah, Gunong Bintang (Kloss’ collector).

4. COLUMBRINA, Rich.

Shrubs or trees. Flowers in short axillary cymes. Calyx 5-fid, tube hemispheric. Petals 5 clawed hooded, insert at edge of disc. Ovary sunk, and confluent with disc 3-celled; style 3-cleft. Fruit sub-globose; pericarp membranous surrounded at base by calyx tube, cells 1-seeded dehiscent. Species 18, chiefly tropical American.

Sea-shore shrub; leaves ovate serrate. . . . . (1) *C. asiatica*

Jungle tree; leaves oblong entire. . . . . (2) *C. anomala*


(2) *C. anomala* King, l.c. 377.

Tree 30 to 40 ft. tall, 10 to 15 in. through. Shoots puberulous. Leaves membranous oblong-oblanceolate, puberulous beneath entire; nerves 5 pairs prominent, 4 to 6 in. long, 1.1 to 2.25 in. wide. Cymes axillary many-flowered branching tomentose. Flowers 1.5 in. across light yellow. Fruit globose depressed 2.25 in. through on a 1 in. peduncle. *Hab.* Forests at 300 to 500 ft. altitude. Perak, Larut Hills (Kunstler). *Native name:* Sena Hutan.

This is a fine timber tree, and extremely dissimilar to the common species.

5. VENTILAGO, Gaertn.

Woody climbers. Leaves sub-coriaceous or membranous, alternate ovate-oblong, base oblique, usually crenulate. Flowers small axillary fascicled or on cymes, slender shoots with small leaves often caducous so as to be paniculate. Calyx conic or campanulate with 5 acute lobes. Petals small bilobed. Stamens as long opposite. Ovary immersed in disc 2-celled; styles 2 recurved. Fruit a samara, nut round, half or not enclosed in the calyx tube; wing narrow oblong or lanceolate. Species about 10, Africa, Asia, Australasia.
Calyx tube half covering nut.
  Wing oblong                      (1) V. malaccensis
  Wing sword-shaped acute          (2) V. gladiata
Calyx tube not covering nut.
  Glabrous; leaves stiff coriaceous entire; wing 3 by '6 in.        (3) V. Maingayi
  Glabrous; leaves thinner serrate; wing 4 by '5 in.                (4) V. oblongifolia
  Branches and nerves velvety; wings 2'5 by '6 in.               (5) V. velutina

Fig. 46.—Ventilago malaccensis.

V. leiocarpa Lawson, in Hook. fi. F.B.I. i. 631; King, l.c. 380, not of Benth.

Leaves thinly coriaceous sub-membranous ovate acuminate to oblong blunt, serrate or nearly entire, base rounded; nerves 6 to 11 pairs; nervules fine conspicuous, 2'25 to 6 in. long, 2'5 in. wide; petioles 12 in. long. Bracts small hairy. Cymes '15 to '2 in. across. Flowers white glabrous except ovary, '1 in. across. Nut globose half covered by the cup-shaped calyx; wing yellow, linear-oblong blunt 2 to 2'5 in. long, 4' in. wide. Hab. Woods
and river-banks common. Singapore (Cantley); Garden Jungle. Malacca (Maingay); Ayer Panas (Goodenough). Perak, Larut (Kunstler). Penang, Telok Bahang; Chalet (Curtis). *Distrih.* Borneo. *Native names:* Akar Hitam; Akar Tukus.

(2) *V. gladiata* Pierre, *Fl. For. Cochinchine,* t. 314c.

Leaves lanceolate acuminate narrowed to the base, membranous, edge minutely serrulate; nerves 6 pairs; nervules conspicuous transverse, 2·6 to 3·3 in. long, 1 to 1·1 in. wide; petioles 1·5 in. long. *Inflorescence* axillary racemose; rachis puberulous. Cymes small. Fruit glabrous; pedicel 1 in. long, nut 2 in. long round enclosed for three-quarters its length in the enlarged calyx, narrowed at the base to the pedicel; wing lanceolate narrow to the base and acute at tip 2·5 in. long, 4 in. wide. *Hab.* Perak, Sungei Larut (Wray). *Distrih.* Cambodia.

The flowers are unknown.

(3) *V. Maingayi* Lawson, l.c. i. 631; *King,* l.c. 379.

Young branches and panicles softly hairy. Leaves thinly coriaceous drying pale glabrous oblong to lanceolate blunt entire, base shortly narrowed and rounded; nerves 8 to 11 pairs; transverse nervules visible on both sides, 2·5 to 4·5 in. long, 1·25 to 1·75 in. wide; petioles 1 to 2 in. long. *Panicles* narrow lax 8 in. long; branches slender. Flowers 1 in. wide, glabrous solitary or in threes; pedicels as long as flowers puberulous at base. Bracts very small pubescent. Calyx short goblet-shaped, lobes acute. Petals deeply bilobed spatulate, lobes truncate. Ovary glabrous. Fruit glabrous; nut 2·5 in. long; wing 1-nerved blunt mottled red, 3 to 3·5 in. long; calyx flat, not covering nut. *Hab.* Edges of forest and river-banks. Malacca (Maingay); Sungei Hudang (Derry). Pahang, Temerloh. Negri Sembilan, Tampin Hill. Perak (Scortechini). Penang Hill (Haniff). Lankawi, Pulau Segai. *Native names:* Akar Kamagan Antan; Kutapek.

(4) *V. oblongifolia* Bl. *Bijdr.* 1144. Smythea macrocarpa *var.* pubescens *King,* l.c. 382.

Stout climber. Leaves lanceolate gradually acuminate acute, base rounded usually oblique, serrate, membranous, glabrous on both sides or tomentose beneath; nerves 7 to 9 pairs strongly elevate beneath, 4 to 4·5 in. long, 1·5 to 1·75 in. wide; petioles very short 1 in. or less. *Inflorescence* axillary or terminal, rachis stout tomentose; branches 4 in. long with distant cymules. Flower-pedicels 1 in. long. Fruit glabrous; nut 2 in. long ovoid; calyx small not enclosing it, 1 in. long, 5 in. wide; wing linear-oblong, blunt, slightly narrowed at base, 5 in. long, 6 in. wide. *Hab.* Thickets and woods. Selangor, Batu Caves. Perak, Waterfall Hill (Wray, Scortechini). *Distrih.* Java, Philippines.

(5) *V. velutina* Ridl. Smythea macrocarpa *var.* pubescens *King,* in *part.*
Branches, petioles and nerves of leaves below velvety hairy. Leaves thinly coriaceous lanceolate-elliptic short acuminate obtuse, base cuneate, edge minutely serrulate, above sparsely hairy, 2 in. long, 7 in. wide; petioles 1 in. long. Cymes axillary small sessile, many-flowered. Bracts narrow acuminate glabrous. Fruit sparsely hairy; nut ellipsoid 4 in. long; calyx at base small cup-shaped ribbed; wing oblong, tip rounded 2 in. long, 6 in. wide. Pedicels very short. Flowers unknown. Hab. Perak (Scortechini).

6. SMYTHEA, Seem.


Leaves elliptic-lanceolate entire; fruit lanceolate or ovate acute.
Leaves ovate-lanceolate or oblong serrate; fruit oblong obtuse.

(1) S. pacifica


Glabrous climber. Leaves elliptic acuminate or lanceolate base rounded entire coriaceous; nerves 3 to 5 pairs; nervules and reticulations conspicuous on both sides, 2 to 3.75 in. long, 1 to 1.5 in. wide; petioles 2 in. long. Flowers in fascicles of 9 in upper axils 1 in. across; peduncles 1 in. long hairy. Calyx lobes triangular acute hairy. Petals obtangular bilobed, lobes rounded; ovary hairy. Fruit lanceolate or ovate acuminate 2 in. long, 1 in. wide, persistent calyx goblet-shaped ribbed. Hab. Seashores, climbing over trees. Singapore, Serangoon River; Bajau. Penang, Pulau Jerajah (Curtis). Province Wellesley, Kelumping, Krian (Borgens). Distrib. Pulau Sangian, Borneo, Timor Laut, Aru, New Guinea, Philippines, Fiji islands. Native name: Bulang Akar.

(2) S. macrocarpa Hemsl. Ic. Pl. 1558; King, l.c. 381.

Branches puberulous. Leaves sub-coriaceous ovate-lanceolate or oblong-lanceolate acuminate serrate, base obtuse oblique; nerves 6 to 9 pairs, 3.5 to 5 or 7 in. long, 1 to 2 in. wide; petioles 2 in. long. Flowers 10 in a fascicle 15 in. across; pedicels as long. Calyx pubescent lobes triangular. Fruit oblong obtuse dehiscing along median line, 2.5 in. long, 1 in. wide. Hab. Open jungle. Perak, Waterfall Hill, Thaiping (Wray, Kunstler). Penang, Batu Feringhi (Curtis).

7. GOUANIA, Lam.

Climbers, rather slender woody cirrhiferous. Leaves alternate. Flowers very small in small cymes on long slender spikes. Calyx
tube obconic 5-lobed. Petals 5 insert below disc cucullate. Stamens 5 wrapped in petals. Ovary immersed in disc; style 3-fid. Fruit inferior crowned by calyx, 3-winged with round wings, 3-celled. Seeds one in a cell plano-convex obovate, small shining black. Species 30, chiefly S. American, some in tropical Asia, Africa and Polynesia.

Branchlets and flowers tomentose; racemes rather crowded. (1) *G. javanica*

Branches and flowers sub-glabrous; racemes elongate; flowers distant. (2) *G. leptostachya*

(1) *G. javanica* Miq. *Fl. Ind. Bat.* 1 (i.) 649; *King*, l.c. 383.


(2) *G. leptostachya* DC. *Prodr.* ii. 40; *King*, l.c. 383.

Branchlets nearly or quite glabrous. Leaves ovate broad serrate or crenate above, glabrous except nerves sometimes puberulous, 1:75 to 3 in. long, 1 to 1:5 in. wide. Racemes slender pubescent, 6 to 12 in. long. Flowers in distant cymes of 3 to 4, sub-glabrous. Disc with 5 oblong truncate emarginate lobes. Fruit broader than long, rather broader than in *G. javanica*. *Hab.* Edges of tracks through forest. Pahang, Raub track (Machado). Perak, road to Jor. Perlis, Kanga. *Distrib.* India.

Very near *G. javanica*, and may be only a variety, but more glabrous with longer spikes.

**Order XLI. AMPELIDÆ.**

Shrubs usually climbing by tendrils, bushes or rarely small trees (*Leea*). Stems angled or flattened or round. Leaves alternate simple, digitate or compound. Flowers small in umbellate cymes, or spicate, regular, bisexual. Calyx entire or 4- or 5-lobed. Petals 4 to 5, free or cohering valvate, often falling in a cap. Stamens 4 to 5 opposite, the petals insert at base of disc or between the lobes; filaments short; anthers 2-celled introrse. Disc free or adnate to petals or stamens. Ovary 2- to 6-celled; style short or o; ovules
1 or 2 in a cell. Berry 1- to 6-celled. Seed often rugose. About 400 species, whole world.

Climbers with tendrils; ovary cells 2-ovuled.
Flowers spicate or cymose; rachis subterete. 1. Vitis
Flowers on a broad red flattened rachis. 2. Pterisanthes
Erect, bushy shrubs; ovary cells 1-ovuled. 3. Leea

1. Vitis, Linn.

Climbing shrubs with tendrils. Leaves simple, trifoliolate to 9-foliolate, rarely pinnate. Flowers in umbellate cymes, or racemes, or spikes. Calyx entire or 4- or 5-toothed. Petals 4 or 5. Stamens 4 or 5. Ovary 2- rarely 3- or 4-celled; ovules 2 in a cell; style short or 0. Berry ovoid or globose; cells 1- or 2-seeded. About 375 species, in tropics of Asia, Africa, Polynesia, rare in America. This genus is often broken up into 3 or 4, which I prefer to keep as sections merely, as do Hooker and King.

i. Ampelocissus. Flowers 4- to 5-merous; disc annular adherent to base of ovary; style conic; stigma minute; inflorescence thyrsoid or a panicule or spike of spikes pendent and usually red-hairy.

Inflorescence thyrsoid,
Stems bristly hairy ........................................ (1) V. Martini
Stems woolly tomentose ................................... (2) V. Harmandi
Inflorescence a panicle of very long racemes of
flowers in clusters; leaves simple entirely
glabrous .......................................................... (3) V. macrostachya
Inflorescence a long raceme of short spikes.
Leaves simple.
Leaves 3 by 2 in. sparsely pubescent beneath (4) V. gracilis
Leaves 2 to 4 in. long red floccose beneath. (5) V. floccosa
Leaves 5 by 5½ in., thickly red-tomentose
beneath (some leaves trilobed) ............. (6) V. cinnamomea
Leaves 3- to 5-lobed always, densely red-
hairy beneath; leaflets sub-coriaceous,
very shortly petioluled ........................................ (7) V. elegans
Leaflets 4 or 5 red-tomentose beneath;
petiolules 1 in. long ..................................... (8) V. compositifolia
Leaflets large long-petioluled, all glabrous. (9) V. polystachya

ii. Tetrastigma. Flowers 4-merous expanding, disc adherent to base of ovary; style very short; stigma large lobed; cymes axillary corymbose erect. Whole plant glabrous and usually very large, woody-stemmed.

Leaves simple ............................................. (10) V. Scortechinii
Leaves trifoliolate; corymb lax.
Leaflets broad ovate; corymb large spreading;
fruit small red ................................................ (11) V. peduncularis
Corymb slender much branched; flowers
very small ..................................................... (12) V. Curtisii
Corymbs very short, few branched 2 in. or
less across.
Leaves stiff; cymes sub-sessile; fruit '5 in.
through, yellow ........................................... (13) V. Lawsonii
Leaves thin; cymes slender peduncled,
few-branched under 1 in. across; fruit
red '25 in. long ................................................ (14) V. Wrayi
Leaflets 3 to 5, oblong lanceolate; stem pustular; corymb 1 to 1'5 in. across . (15) V. lanceolaria
Leaflets elliptic to ovate; cymes 2'5 by 2 in.; flowers rose pink . . . . (16) V. Kunstleri

iii. AMPELOPSIS. Flowers 5-merous; disc cupular; style subulate; stigma entire; cymes leaf-opposed.
Leaflets trifoliate large . . . . (17) V. semicordata
Leaflets bipinnate ovate cuneate truncate 1 in. long . . . . (18) V. cantoniensis

iv. Cissus. Flowers 4-merous; petals falling off in a cap; disc 4-lobed; style subulate; stigma minute; inflorescence cymose corymbose, leaf-opposed.
Leaves simple.
Leaves red woolly beneath . . . . (19) V. pyrrhodasys
Leaves glabrous; flowers not more than 1 in. long.
Leaves rather thick fleshy, base shortly cuneate; fruit black . . . . (20) V. furcata
Leaves thin herbaceous.
Leaflets ovate-lanceolate truncate or cordate, spotted pink and white, red beneath . (21) V. discolor
Leaflets broadly cordate green ovate; coryms 1 in. wide . . . . (22) V. repens
Leaflets ovate base truncate not cordate; coryms 1 in. wide; flowers over 1 in. wide . . . . (23) V. diffusa
Leaflets oblong-ovate truncate slightly subcordate; fruit red 1 in. long . . . . (24) V. glaberrima
Leaflets sagittate; stem succulent 4-angled white . . . . (25) V. hastata
Leaves trifoliate.
Leaflets soft tomentose; fruit large transparent pink . . . . (26) V. mollissima
Leaflets small ovate cuneate, glabrous . . . . (27) V. trifolia
Leaflets 3- to 5-foliate ovate to lanceolate 1 to 2 in. long . . . . (28) V. japonica
Leaflets 7 to 9, stiff, 6 to 9 in. long; petiolules 1'5 in. long . . . . (29) V. novemfolia

(1) V. Martini Hort. V. barbata var. trilobata King, l.c. 388. Ampelocissus Martini Planch. DC. Mon. Phan. 373.

This is the Saigon Vine, which was at one time cultivated in Annam for its fruit, and wine was even made from it, but it did not prove a success.

(2) V. Harmandi Ridl. Ampelocissus Harmandi Planch. l.c. 378.
Stem reddish white-woolly. Leaves deeply cordate trilobed; lobes short broad acute, above glabrous, beneath arachnoid, woolly


Long pendent glabrous climber. Leaves coriaceous shining dark green ovate or oblong cuspitate, edges serrate spiny, base round; nerves 5 pairs, 3'5 to 6 in. long, 1'75 to 3 in. across; petioles 1 in. long. Spikes panicked slender very long pendent, some branches 9 to 14 in. long. Flowers green '1 in. long; pedicels as long, solitary or in fascicles. Fruit '3 in. long. Hab. Common on edges of forests and woods. Singapore, Tanglin; Bukit Timah, Pahang, Benta-Kwantan Road (Evans). Malacca (Griffith); Sungei Hudang; Ayer Panas (Derry). Selangor, Ulu Gombak; Rawang, Perak, Larut (Kunstler); Temengoh. Province Wellesley, Krian. Distrib. Sumatra.

(4) **V. gracilis** Wall. Cat. 6007; Roxb. Fl. Ind. (ed. Carey) ii. 477; King, l.c. 389. Ampelocissus gracilis Planch. l.c. 407.


Stem slender densely covered with red tomentum. Leaves entire ovate-cordate acute; nerves 4 pairs, reticulations conspicuous glabrous above, densely red-tomentose beneath, 2 to 4 in. long and wide; petioles 1 in. long. Peduncles slender 2'5 in. long; branches distant '5 to 1 in. long. Flowers 10 to 12 on each '05 in. long, sessile on the tomentose, rachis 4-merous. Berry round oblong glabrous '5 in. long. Seeds 3 boat-shaped pustular. Hab. Roadsides, local. Johor, Gunong Pulai on the hedges and in thickets at the base (Ridley).

(6) **V. cinnamomea** Wall. Roxb. Fl. Ind. (ed. Carey), ii. 483; King, l.c. 389. Ampelocissus cinnamomea Planch. l.c. 408.

Stems rather slender whitish-woolly or red-woolly. Leaves coriaceous ovate-cordate acuminate, or 3-lobed, outer lobes oblique, edge dentate bristle-pointed, above glabrous, beneath cinnamon-


Stems, petioles, tendrils, inflorescence densely red-tomentose. Leaves trifoliolate or 5-foliolate, central lobe oblanceolate 5 to 6 in. long, 2’75 in. wide, laterals oblique ovate narrowed at base; petiolules winged, 4’5 in. long, 2’75 in. wide, outer edges spine-toothed coriaceous glabrous above except nerves, densely red-woolly beneath; petioles 1 to 1’4 in. long. Panicles 8 to 12 in. long; branches °5 to 1’5 long; peduncle stout 5 to 6 in. long. Flowers glabrous pink tipped green, Disc green; filaments pink. Fruit ellipsoid fleshy purple. Hab. Common on edges of woods in the south. Singapore, Tanglin; Selitar. Johor, Pinerong (Cantley); Serom; Tanjong Merawan. Malacca (Griffith). Dindings, Telok Sera.

(8) V. compositifolia Lawson, in Hook. fl. F.B.I. i. 659; King, l.c. 391.

Stem and petioles covered with dense red tomentum. Leaves coriaceous quinate; leaflets oblanceolate, outer ones oblique, bases narrowed, edge sparsely spine-toothed above (except nerves) glabrous, beneath red-tomentose, 8 in. long, 3’5 in. wide; petioles 5 to 8 in. long, stout; petiolules 1’2 in. long. Inflorescence 12 in. long on a peduncle 6 in. long, woolly except the very small distant flowers; spikes 1 to 2’5 in. long red woolly. Fruit oblong °5 in. long. Seeds flat elliptic keeled on the inner side, acute at both ends °3 in. long, °2 in. wide. Hab. Woods. Malacca (Maingay). Perak, Sungei Rayah (Kunstler). Penang (Phillips).

(9) V. polystachya Wall. Cat. 6028; King, l.c. 390. V. nitida Lawson, l.c. i. 662. V. polythyrsa King, l.c. 390. V. thyrsiflora King, l.c. 391, not of Miquel.

Old stem corky. Leaves 5- to 9-foliolate; leaflets coriaceous glabrous except a little hair on the petioles, elliptic-oblong cuspidate, base cuncate, dentate; nerves 7 to 10 pairs, 4 to 8 in. long, 1’5 to 4 in. wide; petiolules °5 to °75 in. long; petioles 3 to 4 in. long. Panicle 1 ft. or more long, sparsely hairy. Fruit globose-oblong often in large bunches, purple or green, quite eatable. Hab. Not rare in dense jungle. Johor, Gunong Pulai; Kota Tinggi. Malacca (Griffith); Selandor (Cantley). Selangor, Kwalä Lumpur; Petaling. Perak, Maxwell’s Hill; Goping (Kunstler). Gunong

10. **V. Scortechinii** King, l.c. 392.

Slender climber 20 to 40 ft. long. Leaves coriaceous simple oblong-ovate deep green acuminate, base round minutely cordate, edge undulate, above glabrous, beneath pubescent or tomentose; nerves 6 to 8 pairs, 4.75 to 8 in. long, 2.5 to 4.5 in. wide; petioles 1.25 in. long. Cymes 1 in. long, 1.5 in. across, lax few-flowered; peduncles 1 in. long, pubescent. Flowers green 4-merous minutely tomentose. Fruit globose waxy white 2.5 in. across. Seed 1. **Hab.** Woods. Selangor, Batu Caves (Curtis). Perak, Goping (Kunstler).

11. **V. peduncularis** Wall. Cat. 6024; King, l.c. 393.

Stem woody warty flattened, young part rusty pubescent. Leaves trifoliate; leaflets coriaceous ovate or elliptic, lateral ones oblong acuminate, base cuneate spinous-serrate glabrous; nerves 6 to 8 pairs elevate beneath, 3 to 5 in. long, 2 to 3 in. wide; petiolules 5 to 7.5 in. long; petioles 3 to 6 in. long. Cymes from old wood 2 to 3 in. long; peduncles 2-5 in. long rather slender, much branched pubescent. Flowers very small 4-merous fragrant. Petals pubescent. Fruiting cymes up to 8 in. long and wide; fruit pea-shaped red. **Hab.** Hill-forests. Johor, Gunong Pantai. Malacca (Maingay). Negri Sembilan, Bukit Amsi; Tampin Hill. Selangor, Kwala Lumpur. Perak, Larut (Kunstler); Gunong Inas, base (Yapp). Penang (Wallich); Penara Bukit (Curtis). **Distrib.** Sumatra, Borneo.


Stem smooth black. Leaves trifoliate; leaflets coriaceous glabrous entire obovate cuspidate narrowed to base; nerves 8 pairs; nervules and reticulations as prominent, 2.5 to 3.6 in. long, 1.3 to 1.9 in. wide; petiolules 2 in. long, mid-one 4 in. long; petioles 5 in. long. Cymes 3 in. long, graceful spreading compound puberulous. Flowers 1 in. long, on pedicels as long. Calyx very short cup-shaped. Petals 4 oblong, tips recurved. Ovary globose free. Stigma large conic lobed. **Hab.** Penang Hill (Curtis).

13. **V. Lawsoni** King, l.c. 394. Vitis tuberculata Lawson, l.c. i. 656, not of Wallich.

A stout tall liane glabrous, upper parts tuberculate. Leaves trifoliate; leaflets sub-coriaceous obovate cuspidate glabrous, base cuneate, sparingly spine-toothed; nerves 5 pairs inarching slender, 3.5 to 5 in. long, 1.5 to 2 in. wide; petiolules, central one 2 to 1 in., lateral ones 2 to 4 in. long; petioles 1 to 1.5 long. Cymes 1 in. across dense sub-sessile or on peduncles 2.5 to 1 in. long. Flowers 1 in. long. Petals 4 white. Fruit globose 1 in. through, yellow eatable. Seeds 3 to 4. **Hab.** Lowland woods, climbing high on trees. Singapore, Garden Jungle; Bukit Timah. Perak, Simpang (Wray); Thai Ping Hills 2500 to 3000 altitude (Kunstler); Goping (Kunstler); Penang Hill 1200 ft. altitude (Curtis). **Distrib.** Burma.
(14) **V. Wrayi** King, l.c. 394.

Stems slender puberulous. Leaves trifoliate; leaflets membranous oblong lanceolate, mid-one much the longest, 5 in. long, 1'5 in. wide; cuspitate acuminate, base cuneate, coarsely serrate or sub-entire; nerves 5 to 6 pairs; petiolules terminal one '5 in. long, lateral ones '1 in. long; petioles 2'5 in. long. Flowers '1 in. wide greenish yellow. Fruiting cyme 4 in. long; fruit white waxy to red '45 in. through. Seeds 2 to 3 oblong 3-sided. *Hab.* Hills up to 3000 ft. altitude. Johor, Gunong Pantai. Selangor, Batu Caves; Dusun Tua. Negri Sembilan, Gunong Berumban; Bukit Danang (Cantley); Tampin Hill (Burkill). Dindings, Gunong Tungul; Pangkor (Curtis). Perak, Thaiiping Hills (Scortechini); Blanda Mabok (Wray). *Native names:* Akar Riang Riang Rimbah; Akar Chiarek.

(15) **V. lanceolaria** Wall. Cat. 6013; King, l.c. 395.

Whole plant except inflorescence glabrous. Stem flat, lower part tubercled. Leaves 3- rarely 5-foliate; leaflets fleshy coriaceous oblong to elliptic-oblong caudate-acuminate, base narrowed, teeth remote shallow; nerves 6 to 10 pairs winged beneath, 4'5 to 6 in. long, 1'75 to 2'75 in. wide; petiolules '4 to '75 in. long; petioles 2 to 5 in. long. Cymes puberulous spreading '5 to 1 in. long and wide; peduncles '4 in. long. Flowers 4-merous white. Fruiting cyme 1'5 in. long. Berry globose as large as a cherry, white. Seed 1 or 2. *Hab.* River-banks and woods. Pahang, Pulau Chengei, Pahang River. Negri Sembilan, Bukit Klanang and Bukit Sulu (Cantley). Selangor, Batu Caves. Perak, Plus River (Wray); Temengoh. Penang (Curtis). Perlis, Tebing Tinggi. *Native names:* Kankong Gajah; Akar Chabang Limah. *Use:* Poultice of the leaves forague.

(16) **V. Kunstleri** King, l.c. 396.

Stem stout warded. Whole plant glabrous except inflorescence. Leaves 5-foliate; leaflets oblong-lanceolate to broad ovate acute, base shortly narrowed, obscurely coarsely crenate; nerves 7 to 9 pairs slender prominent, 2'5 to 4'5 in. long, 1'1 to 1'75 in. wide; petiolules '25 to '5 in. long, terminal one '1 in. long; petioles 4 in. long. Peduncles red-tomentose '5 in. long. Cymes '15 in. long, 2 in. wide, spreading many-flowered. Flowers 4-merous, puberulous rose pink. Fruit globular '35 in. through. Seeds 2 obvoid. *Hab.* River-banks, Pahang, Pulau Chengei and Pasir Loyang, Pahang River. Perak, Tapah; Larut (Kunstler); Batang Padang (Kunstler).

(17) **V. semicordata** Wall. 6020; Roxb. Fl. Ind. i. 481. var. Scortechinii *King,* l.c. 396.

Glabrous. Leaves trifoliate; leaflets coriaceous, median obovate, laterals oblique elliptic acuminate crenate serrate, base cuneate; nerves 6 to 7 pairs, 4 to 5 in. long, 2'5 to 3'5 in. wide; petiolules lateral '1 to '2 in. long, median '2 to '4 in. long; petioles 3'5 to
5 in. long. Cymes umbellate paniced 2 to 2.5 in. across; peduncle 1.5 to 2 in. long. Flowers 15 in. across, 5-merous. Fruit ovoid black 25 in. long. Seeds 2 to 3. **Hab.** Perak (Scortechini). **Distrib.** India, Burma, Java.

This is very different from the Burmese form, but it is rare here, and possibly further collections of it may show it to be distinct.

(18) **V. cantoniensis** Seeem. Bot. Herald. 370; Lawson, l.c. i. 663; King, l.c. 397.

A slender glabrous vine. Leaves unequally pinnate, lower pair of leaflets often compound, all glaucous beneath, lanceolate or ovate acuminate, serrate in upper part, base entire cuneate; nerves 3 to 4 pairs faint, 75 to 2.4 in. long, 5 to 1 in. wide; petiolules 1 to 2 in. long. Cymes umbellate cymose 75 in. across; peduncles 1.5 to 2 in. long. Flowers 1 in. across, yellow. Berry obovoid 25 in. long, white. Seeds 3 or 4. **Hab.** Roadsides and waste ground. Johor, Batu Pahat. Malacca (Hervey). Selangor, Petaling. Negri Sembilan, Perhentian Tinggi. Perak, Hermitage Hill at 3000 ft. altitude (Curtis); (Scortechini). **Distrib.** China and Cochín-China.

This does not seem to be very common. The Perak plants have quite entire leaflets; they are rounded elliptic in the Hermitage Hill plant.


Slender vine. The shoots, back of leaves and inflorescence densely red-tomentose. Leaves simple ovate-cordate acute, bristle-serrate, glabrous above except the 5 pairs of nerves, 2.25 to 5 in. long, 1.75 to 4 in. wide; petioles 75 to 2.25 in. long. Cymes corymbose; peduncles 5 in. long. Flowers small white. Calyx hairy. Berry pea-shaped black small. **Hab.** Roadsides and thicket. Johor, Gunong Pantai. Malacca (Griffith); Machap (Derry). Perak, Larut (Kunstler). Penang (Phillips). Kelantan, Kwala Lebir. **Distrib.** Sumatra, Borneo, Java. **Native name:** Akar Pakan Paya.

(20) **V. furcata** Lawson, l.c. i. 646; King, l.c. 399.

Glabrous vine. Leaves simple fleshy coriaceous ovate acuminate to lanceolate, base blunt narrowed or broad, serrate; nerves 4 to 5 pairs, 2 to 4 in. long, 1 to 2.5 in. wide; petioles 4 to 1 in. long. Cymes 1 to 1.75 in. long lax, 1 in. across; peduncle short. Flowers cream-colour 4-merous. Panicles 5 to 75 in. long of 5 branches, cymes 25 in. long; pedicels 15 in. long, red. Berry black. Seeds 1. **Hab.** Common in woods. Singapore, Chua Chu Kang; Bukit Timah. Johor, Castlewood. Malacca (Maingay). Selangor, Batu Caves. Perak, Larut (Kunstler); Gunong Batu Putih (Wray).

var. *pubescens* King, l.c.

Branches, underside of leaves and cymes more hairy. **Hab.** Perak, Larut, Goping (Kunstler).

Slender climber. Stems red. Leaves simple ovate-lanceolate to lanceolate acuminate, deeply cordate or rounded or cuneate at base membranous glabrous dark green variegated with red and white, purple beneath; nerves 5 to 7 pairs, 2'5 to 4 in. long, '85 to 2 in. across; petioles '2 to 1'25 in. long. Cymes umbellate lax pubescent or compact '5 to '6 in. wide. Flowers '1 in. long, pale yellow. Fruit pyriform '2 in. through, red. *Hab.* Limestone rocks in the north. Perak (Scortechini). Pulau Adang. Perlis and Setul. *Distrib.* Indo-Malaya, Cochin-China.

This pretty vine is often cultivated for its foliage.

(22) **V. repens** Wight and Arnott, Prod. Fl. Pen. Ind. 124; Lawson, *in* Hook. fl. F.B.I. i. 646; King, l.c. 400.


Glabrous. Stem slender woody. Leaves ovate, acuminate subacute and blunt, base broad sparsely serrate spinulose, edge wavy; nerves 3 pairs fleshy membranous, 2'5 to 2'75 in. long, '1'75 to 2'6 in. wide; petioles '1 in. long. Cymes '5 in. long, glabrous. Flowers few, green, umbellate '1 in. across; peduncle '1 in. long. Fruit globose, black, '1- to 2-seeded '4 in. through. Seed '2 in. long. *Hab.* Common in waste ground, whole plant feetid. Singapore (Cantley); Paya Goyang. Malacca (Griffith). Penang (Curtis). *Distrib.* Borneo, Celebes, Christmas Isle.

(24) **V. glaberrima** Wall. Cat. 5991; Roxb. *Fl. Ind.* (ed. Car.) ii. 476; not of King. V. cerasiformis var. Wallichii *King*, l.c. 400.

Tall glabrous vine. Branches above terete or bluntly angled. Leaves herbaceous elliptic cuspidate, base broad rounded or shortly cuneate, sparsely serrulate; nerves 4 pairs 3 to 3'25 in. long, 2 in. wide; petioles '75 in. long. Cymes many-flowered 2 in. through; peduncle '2 to '1 in. long; branches rather stout. Flowers nearly '2 in. long, umbellate; pedicels stout as long. Calyx entire saucer-shaped. Petals long oblong sub-acute '1 in. long. Fruit pisiform '2 in. through on a pedicel '4 in. long, claret pink. *Hab.* Forests, not common. Singapore (Kunstler); Bukit Mandai; Bukit Timah.

The lower part of the stem of this vine is flat and green, with a thick corky edge on both sides.


(26) **V. mollissima** Wall. in Roxb. Fl. Ind. 482; King, l.c. 402.


(27) **V. trifolia** Linn. Sp. Pl. 203; King, l.c. 403. Cissus carnosa Roxb. Fl. Ind. i. 409.

Glabrous herbaceous. Leaves trifoliate; leaflets ovate, elliptic ovate, sometimes cuspidate, base broad or shortly narrowed, coarsely rounded, serrate, glabrous or pubescent; nerves 5 to 6 pairs, 1.5 to 2.5 in. long, 8 to 1.25 in. wide; petiolules 2 in. long (lateral), terminal one 4 in. long; petioles 1.5 to 2 in. long. Cymes 1.5 in. across; peduncle 2 in. long. Flowers rather numerous crowded glabrous or puberulous white 1 in. long. Fruit pisiform, 25 in. through. *Hab.* Lowland country, Singapore (Hullett); Reservoir. Malacca (Griffith); Perak (Scortechini). *Distrib.* India, Java.

(28) **V. japonica** Thumb. Fl. Jap. 104; King, l.c. 403.

Slender climber. Leaves membranous 3- to 5-foliate; leaflets
ovate to oblanceolate acuminate or acute, narrowed to base, edge serrate, softly pubescent on the back or quite glabrous; nerves 7 to 9 pairs, 1.5 to 2 in. long; petiolules 2 in. long (lateral) to 4 in. long terminal; petioles 1.2 in. long. Cymes to 2 in. across; peduncles 1.25 to 1.5 in. long puberulous. Flowers few puberulous. Calyx cup-shaped. Fruit pisiform. Hab. Open country, villages, etc. Malacca, foot of Ophir (Hullett); Ayer Panas (Griffith). Negri Sembilan, Port Dickson. Selangor, Rantau Panjang; Rawang (Kloss). Penang (Curtis). Distrib. Java, Australia, Japan, China.

(30) V. novemfolia Wall. Cat. 6030; King, l.c. 403.

Long rather slender vine glabrous except the inflorescence. Leaves membranous of 7 to 9 lanceolate acuminate leaflets, the outer pair shorter oblique coarsely serrate, narrowed to the base, 4 to 4.5 in. long, 1.2 in. wide; nerves fine 5 pairs, reticulations conspicuous; petiolules 2 in. long or less; petioles 2.2 in. long. Cymes large and lax about 2 in. long; branches stout on a peduncle 4 in. long. Flowers rather few green 1.5 in. wide; pedicels 2 in. long. Calyx cup-shaped. Drupe 7.5 in. through, globose dull green. Seeds 2 to 4. Hab. Thick lowland forests. Singapore, Tanglin; Selitar. Pahang, Kwala Tembeling and Pulau Tawar. Malacca, Rim (Griffith). Negri Sembilan, Bukit Tumiang (Cantley). Dindings, Bruas. Perak, Maxwell’s Hill. Distrib. Andaman. Native name: Lakom Tubaro.

2. PTERISANTHES, Bl.

Slender wiry climbers rather short. Leaves simple or trifoliate. Flowers sunk in a flat broad undulating and often lobed rachis, at first green, later becoming red, pendent on a slender peduncle with a number of usually female or neuter flowers on slender stalks from the edge. Calyx cupular obscurely toothed. Petals 4 ovate. Stamens 4. Stigma capitate on a short conical style. Berry globose 1- to 4-seeded sessile on the red rachis. Species about 12, Malay Peninsula and islands.

Leaves simple glabrous.
Leaves membranous; rachis 3 to 5 in. long by 6 to 1.5 in. wide...
Leaves coriaceous; rachis 6 by 4 in. ...
Leaves simple woolly beneath
Leaves trifoliate glabrous; pedicels of flowers very long
Leaves trifoliate tomentose beneath.
Leaflets linear-lanceolate
Leaflets lanceolate bullate above under 1 in. wide
Leaflets oblance-ovate smooth over 1 in. wide
Leaves 3- to 5-foliate arachnoid beneath; leaflets 3 in. long, 1.5 in. wide
Leaflets 4 in. long, 2.5 in. wide; red tomentose beneath

(1) Pt. coriacea
(2) Pt. Beccariana
(3) Pt. eriopoda
(4) Pt. glabra
(5) Pt. Dalhousiae
(6) Pt. pulchra
(7) Pt. cissoides
(8) Pt. pedata
(9) Pt. rufula

Slender climber. Leaves simple ovate or elliptic acuminate minutely cordate; nerves 4 pairs, sparsely toothed, glabrous, 3'25 to 4'5 in. long, 1'5 to 2'75 in. wide; petioles 7'5 to 1'25 in. long. Peduncles 5 in. long slender with a tendril at half its length.

Rachis downy 3 to 5 in. long, 6 to 1'5 in. wide, red. Immersed flowers yellowish. Petals ovate spreading, pedicellate flowers female or neuter on pedicels 3 in. long. Fruit pisiform black 2 in. through, on rachis. *Hab.* Forests in the low country. Singapore, Bukit Mandai; Bukit Timah. Johor, Castlewood; Gunong Pantai and Gunong Pulai. Selangor; Sungei Buluh; Rawang. Dindings, Lumut. Perak, ThaiPing Hills; Blanja (Wray); Gunong Keledang. *Distrib.* Borneo, Sumatra. *Native name*: Akar Jangut Baong.
(2) **Pt. Beccariana** Planch. DC. Mon. Phan. l.c. 418. var. *Angustifolia* Ridl.

Glabrous except the petiole. Leaves rigidly coriaceous elliptic cuspidate, base minutely cordate, edge sinuate, shining, strongly reticulate on both sides; nerves 4 pairs, 4.25 in. long, 1.6 in. wide; petioles 2 in. long arachnoid. Peduncles 2.3 in. long, rachis narrow linear over 6 in. long, 4 in. wide. Male flowers in the type on very long peduncles 1 in. long. *Hab.* Mountain forests at 3000 to 4000 ft. altitude. Pahang, Gunong Tahan at Wray's Camp (Ridley). *Distrib.* Of type form, Borneo.

(3) **Pt. eriopoda** Planch. DC. Mon. Phan. l.c. 417. *Pt. coriacea King*, var. *araneosa* l.c. 408.

Slender climber. Leaves simple oblong cuspidate or ovate, base rounded minutely or distinctly cordate, edge entire, above glabrous, beneath red-woolly, 5 in. long, 2.6 in. wide; petioles 4 in. long woolly. Peduncles 1.5 to 4 in. long; rachis 6 in. long, 75 in. wide, very undulate and winged down the face. Fruit globose black 3 in. through. *Hab.* Woods in the northern part. Perak, Goping (Kunstler); Thaiping Hills. Province Wellesley, Krian. Penang Hill at 1800 ft. altitude (Curtis). *Distrib.* Sumatra.

(4) **Pt. glabra** Ridl. Trans. Linn. Soc. iii. 287.

Very slender glabrous vine. Leaves trifoliate; leaflets thin lanceolate acuminate, narrowed at base, dentate at tip; nerves 3 pairs, 3 in. long, 1 in. wide, lateral leaflets oblique inaequilateral; petiolules 5 in. long; petioles 1 in. long. Peduncles 3 to 4 in. long, slender; rachis flat, not lobed, horseshoe-shaped, 3 to 4 in. long, 1 in. wide. Flowers on edge on long slender pedicels 1 in. long or more, globose, sessile flowers immersed. *Hab.* Very rare. In thickets by the river. Pahang, Tahan River (Ridley).

(5) **Pt. Dalhousiae** Planch. l.c. 419.

Slender climber covered with easily-rubbed-off red tomentum. Leaves thin membranous trifoliate; leaflets narrow linear-lanceolate acuminate with few conspicuous teeth on the outer side of the lateral ones and apex of the median leaflet, above glabrous, beneath red-tomentose; nerves 4 pairs, 4 in. long, 4 to 5 in. wide; petiolules of laterals 1 in. long, of median 2 in. long; petioles 1.5 in. long, all covered with wool. Peduncles 2.5 in. long; rachis 3 to 4 in. long, tapering to tip, irregularly 7-lobed rose pink. berry 4 in. long black. *Hab.* Penang, West Hill 2500 ft. altitude (Curtis). Also a drawing, probably by Lady Dalhousie, in Kew Library.

var. *major* Ridl.

Leaves broad lanceolate 5 in. long, 1.5 in. wide; peduncles 9.5 in. long; rachis 6 in. long, 2 in. wide, margins and keel pubescent. Male flowers on pedicels 4 in. long, pubescent. *Hab.* Perak, Hermitage Hill (Curtis).

Planchon described this species from a plant collected by Lady Dalhousie with no locality given. Doubtless she got it in Penang.

Stem slender arachnoid. Lower leaves trifoliate lanceolate acuminate, laterals oblique, central one 2'5 in. long, 7'5 in. wide, upper leaves cordate acuminate 2 in. long, 1'25 in. wide, deep green bullate above, red-hairy beneath, edges undulate; petiolo5e 5 in. long. Peduncles 1'25 in. long arachnoid; rachis flat sinuate 4-lobed, 5 in. long, 2'5 in. wide, green or reddish hairy. *Hab.* Creeping on rocks at about 300 ft. altitude. Selangor, Sempang Mines on rocks, Semangkok Pass (Ridley).

(7) **Pt. cissoides** Bl. *Bijdr.* 193; *King, l.c.* 408. Embamma cordigera *Griff. Notulæ* iv. 694; *Ic. Pl. As. t.* 646.

Stem glabrous. Leaves trifoliate oblong or obovate acuminate, narrowed to base, 3 to 6 in. long, 1'5 to 3 in. wide, arachnoid on both sides when young, glabrous except nerves beneath in adults; petiolo5es 5 to 1'5 in. long; petiolo5es 1 to 3'5 in. long. Peduncle 4 to 8 in. long; rachis 3 to 6 in. long, 1 to 2 in. wide, irregularly broadly lobed, red brown. Male pedicels 1 in. long slender. Flowers 1 in. across. *Hab.* Woods. Johor, Hulu Sembrong (Kelsall). Malacca, Ayer Panas (Griffith); Sungei Hudang. Selangor, Labu River; Dusun Tua. Indings, Lumut. Perak, Batang Padang (Kunstler). *Distrib.* Java. *Native name:* Akar Gamat. *Use:* Leaves used as a poultice to swollen legs.

(8) **Pt. pedata** *Lawson, l.c.* i. 664; *King, l.c.* 409.

Stem arachnoid. Leaves 3- to 5-foliolate membranous; leaflets oblong-lanceolate acute, base rounded or cuneate, laterals with round oblique base, sparsely denticate, above glabrous except the arachnoid nerves, beneath arachnoid; nerves 5 pairs elevate, 1'5 to 3'5 in. long, 7'5 to 1'5 in. across; petiolo5es 1 to 4 in. long; petiolo5es 1 in. long. Peduncles 2 in. long; rachis 2'5 in. long, 9 in. wide, irregularly lobed acuminate with a central wing, glabrous. *Hab.* Forest edges. Johor, Mount Austin. Malacca (Maingay); Sungei Hudang; Negri Sembilan, Beruman (Cantley). Selangor, Sungei Buluh; Petaling; Batu Caves. *Native name:* Akar Kachang Gurnang.

(9) **Pt. rufula** *Planchon, l.c.* 419. Pt. heteranthes *Lawson, l.c.* i. 664.

Stems tomentose, when young. Leaves trifoliate, side lobes lanceolate or oblong oblique, median lanceolate or obovate sparsely toothed narrowed more or less at base, membranous glabrous except nerves above, densely red-tomentose beneath, 5 to 7 in. long, 1'5 to 2'5 in. across; petiolo5es red woolly 2'5 in. across; peduncles 1'5 in. long; rachis 2'5 in. long. 5 in. wide, green irregularly lobed, keel and edge red-tomentose. Male pedicels 5 in. long tomentose. Berries black. *Hab.* Edges of forests. Malacca (Maingay); Alor Gajah (Griffith); Selandor (Cantley). Perak, Goping (Kunstler). *Distrib.* Sumatra. *Native name:* Akar Subun-kak. *Use:* The tubers used for rubbing on swellings.
3. **Leea**, Linn.

Erect shrubs, rarely trees or herbs. Leaves alternate simple or 1- to 3-pinnate often very large; petiole often dilate at base. Stipules sheathing. Inflorescence corymbose or cymose, opposite the leaves sub-terminal. Flowers small red or green. Calyx 5-toothed. Petals 5 connate at base, adhering to staminal tube. Stamens connate into a tube; filaments between the 5 lobes of the tube. Ovary on the disc 3- to 8-celled; ovules 1 to 2 in a cell; style short. Stigma swollen. Berry 3- to 8-celled, pulp scanty, pyrenes wedge-shaped. About 50 species, in tropical Asia, Africa and Polynesia.

Leaves simple; shrublet with few very large leaves.

- Leaflets 3; shrublet 12 in. tall; cyme very small
- Leaves bi- or tri-pinnate; leaflets glabrous; shrubs large.

Leaflets elliptic 6 by 3 in.; corymb 6 to 24 in.

- Leaflets narrow oblong, 9 by 3 in.; corymb 9 in.
- Leaflets elliptic cuspidate with few rounded serratures, 4½ by 2 in.; flowers large, 2½ in. wide.
- Leaflets elliptic-lanceolate 2 by 1½ in. or longer; tree spiny.
- Leaflets lanceolate 3 by 1 in.; low bush; corymbs 2 in. wide, bright red.

Leaves hairy on back nerves.

- Leaflets lanceolate 6 to 12 in. by 3 in.
- Leaflets pubescent beneath lanceolate cuspidate 5 by 1½ in.; peduncles short.
- Leaflets pubescent beneath oblong acuminate; peduncles long, 6 by 4 in.
- Leaflets hairy beneath, with discoid glands.

Herb nearly stemless; nerves hairy beneath; flowers capitate.

(1) **L. simplificifolia**
(2) **L. pauciflora**
(3) **L. gigantea**
(4) **L. sambucina**
(5) **L. Curtisia**
(6) **L. angulata**
(7) **L. rubra**
(8) **L. sundaica**
(9) **L. javanica**
(10) **L. robusta**
(11) **L. aequata**
(12) **L. saxatilis**


Dwarf unbranched shrub glabrous. Leaves simple elliptic or obovate shortly acuminate, base narrowed minutely cordate, entire; nerves 9 to 12 pairs, reticulations distinct, 6 to 12 in. long, 5 to 6 in. across; petioles ½ to 1½ in. long winged. Cymes capitate dense 7½ in. through. Flowers numerous white. Peduncles ½ in. long or much less. Fruit sub-globular 3 to 4 in. across. *Hab.* Forests near river-banks, Perak, Larut 2000 to 2500 ft. altitude (Kunstler); Temengoh (Ridley). *Distrib.* Sumatra.

(2) **L. pauciflora** King, *l.c. 412.*

Shrublet 12 to 15 in. tall. Leaves 3 to 5 pinnate 2 or 3 coriaceous oblong to obovate blunt, cuspitate, base rounded, edge sparsely serrate, glabrous; nerves 8 pairs, 4½ to 7 in. long, 1½ to 3½ in. wide; petiolules 4 in. long (lateral) to 9 in. long (terminal);
petioles 1'5 in. long. Cymes dense few-flowered 3'5 in. through. Fruit globular 4 in. through, white. Hab. Perak, Sungei Rayah (Kunstler).

(3) L. gigantea Griff. Notulae iv. 697; Ic. Pl. As. i. 645; King, l.c. 412.

Large bush like an elder. Branchlets puberulous. Leaves several feet long 3- to 5-pinnate, pinnae a foot or more long, with 4 to 6 leaflets coriaceous glabrous shining green, coarsely serrate elliptic oblong, base shortly cuneate, acuminate; nerves 8 to 13 pairs; nervules fine connecting, 5 to 10 in. long, 2'25 to 4 in. wide;


(4) L. sambucina Willd. Sp. Pl. i. 1777; King, l.c. 414.

Big shrub about 12 ft tall. Branchlets puberulous. Leaves 15 to 20 in. long, 2- to 3-pinnate; leaflets about 9 to a pinna, thinly

Fig. 48.—Leea sambucina.
coriaceous, oblong or elliptic acuminate acute serrate, base slightly cuneate; nerves 7 to 12 pairs prominent beneath, 3 to 9 in. long, 1.5 to 3 in. wide; petiolules 2 to 4 in. long, terminal one much longer. Cymes on peduncles 6 in. long, 8 to 9 in. across, spreading. Flowers apple green. Staminal tube white. **Hab.** Common in damp open spots. Singapore, Tanglin. Johor, Serom, Pahang, Pekan. Malacca (Griffith). Dindings, Lumut. Tringganu, Bundi (Rostado). Adang islands, Pulau Rawei. Kedah, Alor Sta. **Distrib.** India, Andamans, Bangka.

(5) **L. Curtisii** King, l.c. 416.
Shrub 4 to 5 ft. tall. Leaves pinnate. Leaflets 9 oblong-elliptic crenate, sharply acuminate, base cuneate, with silver grey variegations on either side of midrib 3.5 to 4.5 in. long, 1.5 to 2 in. wide; petiolules lateral 3 in. long, terminal one 1.5 in. long. Cymes umbellate 8 in. long, 7 in. wide; peduncles thick, 1.5 in. long, reddish brown, pubescent. Flowers large 2 in. long; calyx and pedicels hairy. Petals whitish yellow. **Hab.** Woods, but local. Perak, Waterloo (Curtis); Lenggong (Ridley).

A thorny tree about 20 to 30 ft. tall. Leaves 12 in. long, 2- to 3-pinnate; leaflets 5 to 7 on a pinna elliptic or oblong-lanceolate acuminate, serrate crenate, base rounded or shortly narrowed glabrous, laterals inequilateral, 2 to 3.5 in. long, 1.1 to 1.5 in. across; petiolules 1 in. long (lateral) to 1 in. long (terminal); petioles 2 in. long winged at base. Cymes 3 in. long, including peduncle 1.5 in. long. Flowers white. Berries lead-grey 3.5 in. through. **Hab.** Open country, usually in sandy heath districts. Singapore, Pasir Panjang. Negri Sembilan, Bukit Tampin. Pahang, Pulau Tawar; Kwala Tembeling. Selangor, Rawang. Perak, Kampong. Kota (Wray); Kampar River (Kunstler); Temengoh. Kelantan, Kwala Aring (Gwynne Vaughan). **Distrib.** Java. **Native names:** Toi; Malli-Malli. **Use:** This tree is supposed to have the property of warding off attacks from tigers. It is the most truly arboreous of our tree-vines.

(7) **L. rubra** Bl. Bijdr. 197; King, l.c. 416.
Shrub about 3 to 5 ft. tall, nearly glabrous. Leaves 2- to 3-pinnate; leaflets 5 to 7 membranous, dark green, ovate or oblong acuminate serrate, base cuneate, sub-sessile; nerves 6 to 10 pairs, winged and crisped, 2 to 3.75 in. long, 1 in. wide; petioles 2 in. long. Cymes dense 2 in. across, dark red on 1 in. long peduncle. Flowers crimson lake. Stamens white. **Hab.** Tidal rivers, common. Singapore, Tanglin; King Road. Pahang, Pulau Manis, Pahang River. Penang, Penara Bukit 1000 ft. altitude (Curtis). Kedah, Alor Sta abundant. Kelantan (Dr. Gimlette). **Distrib.** Java.

(8) **L. sundaica** Miq. Fl. Ind. Bat. i. (2), 610.
Small tree 15 to 20 ft. tall. Stem 2 to 3 in. through. Leaves
pinnate or bipinnate; leaflets oblong, long-acuminate serrate, base rounded; nerves 12 to 16 elevate beneath, 6 to 12 in. long (terminal one largest), 3 to 5 in. wide; petiolules 2 in. long lateral, to 4 in. long terminal, one hairy. Cymes spreading 6 in. across, hairy; peduncles short 1 in. long. Calyx pubescent. Fruit 2 in. through, globose depressed, dark blue. Hab. Dense rocky jungle, 500 to 800 ft. altitude. Perak, Gunong Bubu (Kunstler). Distrib. Java, Celebes, Papua.

(9) **L. javanica** Bl. Bijdr. 197; King, l.c. 418.
Large shrub. Leaves pinnate minutely deciduously tomentose; leaflets about 7 oblong to elliptic-oblong short acuminate, serrate, base rounded or cuneate, glabrous above except nerves puberulous, pubescent beneath, especially on nerves; nerves 10 to 12 pairs prominent beneath, 3 1/2 to 6 in. long, 1 7/5 to 2 5/ in. wide; petiolules 2 in. long; petioles 4 in. long. Cymes wide 5 in. across; peduncles 1 to 2 in. long, puberulous tomentose. Flowers greenish white. Fruit globular black. Hab. Singapore (Schomburgk). Province Wellesley, Permatang Bertam (Ridley). Distrib. Java, Celebes.

I am not very certain about this. Schomburgk's locality is doubtful, and the specimens look like a pubescent form of **L. sambucina**.

Shrub 5 to 6 ft. tall. Branches coarsely rusty pubescent. Leaves pinnate to tripinnate; rachis and petioles angled; leaflets oblong acuminate remotely serrate; nerves 8 to 12 pairs, sparsely strigose both sides and pubescent beneath, 6 in. long by 4 in. wide or less. Cymes long peduncled tomentose. Flowers green, lobes of stamen-tube not bifid. Fruit black. Hab. Very rare on open rocky islands. Singapore, Pulau Brani. Distrib. India, Andamans.

(11) **L. aequata** Linn. Mantissa 124; King, l.c. 418.
Shrub 4 to 10 ft. tall pubescent. Leaves bipinnate; rachis angled; leaflets narrow oblong acuminate distantly serrate, above with scattered bristles upon midrib and nerves, beneath bristly pubescent with circular glandular discs; nerves 7 to 12 pairs, 3 to 7 in. long, 1 to 7 1/5 in. wide. Cymes sessile on peduncles 1 1/5 in. long tomentose. Flowers white, teeth of stamen tube bifid. Fruit depressed globular black. Hab. Perak and Kedah (Kunstler), fide King. Distrib. India, Java, Sumatra.

I have seen no specimen from the peninsula.

Herb nearly stemless. Leaves pinnate; petioles 1 6 ft. long; blade 2 ft. long; rachis sparsely hairy when young; leaflets 9, oblong long acuminate, base rounded, serrate, above glabrous, beneath midrib and 12 to 13 pairs of nerves tomentose hairy, 4 to 7 in.
long, 2 in. wide; petiolules 4 to 6 in. long. Flowers capitate on a hairy peduncle 5 to 1.5 in. long, much shorter than leaves. Head many-flowered 75 in. through, red-hairy. Fruit round flat at top, 5-lobed red 3 in. across on a peduncle 3 in. long and cyme-branches 1 in. long. *Hab.* Limestone rocks in damp forest. Selangor, Batu Caves. Pahang, Tahan River. Perak, Kwala Dipang. Lankawi (Curtis).

**Order XLII. Sapindaceae.**

Trees, shrubs, rarely climbing herbs. Leaves alternate (rarely opposite), pinnate or simple; leaflets entire or toothed. Flowers small, usually unisexual and irregular. Calyx 4- or 5-lobed, or of 4 or 5 sepals, often unequal. Petals equal or not, 4 or 5 or suppressed, often bearded or scaled at the base. Disc annular or unilateral. Stamens 5 to 10, inserted inside, outside or on the disc; anthers 2-celled; filaments often pubescent, rarely connate. Ovary sometimes excentric, entire or lobed, 1- to 3-celled, 1 to 2 ovules in cell affixed to axis of ovary, ascending. Fruit capsular or drupaceous, entire or lobed, rarely winged. Seed globose or compressed, arillate or not, usually exalbuminous. About 800 species, whole world.

*Ovules 1 in each cell.*

Leaves trifoliolate.

- Slender climber with tendrils; fruit capsular inflated
- Shrub usually erect; fruit a drupe
- Leaves equally pinnate (except 1 species *Aphania* simple).
- Fruit indehiscent.
- Seeds not arillate.

- Sepals and petals oblong 4 or 5; fruit 1- to 3-lobed, only 1 lobe developed
- Sepals and petals 3; stamens 6; fruit bilobed
- Sepals orbicular; petals obovate; fruit 1- to 3-lobed; lobes oblong; panicles terminal
- Sepals orbicular; petals smaller; fruit lobes divergent, 1- to 3-lobed. Racemes axillary
- Fruit sulcate, not lobed, 3-angled; petals scaled crested
- Fruit baccate, scales not crested; basal leaflets stipule-like
- Fruit angled; petals 0; disc lobed

Seeds arillate.

- Sepals petaloid imbricate; stamens within disc
- Sepals small, valvate; petals often absent
- Calyx cup-shaped, 4- to 5-lobed, valvate; fruit smooth, hard

*1. Cardiospermum*  
*2. Allophylus*  
*3. Sapindus*  
*4. Curtisina*  
*5. Erioglossum*  
*6. Aphania*  
*7. Lepisanthes*  
*8. Otophora*  
*9. Tristira*  
*10. Xerospermum*  
*11. Nephelium*  
*12. Pometia*
Fruit unknown; sepals and petals 4; stamens outside disc; stigma discoid . . . . . 
Fruit dehiscent, 
  Sepals imbricate in 2 rows; fruit 3-winged or lobed . . . . . 
  Calyx gamosepalous toothed; fruit pear-shaped, 3-angled, large . . . . . 
  Calyx cup-shaped; fruit cocci separate divaricate. 
  Aril enclosing seed . . . . . 
  Aril with 2 spurs at base; fruit 3-lobed . . . . . 
Leaves unequally pinnate; fruit globose, woody, tubercled spiny; no aril . . . . . 

Ovules 2 or more in ovary-cell. 
Leaves simple; capsule membranous . . . . . 
Leaves pinnate; petals large; fruit inflated; seeds arillate . . . . . 

1. CARDIOSPERMUM, Linn.


(1) C. Halicacabum Linn. Sp. Pl. 366; King, l.c. 421.
Two or 3 ft. or more long. Leaflets deltoid, acuminate, 1.5 to 2 in. long, 3 to 5 in. wide with 5 acute lobes, glabrous or sparsely pubescent. Racemes 1.5 to 3.5 in. long with a few flowers at the tip and below them, 2 tendrils. Flowers 11 in. wide. Fruit 1 in. long and wide. Hab. Common in cultivated ground and near the sea, whole peninsula, from Singapore to Lankawi. Native names: Peria bulan; Uban Kayu. Utse: As a pot-herb.

2. ALLOPHYLUS, Linn.

Shrubs, or small trees, rarely climbers. Leaves 3-foliate rarely simple; leaflets serrate rarely entire. Racemes axillary simple or branched. Flowers small numerous globose irregular white. Sepals 4 in opposite pairs hooded imbricate, inner ones larger. Petals 4 small naked or with a shaggy scale above the claw. Disc one-sided with 4 glands opposite the petals. Stamens 8 within the disc. Ovary 2-lobed, 2-celled; ovules solitary. Fruit a red drupe often bilobed. Species many, all the tropics. All our species have been reduced to A. Cobbe Bl. by Hooker and King, but though very similar in the flower, the habits of the plants are so totally different that it is advisable to separate at least the most distinct forms. Radlkofer Sitzung der Math. Phys. Klasse Kgl.
Erect shrubs or small trees.
Leaves glabrous.
低灌木；叶脉在背面上（有时）具毛，4.5到5.0英寸长，1.5到2.0英寸宽；叶脉在1.5到2.5英寸长。花序简单或3歧，通常相当粗壮，往往较粗壮，且毛状。花小 "05" inches wide. 

(3) **A. fulvinervis** Bl. *Rumphia* iii. 183.
小灌木。枝条柔毛状，如为掌状。叶三裂；叶脉在基部和尖端伸长或稍稍长尖，尖锐；叶脉在上面和也在表面毛状（有时）具毛，4.5到5.0英寸长，1.5到2.0英寸宽；叶脉在1.5到2.5英寸长。花序简单或3歧，常较粗壮，往往较粗壮，且毛状。花小 "05" inches wide. 

(2) **A. glaber** Roxb. in *Wall. Cat.* 8057.
小灌木近无毛。叶三裂；叶脉在基部和尖端伸长或稍稍长尖，尖锐；叶脉在上面和也在表面毛状（有时）具毛，4.5到5.0英寸长，1.5到2.0英寸宽；叶脉在1.5到2.5英寸长。花序简单或3歧，常较粗壮，往往较粗壮，且毛状。花小 "05" inches wide. 

(1) **A. ternatus** Loureiro, *Fl. For. Cochinchine* 232.
低灌木3到10英尺高。茎形圆球状，有枝条和叶柄细柔毛状，否则近无毛。叶三裂；叶脉在基部和尖端伸长或稍稍长尖，尖锐；叶脉在上面和也在表面毛状（有时）具毛，4.5到5.0英寸长，1.5到2.0英寸宽；叶脉在1.5到2.5英寸长。花序简单或3歧，常较粗壮，往往较粗壮，且毛状。花小 "05" inches wide. 

Bayer. *Ak. Wissensch.* xxxviii. (2), 201, has given short diagnoses of the various species.
(4) A. villosus Radlk. l.c. 228.

Shrub 3 to 6 ft. tall. Stem, petioles and back of leaves villous-tomentose. Leaves trifoliate elliptic-lanceolate acuminate, edge denticulate narrowed to base, 3:5 to 4:5 in. long, 1 to 2 in. across; petioles 3 in. long; petiolules 'r in. long. Racemes simple 2 to 3 in. long tomentose. Flowers hardly 'r in. long. Habit. Dense jungle. Dinding, Lumut, Perak, Telor Pinang. Penang Hill at 1200 ft., altitude (Curtis). Distrib. India.


Woody climbing shrub. Branches thickly lenticellate brown. Leaves trifoliate; leaflets coriaceous glabrous entire obovate, narrowed to base, apex short blunt acuminate; nerves 8 to 10 pairs, 4 to 6 in. long, 2 to 3 in. wide; petiolules '2 in. long; petioles 1:75 in. long. Inflorescence of 2 racemes (rarely 1 or 3) pubescent widely divaricate 1 to 1:5 in. long, on a peduncle 1 to 1:5 in. long. Flowers crowded rather small on slender pedicels. Bracts minute. Sepals glabrous sub-orbicular. Petals shorter. Habit. In wet forest climbing on trees. Singapore, Bukit Panjarg (Ridley). Distrib. Borneo.

3. SAPINDUS, Linn.


(i) S. rarak DC. Prodr. i. 608; Bl. Rumphia iii. 93, t. 197.

Dittelasma rarak Hook. fil. Gen. Pl. i. 396; King, l.c. 424.

Tree 50 to 60 ft. tall. Leaves 10 to 18 in. long; leaflets 6 to 12 pairs, oblong-lanceolate acute, base cuneate, glabrous, 3 to 4 in. long, 75 to 1:5 in. wide; petiolules hardly 'r in. long. Panicle many-branched, many-flowered, 5 to 6 in. long and 4 to 8 in. wide pubescent. Flowers '2 in. across yellow or white, yellow-pubescent. Fruit sub-globose or twin '75 in. long. Habit. Malacca (Griffith and Maingay), perhaps planted. Distrib. Burma, Cochin-China, Java.

4. CURTISINA, Ridl.

Tall tree. Leaf 12 in. long; leaflets oblong; nerves 8 pairs raised beneath as are the wide reticulations, 4.5 in. long, 2 in. wide; petiolules lateral 5 in. long, terminal one 1 in. long. Panicles 4 in. long; branches 1.5 in. long or less. Flowers 1 in. long sessile or pedicels very short. Stamens shorter than petals. Fruit red, pulpy bilobed 5 in. wide. *Hab.* Penang Hill at 2200 ft. altitude (Curtis).

**Fig. 49.—**Erioglossum edule.

**5. ERIOGLOSSUM,** Bl.

XLII. SAPINDACEÆ.

[Erioglossum.]

(1) E. edule Bl. Bijdr. 229; King, l.c. 425 (Fig. 49, p. 491).

A big tree, more or less pubescent. Leaves 8 to 20 in. long; leaflets 4 to 13 oblong-lanceolate to elliptic acute, base cuneate slightly oblique, above more or less pubescent; midrib and underside usually tomentose; nerves 6 to 10 pairs, 2'5 to 7 in. long, '75 to 2.25 in. wide. Panicles 6 to 12 in. long, pubescent dense-flowered. Flowers white '2 in. across. Fruit lobes '4 in. long, '15 in. through, pubescent astringent sweet, red then black. Hab. Common in villages and open country. Singapore to Penang and Perlis and Kelantan. Native names: Mertajam; Terajang (Kelantan); Kulat Layo; Kulalayo. Use: The small astringent fruits are beloved by children. A decoction of the root for fever. Distrib. Malaya.

6. APHANIA, Bl.

Trees or shrubs. Leaves pinnate (rarely simple); leaflets 1 to 6 pairs. Flowers panicked or racemose. Sepals 4 to 6 imbricate. Petals 4 to 6, small with bases infolded or with a scale. Disc regular slightly lobed. Stamens 5, rarely 3. Fruit deeply 2- (or 3)-lobed; endocarp thin cartilaginous or crustaceous. About 12 species, African and Asiatic.


Tree 60 ft. tall. Leaves 5 to 8 in. long; leaflets 2 to 4 oblong-lanceolate or elliptic acuminate much narrowed at base, glabrous coriaceous; nerves 6 to 8 pairs fine, 3'5 to 8'5 in. long, 1'2 to 3 in. wide; petiolules '2 in. long; petioles 1'25 in. long. Racemes axillary slender puberulous 6 to 8 in. long. Flowers globular '15 in. across, red. Sepals orbicular imbricate. Petals smaller, edges infolded at base. Stamens 8; filaments hairy at base. Disc pentagonal. Ovary stalked ovate; styles short sub-connate. Fruit deeply 2-lobed; lobes obovate round '35 in. long with style between. Hab. Forests, Selanador (Cantley). Malacca (Maingay). Perak (Scortechini). Selangor, Rawang (Kloss). Weld’s Hill (Murdoch). Sungai Ujong, Bukit Danan (Cantley). Penang, Penara Bukit (Curtis). Native names: Kelat Julong Puthi; Puket Jantan; Sutingga; Mumjilai. Use: Timber, hard flexible, heavy used in building.

7. LEPISANTHES, Bl.

Shrubs or trees. Leaves pinnate alternate; leaflets entire. Inflorescence axillary or lateral in panicked spikes. Flowers small unisexual white or pink. Sepals 5 or 4 imbricate in 2 rows. Petals 5 or 4 equal with 1 or 2 wide inflected scales at base. Disc annular or semilunar. Stamens 8 or 10 within disc. Ovary sessile 3-sided, 3-celled; ovules solitary. Fruit 3-celled, 3-sided or ovoid not lobed. Seed solitary. About 16 Asiatic species.
Tree; panicle 9 to 12 in. long. (1) L. Kunstleri

Shrubs; panicles 1 to 3 in. long; leaves glabrous. Leaflets 4 to 9 in. long; fruit ovoid. (2) L. cuneata

Leaflets 12 to 18 in. long; fruit tomentose only. (3) L. Scortechinii

Leaflets 12 to 18 in. long; fruit tomentose only. 3-angled. (4) L. longifolia

Leaflets 12 to 18 in. long; leaflets leaflets leaflets. (5) L. hirta

(1) L. Kunstleri King, l.c. 427.

Tree 30 to 60 ft. tall. Leaves 30 to 40 in. long, glabrous; leaflets 12 oblong or elliptic-oblong cuspidate, base rounded, reticulate; nerves 9 to 13 pairs, 6 to 12 in. long, 2·5 to 3·5 in. wide; petiolules '3 to '4 in. long, stout. Panicles 9 to 12 in. long unisexual erect few-branched; branchlets cymose 3- to 5-flowered tomentose. Flowers '4 in. long. Sepals 5 concave tomentose. Petals 5 silky inside at base, scale glabrous bifid. Stamens 8; filaments silky. Fruit sub-globose greenish yellow with 2 or 3 rounded angles, tomentose 1·5 in. through. Seeds 3. Hab. Perak, near Gunong Bubu at 500 to 800 ft. altitude (Kunstler).

(2) L. cuneata Hiern, in Hook. fl. F.B.I. i. 680; King, l.c. 428.

A shrub or a slender tree 20 to 25 ft. tall, 2 to 3 in. through. Leaves 20 to 30 in. long; leaflets 10 to 14 thinly coriaceous oblong cuspidate, base narrowed, reticulate; rachis and bases of leaves beneath slightly puberulous; nerves 8 to 14 pairs, prominent beneath, 4 to 9 in. long, 1·5 to 2·75 in. wide; petiolules '25 to '35 in. long; petioles 5 in. long. Panicles on stem below leaves spike-like 3 to 5 together, 1 to 3 in. long, dense. Flowers 1 in. across greenish white. Sepals round puberulous. Petals glabrous with a scale at base. Fruit ovoid compressed with a vertical groove, minutely tomentose '25 in. long and as broad. Hab. Dense jungle near streams in low country. Pahang, Sungei Chenei (Fox). Sungei Ujong, Gunong Beremban (Cantley). Perak, Larut (Kunstler); Jenah (Wray); Tambun. Dindings, Tanjong Hantu. Penang, near Waterfall (Curtis). Native name: Perupoh.

(3) L. Scortechinii King, l.c. 429.

Tree. Leaves 2 to 3 ft. long; leaflets about 8 elliptic-oblong shortly acuminate, base shortly cuneate, glabrous except midrib and nerves 12 to 14 pairs elevate beneath puberulous, 12 to 18 in. long, 5 to 7 in. wide; petiolules '75 to 1 in. thick. Panicles narrow axillary 2 in. long pubescent. Bracts and bracteoles narrow '25 in. long; pedicels hairy. Flower-buds '3 in. across pink. Sepals 5 concave. Petals 5 with a recurved scale on base. Disc glabrous. Stamens 8; filaments hairy. Fruit sharply 3-angled, densely rusty-tomentose 1 in. long and as broad. Hab. Very rare in forests. Perak (Scortechini). Kedah, Yan. var. hirta Ridl.


This variety may be distinct specifically.
(4) L. longifolia Radlk.ber. Über die Sapindaceen Hollandsch-Indiens i. 35; King, l.c. 429. Hemigyrosa longifolia Hiern, in Hook. fil. F.B.I. i. 671.

Shrub 8 to 20 ft. tall. Young parts and inflorescence tomentose. Leaves 2 to 2'5 ft. long; leaflets 6, narrow oblong acuminate or acute, base narrowed, glabrous coriaceous; nerves 14 to 18 pairs, 12 to 15 in. long, 2 to 4 in. wide; petiolules '4 to 8 in. long puberulous. Racemes solitary or crowded, sometimes branched, 2 to 3 in. long. Flowers 5 in. long tomentose pink and white. Bracteoles subulate 15 in. long. Petals 5 obovate, scales hairy entire or bifid. Fruit depressed globular trigonous softly echinate rusty-tomentose 1 in. long, 8 in. wide. Hab. Dense jungle low ground, not common, Johor, Kwala Sembrong (Kelsall); base of Gunong Pantai. Malacca (Griffith and Maingay). Perak, Larut (Kunstler). Penang. Balik Pulau (Curtis).


Small tree-like shrub, entirely softly hairy except the upper side of the leaves. Leaves 2 ft. long or more; leaflets 10, alternate elliptic-lanceolate shortly acuminate; nerves 18 pairs, membranous, 12 in. long, 4 in. wide; petiolules 15 in. long. Panicles axillary; branches few distant. Flowers 1 in. wide racemose. Sepals 5 orbicular pubescent, edge ciliate. Petals 4 glabrous ovate rounded nearly twice as long, scales at base oblong densely white-woolly. Stamens 3 short. Disc undulate. Pistil densely hairy. Hab. Kelantan, Chaning Woods (Ridley). A plant on the Pehi stream had much smaller leaves, the leaflets 5 by 2 in., oblong and quite blunt.

8. OTOPHORA, Bl.

Trees or shrubs. Leaves alternate simple or pinnate stipulate at base of petiole; leaflets entire. Inflorescence axillary and terminal. Flowers regular bisexual. Sepals 4 or 5 imbricate. Petals 5 (or 4) smaller squamate by inflection of auricular base. Disc annular complete. Stamens 6 to 9 (rarely 5) within disc very short included. Ovary ovate 2- to 3-celled; ovules solitary. Stigma sessile 3- to 4-rayed. Fruit baccate not lobed 3- or 4-celled (to 1-celled). Seeds arillate. Species 12, Malay Peninsula and islands.

Leaves simple . . . . . . . . . . . . (1) O. Hullettii
Leaves pinnate.
Leaflets sessile oblong 12 by 4 in. . . . . . . (2) O. sessilis
Leaflets sub-sessile linear acuminate 8 by 1'5 in. . . . . . . (3) O. resecta
Leaflets sessile oblong-lanceolate 4 by 1 in. . . . . . . (4) O. imbricata
Leaflets petiolated lanceolate 8 by 3 in. . . . . . . (4) O. erythrocalyx


Shrub? Leaves simple lanceolate long acuminate, base shortly

(2) O. sessilis King, l.c. 430.
Shrub or treelet 6 to 10 ft. tall. Leaves 30 to 40 in. long; rachis and petiole stout; leaflets 10 to 12 sessile coriaceous broad elliptic shortly cuspicate, base shortly narrowed, glabrous; nerves 9 to 15 pairs, prominent beneath, 8 to 12 in. long, 2'75 to 4 in. wide. Stipules at base of petiole ovate round 2 to 2'5 in. long. Panicles axillary 8 to 10 in. long of 2 or 3 raceme-like branches. Flowers '25 in. long. Sepals 4, obovate. Petals 4 pink, dark red outside, elliptic, bases inflexed scale-like silky. Stamens 6, glabrous. Fruit ellipsoid glabrous not lobed 1 in. long, '5 in. wide. Hab. Dense rocky jungle, Perak, Larut 600 to 800 ft. altitude (Kunstler). Penang Hill (Curtis). Lankawi (Curtis).

Small tree. Leaves glabrous 30 in. long; leaflets 20 sub-sessile linear acuminate sub-acute unequal at base, 7'8 to 8'4 in. long, 1'2 in. wide membranous-chartaceous. Stipules sub-orbicular. Panicle 13 in. long; branches thyrsoid 2 to 14 in. long. Flowers red. Sepals 4 or 5 ovate. Petals 4 or 5 elliptic much smaller, edges ciliate, pilose at base outside, scales emarginate pilose. Stamens 8; filaments villous. Fruit small ovoid flattened '5 in. long. Hab. Woods and forests. Pahang, Pekan; Pulau Plah (Fox). Penang, Penara Bukit. Native name: Stengok.

(4) O. imbricata Bl. Rumphia iii. 144.
Small tree. Leaves 2 ft. or more long; leaflets numerous over 30, narrow lanceolate-oblong acuminate, base round, 4 in. long, 1 in. wide, sessile; nerves very fine and numerous. Stipules sub-orbicular. Panicle over 12 in. long lax with few branches 6 in. long, and distant branchlets '5 in. long, puberulous. Flowers small globose puberulous greenish yellow or white. Male flowers, calyx 5-lobed, inner 3 lobes larger. Petals 5, small, semi-orbicular. Stamens 8, short. Female flowers, ovary globose sub-trigonous hairy. Stigma large sessile. Fruit globose triquetrous 1 in. long puberulous. Seeds completely white arillate ellipsoid-oblong. Hab. In secondary jungle, Pahang, Cheneh Reserve (Burn-Murdoch). Disrib. Labuan, Borneo.

Motley in Herb. Kew says it is called Kayu Matahari in Borneo, and that the leaves come out white, changing through light purple to red, conspicuous from a vast distance. Wood very hard and used for making hooks to catch crocodiles.
(4) *O. erythrophyllum* Hiern, in Hook. fil. F.B.I. 680; King, l.c. 430.

Small glabrous tree. Leaves 30 to 45 in. long; leaflets 14 to 19, coriaceous elliptic-oblong, shortly cuspidate, base cuneate, reticulate; nerves 10 to 13 pairs prominent beneath, 5 to 8 in. long, 1.5 to 3 in. wide; petiolules 1.4 in. long. Stipules ovate, 3.5 in. long. Panicles 18 to 30 in. long, lax much-branched; pedicels slender. Flowers 1.5 to 2 in. long. Sepals red, 5. Petals 5, pale rose. Stamens 8, hairy. Fruit ovoid trigonal 1.5 in. through. *Hab.* Forests, local, Malacca (Mainay); Selandor (Derry); Ayer Panas (Goodenough).


Trees. Leaves pinnate. Flowers panicled, terminal numerous, usually unisexual. Sepals 4, ovate. Petals 0. Stamens short not exsert, 5 to 7. Disc irregularly lobed not unilateral. Ovary conic triquetrous narrowed to top with three sessile stigmas. Fruit triquetrous. Species 3 or 4, Malay islands.


Large tree. Leaves paripinnate 7 in. long; leaflets 2 or 3 pairs chartaceous oblong blunt, glabrous, base shortly cuneate or round, 3 to 5 in. long, 2 to 2.5 in. wide; petiolules 2.5 in. long; petioles 3 in. long. Panicle terminal lax, 8 in. long; branches remote, lowest 2 in. long. Flowers numerous in small fascicles on branches pubescent; pedicels 1 in. long densely velvety-pubescent. Sepals 4, ovate woolly pubescent outside. Petals 0. Stamens short not exsert in female, with short filaments, in male flowers filaments long slender; anther-cells separate. Disc irregularly lobed not unilateral. Ovary triquetrous densely hairy. Stigmas 3, sessile on the narrowed tip of the ovary. *Hab.* Penang Hill at 1200 ft. altitude (Curtis). Negri Sembilan, Port Dickson (Foxworthy).

This plant is doubtful, as I have not seen the fruit, and it differs in general appearance from the rest of the genus. It has the habit of *Erioglossum*, but in many respects resembles *Lepisanthes*.

10. **XEROSPERMUM**, Bl.

Trees with the habit of *Nephelium*. Leaves alternate pinnate; leaflets entire. Racemes axillary and terminal. Flowers regular small white. Sepals 4 or 5 imbricate in 2 rows. Petals 4 or 5 spathulate about as long, no scales. Stamens 8 or 7, within the annular glabrous disc. Ovary bilobed muricate 2-celled; ovules solitary; style short, thick. Stigma hairy. Fruit 1- or 2-lobed muricate with pyramidal tubercles or simply rough. Seed 1 with a thin acid pulp. Species 6, Malayan.

Petals 5; leaflets one pair.

<table>
<thead>
<tr>
<th>Sepals</th>
<th>Status</th>
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<tbody>
<tr>
<td>4</td>
<td>(1) <em>X. lævigatum</em></td>
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<tr>
<td>5</td>
<td>(2) <em>X. unijugum</em></td>
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A large tree, glabrous. Leaves 4 in. long; leaflets 2, elliptic acuminate, base cuneate; nerves 5 pairs faint, 2'25 to 3 in. long, 1 to 1'25 in. wide; petiolules slender, 2 to 2'5 in. long; petioles 1'5 in. long. Racemes or panicles terminal and axillary 2 to 4 in. long, slender. Flowers 1'5 in. across. Sepals 4, round. Petals 5, limb woolly, claw slender. Stamens 5, filaments woolly. Disc annular waved. Ovary tomentose. Fruit usually 1-lobed, obovate ellipsoid compressed, 1'35 in. long, 85 in. across sharply muricate. **Hab.** In forests, Pahang, Kwala Tenok, Tahan River. Perak (Scortechini). Penang, Waterfall, the spout (Curtis).


Tree 60 to 80 ft. tall. Leaves 3'9 to 6 in. long including petiole 4 in. long; leaflets one pair, elliptic to oblong lanceolate, acute or acuminate, bases narrowed, shining smooth glabrous, 3'6 to 5 in. long, 1'4 to 2'2 in. wide. Panicle 1'2 to 4'8 in. long. Sepals glabrous. Petals 5, spatulate, densely villous. Stamens villous at base. Fruit 8 in. long, 4 in. through ellipsoid acutely muricate. **Hab.** Forests, Selangor, Klang (Keheding). Perak at 100 ft. altitude (Kunstler).

I have not seen either of these specimens, and do not see how this species differs from **laevigatum**, except in the number of the sepals.


Tree 50 to 70 ft. tall, 15 to 20 in. through. Branchlets, petioles and inflorescence puberulous. Leaflets one pair elliptic-lanceolate shortly acuminate, base acute; nerves 5 pairs elevate beneath, 3'5 to 7 in. long, 1'25 to 3'5 in. wide; petiolules 5 in. long. Panicles racemiform 1 to 2 in. long. Flowers sub-sessile 1'5 in. long. Sepals 4, edge ciliate. Petals 4, villous on both sides. Stamens villous. Fruit obovoid flattened, very sharply muricate 1 in. long, 5 in. through, dark green. **Hab.** Hill Jungle 500 to 800 ft. altitude. Perak, Ulu Kerling (Kunstler).

(4) **X. intermedium** Radlk. Bot. Surv. Ind. iii. 349. X. muri-catum King, l.c. 431, not of Radkofer.

Glabrous tree 50 to 80 ft. tall. Leaves 4 to 9 in. long; leaflets one or two pairs elliptic-oblung acuminate, base acute; nerves 7 to 9 pairs, prominent beneath, 3 to 6 in. long, 1'35 to 2 in. wide; petiolules 35 in. long. Racemes axillary, sometimes branched. Flowers 2 in. across. Sepals 4 round, edges ciliate. Petals 4, shorter villous. Stamens 8; filaments pubescent. Fruit obovoid sharply muricate 1'25 in. long, 75 in. through, yellow. **Hab.**

(5) X. Wallichii King, l.c. 432.

Glabrous tree 30 to 40 ft. tall, 5 to 7 in. through. Leaves 12 to 18 in. long; leaflets 2 pairs elliptic or obovate-elliptic shortly blunt-cuspidate, narrowed to base; nerves 5 to 7 pairs elevate beneath, 4.5 to 8 in. long, 2.25 to 4 in. wide; petiolules stout 0.25 to 0.45 in. long. Racemes 2 to 4 together, axillary 1 to 2.5 in. long. Flowers 0.15 in. long, green. Sepals 4, round, edges ciliate. Petals 4, smaller round, claws short woolly. Stamens 8; filaments woolly. Ovary pubescent. Fruit sub-globose or elliptic usually i-coccous, rough but not muricate, rusty brown to black 0.25 in. long, 0.75 in. wide. Hab. Forests, dense hilly jungle, Singapore (Wallich); Bukit Mandai. Pahang River, Perak, Ulu Bubong, Ulu Kerling and Ulu Kal (Kunstler), Temengoh. Native name: Balong Ayam.

11. NEPHELIUM, Linn.

Trees. Leaves alternate pinnate; leaflets entire. Panicle terminal and in terminal axils rarely racemose. Flowers regular small unisexual (or bisexual). Calyx 4- to 5-lobed. Petals small, white, villous rarely with 2 scales, sometimes 0. Stamens 6 to 8 within the fleshy disc; filaments usually pubescent. Ovary pubescent, warted or setose 1- to 2- (rarely 3-) lobed; lobes 1-celled, 1-ovuled. Fruit 1- or 2-coccous drupaceous oblong or globose echinate or tubercled rarely smooth. Seed ellipsoid with sweet or acid white pulpy aril. About 20 species, Malayan. Several are well-known fruit trees.

Leaves glabrous on both sides.
Leaves broad elliptic, 5 by 2.5 in.; fruit warty, base gibbous; petals 0.
Leaves narrow lanceolate; petals 5 or 6; fruit globose sparsely warty.
Leaves broad elliptic; petals 0; fruit red-tomentose.
Leaves oblong-elliptic; petals 5; fruit sparsely muricate.
Leaves narrow lanceolate coriaceous; fruit spiny all over; petals 3 to 5 glabrous.
Leaves lanceolate caudate coriaceous; petals villous.
Leaves glaucous and minutely puberulous beneath; fruit spiny.

Petals 5.
Leaves broad elliptic coriaceous.
Petals 0.
Leaves elliptic thin coriaceous.

(1) N. glabrum
(2) N. longana
(3) N. lappaceum
(4) N. rubescens
(5) N. Herveyi
(6) N. caudifolium
(7) N. costatum
(8) N. tuberculatum
Leaflets lanceolate 4 by 1.5 in.; spines on fruit not conical. (9) **N. mutabile**

Leaflets lanceolate more coriaceous; spines on fruit conical. (10) **N. hamulatum**

Leaflets red-tomentose beneath; fruit covered with short soft spines. (11) **N. ophiodes**

Petals 5.

Leaflets hairy beneath; fruit globose tessellate. (12) **N. malaiense**

Leaves very long; flower and fruit racemes long pendulous; fruit spiny. (13) **N. eriopetalum**


Tree 60 to 80 ft. tall, glabrous. Leaves 7 to 11 in. long; leaflets 4 to 6 coriaceous elliptic shortly acuminate or blunt, base cuneate; nerves 8 to 10 pairs, 3 to 4.5 in. long, 1.5 to 2.25 in. wide; petiolules 4 to 6 in. long. Panicles lax puberulous 8 in. long. Flowers less than 1 in. across unisexual. Males, sepals 5 round pubescent. Petals 0. Stamens 6 or 7 pubescent exsert. Female, calyx 5-toothed. Stamens very short. Ovary obovate pubescent. Fruit oblong gibbous on one side, wrinkled not spiny 1 in. long, 6 to 7 in. wide. **Hab.** Lowland forests. Singapore, Garden Jungle; Selitar. Malacca, Batu Tiga; Ayer Panas; Merlimau (Derry). Perak, Tapa (Wray); Chanderiang (Kunstler).


Inflorescence and backs of leaves rusty tomentose. Malacca (Griffith, Maingay). The fruit described as belonging to this by Radlkofer is not attached to the specimen, and probably did not belong to it. **Native names:** Redan; Redin.

(2) **N. longana** Camb. Mem. Mus. Par. xviii. 30; Hiern, F.B.I. i. 688.

Tree 30 to 40 ft. tall. Leaves 4 to 18 in. long; leaflets elliptic-lanceolate acuminate or blunt glabrous rather stiff; nerves 13 pairs, 4 in. long, 1.25 to 1.75 in. wide; petiolules 1.5 in. long; petioles 3.5 in. long; panicle pubescent. Flowers yellowish white 1.2 to 2.5 in. wide. Calyx tomentose. Petals 5 or 6 pubescent. Fruit globose 5 to 7.5 in. through, reddish or purple, tubercles wrinkled or smooth. **Hab.** Terutau island (Curtis).

Often cultivated in India and China and wild in India. The fruit resembles that of the Mata Kuching (**N. malaiense**), which name Curtis gives it, but the foliage is quite different.

(3) **N. lappaceum** Linn. Mantissa i. 125; Hiern, l.c. i. 687; King, l.c. 436.

Tree about 30 to 50 ft. tall. Branchlets puberulous. Leaves 4 to 10 in. long; leaflets 4 to 6 elliptic or oblong obtuse, thinly coriaceous, 2.5 to 6 in. long, 1.25 to 3 in. wide; petiolules 2 in. long. Panicles 6 in. long terminal and axillary lax spreading.
Flowers 1 in. across white often unisexual in cymose fascicles. Sepals 4 to 6. Petals 0. Stamens 5 to 8 exsert. Ovary 2- to 3-lobed echinate. Fruit 1- or 2-lobed ellipsoid densely covered with long soft spines yellow to bright red, 1.5 in. long, .5 in. through, Hab. Cultivated everywhere, and often occurring in forests as an escape, or in abandoned cultivations. The Rambutan.

(4) N. rubescens Hiern, l.c. i. 688. N. rufescens King, l.c. 435.

A tree 50 to 60 ft. tall, 8 to 10 in. through. Leaves 6 to 12 in. long; leaflets 6 to 10 coriaceous narrow oblong acuminate, base cuneate or round glabrous; nerves 8 to 14 pairs faint, 3 to 5.5 in. long, 1.5 to 1.65 in. wide; petiolules 1.5 to 2.5 in. long. Panicles axillary and terminal puberulous. Flowers .2 in. across, white. Calyx lobes 5, ovate acute pubescent. Petals 5, narrow lanceolate hairy. Disc small. Stamens exsert 8; filaments pubescent. Fruit with 1 or 2 lobes oblong with short conic tubercles red, 1.25 in. long, .5 in. through; seed-pulp thin acid. Hab. Common in woods. Singapore (Wallich); Chan Chu Kang. Johor, Batu Pahat. Malacca (Maingay). Perak, Larut (Kunstler).


Tree. Leaves narrow lanceolate blunt acuminate, base shortly acute, coriaceous glabrous; nerves about 18 pairs, shining above, sub-glaucescent beneath, 3 to 3.5 in. long, 1.5 in. wide; petiolules 1.8 in. long. Panicles 4 to 6 in. long densely tomentose. Calyx-lobes appressed tomentose, ovate. Petals 3 to 5 very small narrow glabrous. Stamens glabrous. Fruit 1.25 in. long, red, covered with short flat blunt spines widest at base 1.2 in. long. Hab. Malacca, Alor Gajah (Griffith, Hervey, Maingay). Dindings, Pangkor (Curtis).

This closely resembles N. rubescens Hiern, and has been confused with it. The leaves are narrower and more rigid, and the fruit is totally different, bearing flat triangular blunt spines close together.

(6) N. caudifolium Ridl.

Leaves 5 in. long with 5 pairs of leaflets, quite glabrous; petioles 2 in. long. Leaflets coriaceous, smooth, lanceolate, bluntly cuneate acuminate, base shortly cuneate, finely reticulate above; nerves fine, very inconspicuous, 10 pairs, 3.5 in. long, 1 in. wide; petio-lules 1.2 in. long. Panicles 5 in. long (base 3 in. long, nude); branches 1.25 in. long, pubescent. Flowers numerous crowded; pedicels 1 in. long, pubescent. Sepals 5, lanceolate blunt, silky on both sides. Petals 5, little longer, narrow linear-lanceolate, silky villous. Stamens much longer; filaments villous. Ovary bilobed, tubercular, hairy; style rather stout. Fruit (unripe) of 2 equal spreading lobes covered with short conic tubercles, glabrous. Hab. Selangor, Kelambu Forest, Klang (Foxworthy). Native name: Gigi Buntal.
(7) N. costatum Hiern, l.c. i. 608; King, l.c. 436. N. longana var. hypoleucum King, l.c. 435 (in part).

Tree 50 to 60 ft. tall. Leaves 6 to 12 in. long; leaflets 4 to 10, coriaceous oblong lanceolate or elliptic acute or short acuminate, base narrowed round beneath glaucous and slightly puberulous; nerves 10 to 18 pairs, 2·75 to 5·5 in. long, 1·25 to 1·75 in. wide; petiolules '25 in. long. Panicles axillary and terminal 4 to 6 in. long puberulous. Flowers '2 in. across. Sepals 5 round tomentose outside, pubescent inside. Petals 5 smaller spatulate villous. Disc large. Stamens 8 to 12 hairy at base. Ovary ovate 2-lobed coarsely villous. Fruit of 1 or 2 lobes with long puberulous blunt setae. Hab. Malacca (Maingay). Perak (Scortechini). Native name: Rambutan Passeh.


Tree 60 to 80 ft. tall, 2 to 3 ft. through. Branches, panicle and petiole grey-puberulous. Leaves 8 to 14 in. long; leaflets 2 to 6 pairs, oblong blunt coriaceous, base rounded; nerves 7 to 9 pairs elevate, sparsely pubescent glaucescent beneath, 6 in. long, 2·5 in. wide. Panicle 8 in. long terminal dense-flowered. Flowers '2 in. across. Calyx of 5 blunt whitish pubescent lobes. Petals 0. Disc hairy. Stamens short not exsert glabrous. Fruit 1 to 2 in. long elongate ellipsoid bright green hoary, covered with glabrous pyramidal tubercles (I have seen no fruit). Hab. Perak (Scortechini).

(9) N. mutabile Bl. Rumphia iii. 104. N. chryseum King, l.c. 437, not of Blume.

Tree usually about 30 ft. tall. Leaves 6 to 12 in. long; rachis puberulous; leaflets 4 to 8 sub-coriaceous oblong to elliptic-oblong acuminate or acute, base narrowed, glaucous beneath; nerves 9 to 12 pairs, 2·5 to 5 in. long, 1·25 to 1·75 in. wide; petiolules '15 in. long. Panicles axillary 3 to 4 in. long; flowers white '15 in. across, clustered. Calyx shortly bluntly 5- or 6-lobed tomentose. Petals 0. Stamens 7 or 8 short pubescent. Ovary reniform bilobed pubescent. Fruit usually lobed about 2 in. long covered with truncated spines dark purple. Hab. Commonly cultivated, the Pulasan.

Blume distinctly says he intended the Pulasan by this name. N. chryseum Bl. with a yellow fruit and soft spines like a rambutan, may be a variety of N. lappaceum Linn.

N. pallens Radlk. Rec. Bot. Surv. Ind. iii. 352, N. mutabile var. pallens Hiern, F.B.I. i. 687 (exclusive of the fruiting specimen Maingay 1629, which is N. lappaceum) is a form of the Pulasan.


Tree. Branchlets puberulous. Leaves 10 to 15 in. long; rachis puberulous; leaflets 6 to 10 oblong acuminate blunt, base cuneate, glabrous above midrib puberulous, beneath sub-glaucous minutely
pubescent; nerves 16 to 24 pairs raised, 2·5 to 4·5 in. long, 1 to 1·75 in. wide; petiolules '15 in. long. Panicles terminal and axillary; branches few racemose tomentose. Flowers '15 in. across numerous. Calyx tomentose, 4 broad blunt lobes. Petals 0. Stamens 6 or 7 exert; filaments pubescent. Fruit red ovoid covered with woody puberulous spines with bulbous bases 1·5 in. long, 1 in. through. Hab. Forests, Malacca, Bukit Kayu Arang (Cantley); Kesang (Goodenough). Selangor, Kwalampa Lumpur (Fox-worthy). Dindings, Pangkor. Native name: Sunggal Lotong.

(11) **N. ophiodes** Radlk. l.c. 78; King, l.c. 438.
Tree 50 to 80 ft. tall, 10 to 15 in. through. Branchlets and panicles rusty-puberulous. Leaves 12 to 18 in. long; leaflets 6 to 10, stiff coriaceous oblong short blunt acuminate, base shortly narrowed blunt oblique, beneath scaly red puberulous; nerves 15 to 18 pairs strongly elevate beneath, 6 to 8 in. long, 2 to 2·5 in. wide; petiolules '2 to '25 in. long. Panicles axillary or terminal 8 to 16 in. long. Flowers '15 in. across yellow and white. Calyx tomentose acutely 5- or 6-lobed. Petals 0. Stamens 6 pubescent short. Ovary ovoid setose tomentose. Fruit ovoid-globose with dense puberulous setae, 1·5 in. long, 1 in. wide, blood-red. Hab. Malacca, Tebong (Griffith). Perak, Larut (Kunstler). Native name: Pulassan tukul.

(12) **N. malaiense** Griff. Notulae iv. 549; King, l.c. 439.
Tree about 50 ft. tall. Branches scurfy pubescent. Leaves 10 to 14 in. long; rachis tomentose; leaflets 6 to 8 thinly coriaceous elliptic cuspidate, base rounded smooth above; nerves 14 to 18 pairs strongly elevate and pubescent beneath, 3·5 to 5 in. long, 2 to 2·5 in. wide; petiolules '15 in. long. Panicles terminal tomentose 6 to 9 in. or more long; branches numerous. Flowers fascicled '25 in. across. Calyx pubescent; lobes 5 round blunt. Petals 5 as long obovate villos inside. Stamens 8 short. Fruit globose smooth brown '65 to '75 in. through. Seed globular with thin pulp. Hab. Common in villages, a well-known fruit tree. Native name: Mata Kuching.

A tree about 80 ft. tall. Young parts, rachis, under-side of leaflets and panicle red-tomentose. Leaves 12 to 24 in. long; leaflets 6 to 10 thick coriaceous oblong sub-acute narrowed at rounded or cuneate base; nerves 16 to 24 pairs, 4 to 12 in. long, 1·65 to 4 in. wide; petiolules '25 to '35 in. long stout. Racemes pendant in axils lengthening in fruit 4 to 10 in. long or more. Flowers in tufts '25 in. wide. Calyx-teeth 5 triangular acute pubescent outside. Petals 5 or fewer narrow spatulate pubescent. Disc lobed pubescent. Stamens 10 pubescent. Fruit ellipsoid densely covered with soft spines, 2 in. long, 1·5 in. through, crimson red.

Tree. Branchlets, petioles and inflorescence stellate-hairy. Leaves 5 to 6 in. long; leaflets 4 to 6 lanceolate acute or long acuminate, base cuneate, sub-coriaceous; nerves sparsely hairy, 3.5 to 7 in. long, 1.25 to 2 in. wide. Panicles terminal. Fruit covered with short conic processes. _Hab._ Perak (Scortechini). I have not seen this plant.


Tree 40 to 60 ft. tall. Branchlets, petioles and nerves stellate-pubescent with setae. Leaves 7 to 8.5 in. long; leaflets oblong lanceolate short acuminate, base obtuse chartaceous coriaceous, 2.25 to 4.25 in. long, 1 to 1.5 in. wide. Panicles terminal elongate 8 in. long. Calyx lobes blunt stellate-pubescent, inside puberulous. Petals narrow spatulate acute, strigose villous. Disc with fascicled hairs. Stamens pilose. _Hab._ Larut 1000 to 2000 ft. altitude (Kunstler). I have not seen this plant.

12. POMETIA, Forst.

Trees tall or medium. Leaves alternate pinnate. Leaflets sub-opposite dentate or entire, lowest pair stipule-like. Racemes panicked or simple. Flowers small regular bisexual fascicled. Calyx cup-shaped 4- to 5-lobed. Petals 0 or 4 to 5 small. Disc entire annular. Stamens usually 6 or 5 (rarely less or more) within disc exsert. Ovary 2- or 3-coccous and -celled; ovules solitary; style elongate. Fruit of 1 to 3 globose or oblong, lobes smooth. Seed with a thin pulpy aril. Species 4, Malaya, Ceylon, Australasia.

_Calyx and leaflets glabrous_ . . . . . (1) _P. macrocarpa_
_Calyx and inflorescence pubescent._
_Leaves 12 to 24 in. long, sub-glabrous_ . . . . . (2) _P. pinnata_
_Leaves 3 to 8 in. long, hairy beneath_ . . . . . (3) _P. alnifolia_

(1) _P. macrocarpa_ Kurz. _Journ. As. Soc. Beng._ xliv. (2), 205; _King, l.c._ 440.

Glabrous tree. Leaves 9 to 12 in. long; leaflets coriaceous oblong to elliptic acuminate remotely denticulate, base round; nerves 15 to 18 pairs prominent beneath, 4.5 to 6 in. long, 1.75 to 2 in. wide; petiolules 2 in. long. Panicles axillary 8 to 12 in. long with several racemose dense-flowered branches. Flowers 1 in.
long, glabrous. Calyx 5-lobed. Petals 0. Stamens 5; filaments pubescent. Fruit ovoid 1·5 to 2 in. long. *Hab.* Malacca (Maingay). Apparently very rare, as it never seems to have been collected again.

(2) **P. pinnata** Forst. *Char. Gen.* 110.

A pubescent tree 30 to 60 ft. or more tall. Leaves 12 to 36 in. long; leaflets 4 to 12 pairs thinly coriaceous oblong or ob lanceolate-oblong acute serrate, base rounded sub-cordate (lowest leaflets small and round), 4 to 12 in. long, 1·75 to 4 in. wide; petiolules 1·15 in. long, glabrous or puberulous upon the nerves. Panicles 12 in. or more long; pubescent flowers 1 in. across. Calyx pubescent; teeth triangular 4 or 5. Petals 4 or 5 small. Disc fleshy lobed glabrous. Stamens 5 to 6, bases pubescent. Fruit ellipsoid black 1·75 to 1·25 in. long. *Hab.* Banks of streams common, in the lowland country, conspicuous from the young red leaves. Johor, Bukit Soga. Malacca (Maingay). Pahang River. Selangor, Dusun Tua. Perak, Batang Padang (Kunstler). Plus River (Wray). Penang Road to Balik Pulau (Curtis). *Native names:* Kasai; Asam Kwang. *Distrib.* Malay Isles and Polynesia.


A small tree 20 to 60 ft. tall, 8 to 18 in. through. Leaves 3 to 8 in. long; rachis pubescent; leaflets thinly coriaceous oblong or ob lanceolate-oblong acuminate, base rounded or cuneate, edge denticulate or nearly entire, sparsely hairy beneath; nerves numerous little elevate; upper leaflets 3 to 4 in. long, 1·9 to 1·25 in. wide, lower ones smaller. Panicles pubescent axillary terminal 8 in. long; flowers numerous dense, less than 1 in. long, green. Calyx-lobes 5 triangular pubescent. Petals 5 oblong or rounded very small and often absent. Stamens 5 long or short exserted glabrous. Fruit usually simple oval obtuse greenish yellow, 1·25 to 1 in. long on a short thick pedicel. *Hab.* Common in forests. Singapore, Tanglin; Bukit Mandai. Selangor, Weld’s Hill (Foxworthy). Perak, Goping and Batang Padang (Kunstler); Tapah (Wray). Penang, Telok Bahang (Curtis).

I cannot separate King’s *P. gracilis* from this species. King also, l.c. 443, gives the MSS. names of *P. Curtisi* and *P. Ridley* to two plants from Penang and Negri Sembilan respectively which are not fully described, and which I do not know.

**13. NAPEODENDRON,** Ridl.


A big tree. Leaves alternate glabrous; petioles 2.5 in. long; leaflets 4 alternate or sub-opposite coriaceous glaucous beneath, elliptic acute, base blunt; nerves elevate beneath 12 pairs, 3.5 to 5 in. long, 1.75 to 2.5 in. wide; petiolules 1.2 in. long. Panicles axillary terminal 8 in. long, basal half nude; branches 1.5 in. long. Flowers on short cymes at the branch-ends 1 in. long, shortly pedicelled. Sepals 4 ovate puberulous. Petals 4 longer oblong puberulous. Stamens 8 outside the disc; filaments broad oblong hairy; anthers ovoid terminal apiculate. Disc deep annular, edge thick. Style short thick; ovary partly free from disc 2-celled; ovules 1 in each. Stigma large discoid. Fruit not seen. *Hab.* In dense forest in the hill ranges, Selangor, Ulu Gombak (Ridley).


- Rachis of leaves winged.
- Leaflets glaucous beneath...
- Rachis of leaves terete.
- Leaflets glabrous not glaucous beneath...
- Leaflets glabrous glaucous beneath...
- Leaflets puberulous...
- Midrib pubescent...
- Rachis, midrib, petioles tomentose...


Large shrub or small tree, pubescent. Leaves 4 to 7 in. long; rachis narrow, winged; leaflets 3 to 7 ovate-lanceolate or oblancoate acute, base cuneate, glaucous beneath sparsely hairy, 2.5 to 4.5 in. long, 1 to 1.75 in. wide; petiolules 1 in. long. Racemes branched 2 to 4 in. long. Flowers white. Fruit 1.75 in. broad; wings rounded, base contracted to a short stalk. *Hab.* Common in woods and hedges, open country, Singapore. Johor, Pulau Tinggi (Kelsall). Pahang, Rumpin River. Malacca, Bukit Bruang (Derry). Dindings. Province Wellesley, Kubang Ulu (Curtis). Penang, Ayer Hitam (Curtis). Kelantan, Kota Bharu.

var. *bifuga* King, l.c.

- Leaflets 2 pairs; rachis dilated at top. Common, Singapore, Pasir Panjang; Chan Chu Kang; Bukit Timah Road (Hullett). Malacca, Penang, Moniot’s Road (Curtis). *Distrib.* Cochin-China, Borneo, Sumatra. *Native names:* Sempayan Ulur; Pena-Pena.
(2) G. squamosa Radlk. l.c. 609; King, l.c. 444. Cupania glabrata Hiern, in Hook fil. F.B.I. i. 676.

Small tree 20 to 30 ft. tall. Leaves 6 to 10 in. long; leaflets 4 to 8 pairs, lanceolate to ovate-lanceolate short acuminate subfalcate, base narrow oblique, glabrous not glaucous beneath; nerves 8 to 10 pairs. Panicles racemose 2 to 3 in. long puberulous or nearly glabrous. Fruit 1 in. across; wings broad oblong rounded, abruptly narrowed to a stalk. Style persistent. Hab. Woods and open forests. Singapore, Selitar; Bukit Timah. Malacca, Brisu (Holmberg). Penang, Government Hill (Curtis, Wallich) at 1500 to 2000 ft. altitude.

(3) G. pubescens Radlk. l.c. 612; King, l.c. 445. Cupania pallidula Hiern, l.c. i. 676. C. Griffithiana Kurz, Journ. As. Soc. Beng. xlv. (2), 188.


Tree 30 to 40 ft. tall. Leaves 4 to 12 in. long; leaflets 3 to 4 pairs, elliptic sub-acute, base slightly narrowed oblique, sparsely puberulous on both sides, midrib above pubescent (occasionally glabrous, var. glabrescens King), not glaucous beneath; nerves 6 or 7 pairs, 2 to 3 in. long, 1 to 1'5 in. wide; petiolules 2 in. long. Racemes shortly branched 2 in. long pubescent. Fruit 5 in. across, lobes broader than long, rounded, gradually narrowed to a basal stalk. Hab. Dindings. Perak, Larut Hills (Kunstler). Distrib. Tenasserim.


Tree pubescent. Leaves 4 to 6 in. long; rachis, petioles, midrib tomentose; leaflets alternate 6 pairs coriaceous lanceolate acuminate, base cuneate oblique, 1'5 in. long, 4 in. wide; petiolules 1 in. long. Panicles little branched below leaves 2'5 in. long pubescent. Flowers 2 in. across. Petals round. Hab. Perak, Hermitage Hill (Curtis), only known locality.
15. **TRIGONACHRAS**, Radlk.


Leaves 8 to 12 in. long; leaflets 11 to 15, oblong-lanceolate; nerves 8 to 10 pairs, 2 to 3·5 in. long, 6 to 8 in. wide; petiolules 2 in. long. Racemes panicked tomentose; flowers rather long-pedicelled. Ovary elongate conic pubescent. Fruit 2 in. long, 1·2 in. wide. *Hab.* River-banks in open country and woods. Singapore (Wallich); Bukit Timah. Malacca, Pulau Besar (Maingay). Pahang, Pekan. *Distrib.* Malay Islands.


17. **MISCHOCARPUS**, Bl.

Tree. Leaflets 1 to 5 pairs ovate-lanceolate or elliptic. Racemes axillary simple or branched. Calyx cup-shaped with 5 imbricate segments. Petals 5 with 2 large pectinate scales or absent. Disc annular. Stamens 8. Fruit pyriform blunt 3-angled or rounded,
pedicelled, 3-celled. Seed with a thin aril with 2 basal spurs. Species 10, Malaya, Australia.

Petals 5 minute . : : : : : (1) M. sumatranus
Petals none or 3 . : : : : : (2) M. Lessertianus

(1) M. sumatranus Bl. Rumphia iii. 168; King, l.c. 448. Cupania fuscescens Bl. King, l.c. 447.

Tree 30 to 70 ft. tall, glabrous except inflorescence. Leaves 9 to 12 in. long; leaflets 4 to 6 elliptic-oblong or oblong-lanceolate acuminate coriaceous finely reticulate, base cuneate; nerves 12 to 15 pairs elevate beneath, 4 to 8 in. long, 1.5 to 2 in. wide; petiolules 12.5 in. long thick. Panicles erect 12 in. long; branches few racemose. Petals 5 minute pale yellow. Disc hairy. Fruit pyriform 4 in. long with a pseudo-stalk 25 in. long. Hab. Woods in lowlands, Singapore, Bukit Panjang; Pulau Ubin. Selangor, Kwa Lumpur. Perak, Thaiping. Penang, Moniot’s Road (Curtis) at 1200 ft. altitude. Distrib. Malay Isles, Cochin-China and India.

If the plants identified as M. fuscescens Bl. by King are really what Blume intended, these two species seem identical, except that M. fuscescens has five rudimentary petals.


Tree 25 to 50 ft. tall. Leaves 6 to 10 in. long; leaflets 3 to 6 elliptic oblong or oblong-lanceolate acuminate, base cuneate glabrous coriaceous; nerves 8 to 10 pairs faint, 2.5 to 6 in. long, 1.5 to 2 in. wide; petiolules 15 in. long. Panicles of a few dense racemose branches, puberulous. Calyx pubescent yellow. Petals 0 or 3. Fruit globular pyriform 3-angled when young, 25 in. long, pseudo-stalk 4 in. long. Hab. Sea coasts, river-banks. Singapore, Serangoon; Changi Road. Johor, Minyak Buku. Malacca, Bukit China Road (Maingay). Pahang, Rumpin River and Pekan (Evans). Penang, Coast (Curtis). Setul. Tringganu, Sai Chao, Bukit Besar (Yapp). Distrib. S. Siam. Native names: Ludai Bulan; Medang Serai; Perapat Bukit; Tasai.

Distinguished from M. sunaicicus Bl. by the smooth rounder leaves and the form of the fruit, the base of which is rounded, and not dent current to the pseudo-stalk. Blume’s plant has also a much larger pear-shaped, strongly-angled fruit.

18. PARANEPHELUM, Miq.

Tree often vast, with the habit of Pometia. Leaves unequally pinnate; leaflets usually dentate. Flowers panicked regular bisexual. Calyx 4- to 6-lobed. Petals 5, small with a larger scale. Disc entire deep. Stamens 6 to 10 glabrous. Ovary 3-celled, 3-angled. Fruit a woody, spiny or tubercled capsule 3-valved, 1- to 3-seeded. Seed large or angled globose. Species 3 or 4, Burma, Cambodia, Malaya.
Leaves 18 to 20 in. long; fruit with short thick spines. (1) P. macrophyllum
Leaves 12 in. or more long; fruit with long stiff acuminate spines. (2) P. muricatum
Leaves 15 to 18 in. long; fruit lobulate scurfy. (3) P. nitidum

(1) P. macrophyllum King, l.c. 450.
A tree 30 to 100 ft. tall and 5 or 6 ft. through with buttresses, glabrous. Leaves 18 to 20 in. long; leaflets 5 to 9 coriaceous shining oblong-cuspidate, edges remotely serrate, base cuneate; nerves 18 to 28 pairs prominent beneath, 6 to 15 in. long, 2'5 to 4'5 in. wide; petiolules '35 in. long. Panicles erect spreading 12 in. long crimson. Flowers '2 in. across. Sepals pink. Petals little longer white flushed pink. Disc large and conspicuous olive yellow hairy. Stamens pink. Fruit globular woody covered with thick spines, brown. Hab. In dense forests, Singapore, Bukit Timah. Perak, Larut and Kinta (Kunstler); Kwala Kangsar; Temengoh (Ridley).

A small tree 18 to 30 ft. tall. Leaves 12 in. or more long; petioles tomentose; leaflets 2 pairs, coriaceous elliptic-oblong acuminate, base unequal narrowed, edge distantly coarsely serrate; nerves about 12 pairs; upper leaflets 10 in. long, 4 in. wide; petiolules thick '2 in. long. Panicles 6 to 12 in. long. Sepals oblong lanceolate velvety outside. Fruit sub-globose with numerous stiff acuminate spines. Hab. Open heathy country. Perlis, Chupeng (Ridley). Distrib. Siam.

I suppose this specimen (only in fruit) is what Pierre intended, though its leaves are quite glabrous, as are petioles and fruit. He describes these parts as velvety. The panicle is, however, pubescent.

(3) P. nitidum King, l.c. 450.
Tree 40 to 60 ft. tall, 15 to 20 in. through, glabrous. Leaves 15 to 18 in. long; leaflets 5 to 9 coriaceous oblong-lanceolate acuminate entire, base much narrowed; nerves 14 to 16 pairs, 4'5 to 6'5 in. long, 1'5 to 1'75 in. wide; petiolules '25 in. long. Panicles 3 to 4 in. long lax. Flowers '2 in. wide white. Fruit woody lobulate globular scurfy rusty-brown, 3-seeded, '75 in. long, 1 in. wide. Hab. Dense rocky jungle. Selangor, Ulu Selangor (Goodenough). Perak, Gunong Bubu (Kunstler).

19. DODONÆA, Linn.

Shrubs (or trees). Leaves simple alternate. Cymes lateral. Flowers small green unisexual. Sepals 2 to 5. Petals none. Stamens 5 to ro, usually 8. Disc obsolete, or very small. Ovary 3- to 6-seeded and celled; ovules 2. Capsule thin flat sub-orbicular emarginate papery 2-valved, valves winged on the back, 1- or


A glabrous bush 4 to 6 ft. tall or less. Leaves oblanceolate acute or blunt, base much narrowed shining, thinly coriaceous, many-nerved, viscid, 1'75 to 4 in. long, 1'5 to 1'5 in. wide; petioles 1 in. long. Cymes 1 in. long spreading axillary. Flowers 1'25 in. wide. Sepals oblong. Capsule 1'75 in. long and little broader. *Hab.* Sand-hills on the seashore. Johor, Pulau Tinggi (Fielding). Pahang, Kwala Pahang; Rumpin River (Evans). Malacca (Griffith, Maingay). Dindings, Pangkor near the old Dutch Fort (Curtis). Penang, Telok Bahang (Curtis). Lankawi, Burau Bay. Kelantan, Kwala Kelantan. *Distrib.* Tropics generally. It is never cultivated in the Malay Peninsula, as *King* suggests. The species is very variable in many parts of the world, if the plant usually so named is not a mixture of several species. There is only one form in the Malay Peninsula, the sand-hill bush. In Java this species forms a tree 60 ft. tall, grown as a woodland tree. *Native names:* Kayu Bertih; Seringan Laut.

**20. HARPULLIA,** Roxb.


(i) **H. confusa** Bl. *Rumphia* iii. 176.

Small tree about 20 ft. tall. Leaves 6 to 18 in. long; leaflets 6 to 10 membranous shortly cuspidate oblong or elliptic, base round or shortly cuneate; nerves fine 8 to 10 pairs, 4'5 to 8 in. long, 2'5 to 3 in. wide; petiolules 1 in. long. Panicles 8 in. long with few distant short branches, puberulous. Sepals ovate round pubescent. Petals oblong not clawed blunt. Capsule ovoid beaked mealy pubescent 6 in. long and as wide. *Hab.* On forests rare. Pahang, Pulau Tawar; Kwala Lipis (Foxworthy). Negri Sembilan, Tampin. *Distrib.* Java. *Native name:* Kesema.

I think the Perak specimens mentioned by *King*, are this and not *H. cupanioides*, but his description, *l.c.* 451, is that of the Indian *cupanioides*. 
**Order XLIII. STAPHYLEACEÆ.**

Trees or shrubs. Leaves opposite, compound. Flowers small white regular panicled. Sepals 5. Petals 5. Stamens 5 outside the flat or ring-like disc. Ovary 2- to 3-lobed; styles 3, free or connate. Fruit a drupe or berry 3-celled. Seeds few or many. Genera 22, species 5, Europe, N. America, Asia.

1. **TURPINIA,** Vent.

Glabrous trees. Leaves pinnate 3- to 5-foliate sub-coriaceous opposite. Panicles axillary, and falsely terminal, lax of small white flowers bisexual. Calyx 5-lobed imbricate. Petals 5 imbricate. Stamens 5 insert outside the lobed disc. Ovary sessile 3-lobed, 3-celled; styles 3 free or not. Fruit sub-globose green fleshy, 3-celled. Styles 2 or 3 distinct at tip. Species about 12, India and Malaya and America.

Leaflets 3.

- Flowers '3 in. across in a short panicle 2 to 3 in. long . (1) **T. trifoliata**
- Leaflets 5.
- Flowers '15 in. across in lax panicle 8 in. long . (2) **T. latifolia**
- Flowers '1 in. across, panicle; 15 in. long very lax . (3) **T. laxiflora**


Tree. Leaflets 3 distant elliptic blunt or cuspidate acuminate crenulate or blunt serrate sub-equal, 6 in. long, 3 in. wide; central

(2) **T. latifolia** Wall. Cat. 4939; Ridl. l.c. T. pomifera King, l.c. 452, not of DC. Tree about 30 to 40 ft. tall, glabrous. Leaves over a foot long, of 5 stiff dark shining green leaflets ovate-elliptic shortly cuspidate or blunt, base round, quite entire or minutely serrulate, 4 in. long, 3 in. wide or less; petiolules, terminal one 2 in. long, laterals ‘25 to ‘5 in. long; petioles 3 in. long. Panicles terminal and axillary very lax spreading, 8 in. long and as wide; flowers cymose and racemed at the branch-ends. Sepals ovate blunt ‘06 in. long. Petals oblong blunt longer white. Fruit globose fleshy green ‘5 in. through. Hab. Common in woods in the low country. Singapore, Tanglin; Bukit Mandai. Muar, Bukit Keyara (Fox). Malacca. Selangor, Sungei Buluh; Bukit Kutu. Perak, Larut (Kunstler); Togoh (Wray). Penang Hill; Telok Bahang (Curtis, Wallich). **Native names:** Giramong; Geritta; Merbong Jantan.

(3) **T. laxiflora** Ridl. l.c. 179. Very big tree 80 ft. or more tall. Leaves 9 to 10 in. long; leaflets 5 ovate elliptic blunt or acuminate entire or minutely crenulate, 4 in. long, 3 in. wide; petiolules, terminal one 1’75 in. long, lateral ones ‘15 to ‘2 in. long; petioles 2 in. long. Panicles very lax slender spreading, 15 in. long, 5 in. or more wide; peduncle and secondary peduncles 4 in. long. Flowers sub-racemose distant; pedicels ‘08 in. long; upper part of panicle pubescent. Sepals ovate ‘05 in. long. Petals little longer. Hab. Forests, Singapore, Garden Rockery, a big tree. Pahang, Bukit Beserah, Kwantan (Foxworthy). Perak, Larut (Kunstler). **Native name:** Kapan Buit.

A much bigger tree with much more lax panicles, which usually appear after leaf-shedding. King has written the plant up as *pomifera* var. *sphaerocarpa*, but it is quite different from the Javanese *sphaerocarpa* Hassk.

**ORDER XLIV. SABIACEÆ.**

Climbing shrubs or small to large trees. Leaves alternate, simple or compound. Flowers small or minute, bisexual (rarely unissexual) usually panicked. Calyx 4- to 5-lobed, lobes imbricate.
Petals 4 or 5, imbricate, equal or unequal, opposite or alternate. Disc annular. Stamens 4 or 5, opposite petals, all or only two perfect, and 3 sterile filaments clavate or subulate; anther-cells distant, bursting transversely or with a cap. Ovary 2- to 3-celled, compressed or 2- to 3-lobed; styles 2 or 3, connate or free or 0; ovules 1 or 2 in a cell. Fruit 1- or 2-carpelled, drupaceous. Seeds compressed or globose ex-albuminous. About 35 species, chiefly Indian.

Climbers; stamens 4 to 5 perfect or equal
Trees; stamens 5, unequal.

1. SABIA, Colebr.

Climbing or sarmentose shrubs, sub-glabrous. Leaves simple, entire. Flowers axillary, solitary, cymose, racemose or panicled, small green or purplish, 2-bracteate. Calyx 4- or 5-partite. Petals 4 or 5. Disc annular, 5-lobed. Stamens 4 or 5, from base of disc. Carpels 2 (or 3); styles 2; ovules 2 in a carpel. Fruit of 1 or 2, gibbous carpels dry or drupaceous. Seed reniform, testa coriaceous. About 16 species, Indo-Malayan.

Flowers solitary, axillary
Flowers racemose or panicled


Leaves ovate-lanceolate or elliptic acuminate, base cuneate, membranous, minutely puberulous beneath; nerves 5 pairs, elevate beneath, reticulations wide conspicuous, 3'5 to 7 in. long, 1'25 to 3'5 in. wide; petioles '35 to '75 in. long. Peduncles '35 in. long, lengthening in fruit. Sepals triangular, edges pubescent. Petals longer, lanceolate. Stamens nearly as long. Fruit ovoid compressed '5 in. long, white spotted blue. Hab. Rare in mountain forests. Hab. Perak, Larut Hills at 1800 ft. altitude (Kunstler). Distrib. Sumatra.

(2) **S. limoniacea** Wall. Cat. 1000; Hook. fil. F.B.I. ii. 3; King, l.c. 454.

Leaves coriaceous, oblong or lanceolate acute or blunt, base cuneate or rounded, glabrous; nerves 5 or 6 pairs, faint, 2'5 to 6 in. long, 1 to 1'75 in. wide; petioles '6 in. long. Flowers '15 in. wide in racemes, 2 to 6 in. long, distant. Sepals 5, oblong blunt. Petals 5 obovate. Stamens included. Fruit solitary or paired, oblique orbicular or elliptic '5 in. long. Hab. Rare in hill forests. Perak (Scortechini). Penang, Sungei, Penang Road (Curtis). Distrib. India.

2. MELIOSMA, Bl.

Trees, often small. Leaves simple or unequally pinnate. Flowers small or minute, white or yellow in large branched terminal panicles.
usually bisexual. Bracteoles and sepals 5 to 9, forming a persistent whorl round the petals. Petals 5, 3 large orbicular, 2 smaller behind the fertile stamens, sometimes reduced to a bifid scale adnate to filament. Stamens 5, 2 fertile, top expanded into a cup with 2 globose cells dehiscing transversely, 3 deformed, cells empty. Disc cupular or annular with 2 to 5 teeth. Ovary 2- (or 3-) celled; style simple or bifid; ovules 2 in a cell. Stigma 1. Drupe small, globose, oblique; stone crustaceous. Seed globose. Species about 34, tropical Asia and S. America.

Leaves simple.

Petals 5.

| Flowers '05 in. across | (1) M. elliptica |
| Flowers '1 in. across | (2) M. monophylla |

Petals 0.

| Flowers '1 in. across | (3) M. lancifolia |

Leaves pinnate, glabrous.

| Leaves 30 to 40 in. long | (4) M. levis |
| Leaves 12 to 18 in. long | (5) M. nitida |
| Leaves 6 to 8 in. long | (6) M. elegans |

Leaves pinnate hairy beneath.

| Flowers clustered, sessile | (7) M. lanceolata |
| Flowers solitary, pedicelled | (8) M. Ridleyi |

(1) M. elliptica Hook. fil. F.B.I. ii. 5; King, l.c. 456.

Small tree 20 to 30 ft. tall. Branches, petioles, midribs above and under-side of leaves densely red-tomentose. Leaves simple, elliptic or oblanceolate, caudate-acuminate, entire or serrate, widest in middle, coriaceous; nerves 10 pairs, elevate beneath, 4 to 9 in. long, 1'25 to 3 in. wide; petioles 5 to 1'5 in. long. Panicle terminal, spreading 6 in. long; branches 3 in. long. Flowers crowded, sessile, '05 in. across. Sepals 4 orbicular, ciliate. Petals 5, orbicular. Fertile stamens 2 to 4. Fruit sub-globular, dark red, 2'2 to 2'5 in. long. Hab. Dense damp forest, lowlands, Singapore, Chanchukang; Malacca, Bukit Bruang (Derry). Selangor, Kwala Lumpur. Perak, Larut and Ulu Bubong (Kunstler). Native names: Buah Tipus; Medang Berhulu; Buah Palu.


Leaves simple, elliptic acuminate, point long, base narrowed, thin glabrous; nerves 7 pairs slender, 6 to 8 in. long, 3 to 3'5 in. wide; petioles slender, 1'5 to 2 in. long. Panicles axillary or terminal, 2 to 3 in. long; peduncles 1 in. long, glabrous; branches few short. Flowers '1 in. long. Sepals 5, orbicular, unequal, ciliate. Petals 5, 3 orbicular, 2 small irregular. Stamens 2 fertile, 3 sterile lobed. Ovary glabrous. Hab. Rare in hill forests, Perak, Hermitage Hill (Ridley).

(3) M. lancifolia Hook. fil. F.B.I. ii. 5; King, l.c. 456.

Tree 20 to 40 ft. tall. Branches and panicles red-villous. Leaves thinly coriaceous, oblanceolate acuminate, gradually narrowed from middle to base; nerves 20 to 24 pairs, elevate, 12 to 18 in.

(4) **M. levis King**, *l.c.* 457.

Tree 40 to 50 ft. tall, 15 to 20 in. through. Leaves pinnate, 30 to 40 in. long; leaflets 10 to 12 pairs, coriaceous, oblong-lanceolate caudate-acuminate, base cuneate, glabrous; nerves 14 to 16 pairs, slender raised, 5 to 7 in. long, 1 to 1.25 in. wide; petioles 3.5 in. long. Panicles 18 in. long; branches distant racemose, lower ones 5 in. long, upper ones shortening, shortly hairy. Flowers less than 1 in. across, sessile, pale yellow. Sepals 2, orbicular, puberulous outside. Petals 5, 3 outer large, 2 inner small. Stamens 2 to 3; connective of anther hooded. *Hab.* Dense wet jungle, 200 to 300 ft. altitude, rare. Perak, Batang Padang district (Kunstler).


Small tree or erect shrub about 10 to 20 ft. tall, nearly glabrous. Leaves pinnate, 12 to 18 in. long; leaflets coriaceous, 7 to 13 elliptic-ovate or lanceolate, acuminate, base cuneate, glabrous; nerves 7 to 10 pairs and reticulations prominent beneath, 4 to 12 in. long, 1.75 to 4.25 in. wide; petiolules 35 to 75 in. long. Panicles terminal axillary strict, 8 to 12 in. long, red-scurfy; branches short. Flowers 1 in. across, white, pedicelled. Sepals rounded 4. Petals 5, 3 outer round enclosing the two small inner ones. Stamens 2; anthers hooded with 2 round lobes. Fruit oblique to ovoid round, 1 in. long, 8 in. across, orange. *Hab.* Woods low country up to 2500 ft. altitude. Pahang, Bentong (Foxworthy). Malacca, Rim (Griffith); Nyalas. Johor, Kota Tinggi; Merlimau (Cantley). Selangor, Petaling; Ulu Gombak (Murdoch). Perak, Gunong Harom Parah (Scortechini) up to 2500 ft. altitude; Hermitage Hill. Dindings, Lumut. Penang, Government Hill. *Native names:* Pinang Pelandok; Mata Gajah; Tahi Gigi. Mengading. *Use:* Fruit eaten by Jakuns.

(6) **M. elegans** Ridl.

Small tree 20 to 30 ft. tall. Leaves pinnate 6 to 8 in. long; leaflets opposite, 6 to 10 pairs, lanceolate acuminate, base cuneate, glabrous except a few reddish hairs on petiolules and midrib, 2 in. long, 1 in. wide; petiolules 2.5 in. long. Panicle lax, 12 in. long, hairy; branches remote, 6 in. long; branchlets 1 to 2 in. long. Flowers sub-sessile, pink fragrant. Calyx-lobes 4 to 5 lanceolate obtuse ciliate. Petals glabrous, 5 outer ones orbicular, inner ones oblong hooked. Stamens 3, with a bilobed cup surrounding anther. Drupe pisiform, 25 in. long. *Hab.* Forest hill ranges. Selangor, Semangkok Pass (Curtis).
(7) **M. lanceolata** *Bl. Rumphia* iii. 203, t. 168; *King*, l.c. 458.
Small little-branched treelet about 20 ft. tall. Branchlets and young parts rusty-tomentose. Leaves 12 to 24 in. long; leaflets 13 to 17, stiff, coriaceous, glabrous, shining above; nerves 12 pairs with reticulations deeply impressed above, elevate beneath, more or less tomentose beneath, 3 to 6 in. long, 1·25 to 2 in. wide; petiolules 0·2 to 0·35 in. long. Panicles very large, drooping, much-branched; branches 2 ft. long; branchlets 8 in. long. Flowers in small clusters, sessile, 1 in. across, cream colour. Sepals 3, orbicular-triangular, blunt. Petals 5; 3 outer larger orbicular. Stamens 2.

var. **pubescens** *Hook. F.B.I.* ii. 7, is a more tomentose state of the plant.

(8) **M. Ridleyi** *King*, l.c. 458.
Slender little branched tree 25 ft. tall. Leaves 15 in. long; rachis, midribs, nerves beneath red-tomentose; leaflets 11 to 15
thinly coriaceous, oblong to lanceolate acuminate, base obliquely shortly cuneate, smooth above, red-tomentose beneath; nerves 7 to 8 pairs, reticulations distinct, 2½ to 5 in. long, 9 to 1.2 in. wide; petiolules 1 to 2 in. long. Panicles axillary and terminal, 5 to 12 in. long, red-tomentose; branches spreading. Flowers solitary, spicate, oblong under 1 in. across, white. Fruit globose, 1.25 in. through, black. Hab. Southern woods of the peninsula, Singapore, Garden Jungle; Bukit Timah. Johor, Castlewood. Malacca (Griffith).

Order XLV. ANACARDIACEÆ.

Trees, often vast, rarely shrubs, with a clear resin which turns black on exposure, very poisonous. Leaves usually simple, coriaceous or pinnate, alternate, rarely opposite. Flowers small or minute, white, yellow or pink, uni- or bi-sexual in panicles in the uppermost axils. Calyx 3- to 5-lobed or spathaceous (Gluta) or calyptrate (Melanorrhœa). Petals 3 to 5. Disc flat cupular or annular or lobed. Stamens many as petals or fewer or more, some often abortive insert beneath, rarely on, disc. Ovaries 1 or 4 to 6, apocarpous or 2 to 5 syncarpous; ovules solitary, pendulous. Styles 1 to 5, or stigma sub-sessile. Fruit drupaceous, 1-celled and 1 seed or a stone 2- to 5-celled. Seed exalbuminous. About 430 species, chiefly tropical. (King, Journ. As. Soc. Beng. lxiv. ii. 459.)

Spondias dulcis, Willd., the Hog plum, is occasionally planted. There are trees at Grit in Perak. It is a big tree with caducous leaves, long leaflets and greenish yellow plum-like fruit.

**i. ANACARDIÆ.** Ovary 1-celled; leaves simple; carpels 1 to 5, only 1 fertile; style lateral or from base of ovary.

Petals not accrescent; stamens in 1 whorl, sometimes reduced to 1; fruit a drupe.

Stamens 10; carpels 5 (4 or 6)

**Carpel 1.**

Leaves opposite

Leaves alternate.

**Stamens 1 to 5; calyx 4- to 5-partite**

Stamens 8 to 10; drupe reniform on a fleshy peduncle.

Calyx spathaceous; drupe corky, fleshy often tubercled.

Petals accrescent.

Calyx calyptrate; drupe sessile

Calyx 5-partite; drupe stalked

**ii. RHODEÆ.** Carpels 1 or 3 united; ovary 1-celled; stamens in 1 to 2 whorls; fruit 1-celled, 1-seeded; leaves usually pinnate.

Leaves simple.

Flowers 5-merous; stamens 6 to 10

**1. Buchanania**

**2. Bouea**

**3. Mangifera**

**4. Anacardium**

**5. Gluta**

**6. Melanorrhœa**

**7. Swintonia**

**8. Campnosperma**
Leaves pinnate.

Sepals accrescent in fruit . . . . 9. Parishia
Sepals not accrescent in fruit.
Stamens 5 with 5 staminodes.
Stigma erect 5-lobed . . . . 10. Microstemon
Stigma flat not 5-lobed, bent . .
Stamens 4 to 10, no staminodes; drupe small . . . . 12. Rhus

iii. Semecarpae. Ovary 1-celled of 3 carpels united; ovule 1; stamens in 1 row; styles 3 or 1; drupe large, connate with a fleshy peduncle; leaves simple.

Petals valvate; style 1; calyx enlarged adherent to drupe . . . . 13. Melanochyla
Petals imbricate; styles 3; drupe on a large fleshy receptacle . . . . 14. Semecarpus

iv. Spondi. Ovary and drupe 2- to 5-celled; leaves imparipinnate.
Flowers bisexual; drupe large globose; flowers 5-merous, stamens 10; drupe 5-celled. 15. Dracontomelum

1. Buchanania, Roxb.


Leaves round or blunt at tip; panicle glabrous . . . . (1) B. lucida
Leaves acute; panicle pubescent . . . . (2) B. sessilifolia


Tree about 40 to 60 ft. tall. Leaves coriaceous, oblong-lanceolate or obovate blunt rounded, narrowed from below middle to the long-winged petiole, shining; nerves 12 pairs fine, reticulations distinct, 3 to 5.5 in. long, 1.5 to 1.75 in. wide; petioles 5 to 7.5 in. long. Panicles axillary at branch-ends, lax, spreading, 6 in. long, 2 in. across. Flowers greenish white 25 in. across; pedicels 1 in. long. Sepals 4 to 5, orbicular. Petals 4 or 5, elliptic. Stamens 8; anthers elongate cordate. Pistils 3 to 4. Drupe ovoid or subglobose, 25 in. long. Hab. Common in woods. Singapore to Penang and Kedah and Lankawi. Distrib. Burma, Sumatra, Labuan, Siam. Native names: Arga; Kelompang Kras (Kedah). var. laxiflora Ridl.

Leaves oblanceolate, quite blunt, rounded. Panicle 6 in. long, very lax; branchlets (lower) 1.5 in. long; peduncle 7 in. long; pedicels 2 in. long, slender; buds oblong 1 in. long. Hab. Pulau Adang.
Engler's var. petiolaris is merely based on a state of the foliage, the leaves being smaller and rounder.


Tree about 30 or 60 ft. tall. Leaves thinly coriaceous, lanceolate or oblanceolate, abruptly acute, narrowed to base, glabrous except sometimes the puberulous midrib beneath; nerves 13 to 15 pairs, elevate beneath, 3'5 to 7 in. long, '1'5 to 2'5 in. wide; petioles '1 to '6 in. long. Panicles 8 to 9 in. long, peduncled, spreading 4 in. across. Flowers crowded at tips, greenish white '15 in. across. Sepals 5, round. Petals 5 to 6, oblong, blunt. Stamens 8 to 10, white; anthers sagittate. Drupe sub-cordate round compressed, '35 in. long. Hab. Common all over the peninsula in woods. Singapore, Pahang, Johor, Malacca, Perak, Penang. Distrib. Burma and Malay islands. Native names: Pauh pipit (Sparrow mango); Medang Hudang; Kurutak Hudang; Otak Hudang; Poko Hudang; Kuluk Hudang; Katawu Hudang (in Sumatra Katidang and Katudang); Temohong; Gulawai.

In some forms the buds and inflorescence are more or less hairy.

2. BOUEA, Meissn.


Leaves 5 to 8 in. long.


A bushy tree 30 to 80 ft. tall. Leaves deep green coriaceous, oblong-lanceolate blunt acuminate, base cuneate; nerves 10 to 15 pairs fine, depressed above, faintly raised beneath, 2'5 to 3 in. long, '5 to '1 in. wide; petioles '4 in. long. Panicles dense 1 to 1'25 in. long. Flowers crowded, yellow '1 in. long. Sepals 4 ovate, puberulous. Petals 4, oblong obtuse, much longer. Stamens 3 or 4, shorter, red; anthers linear. Drupe oblong, '1 in. long, orange, like a small plum. Hab. Villages and woods. Singapore, Pahang, Malacca, Perak, Penang, often in orchards, but I think wild also. It occurred in the Garden Jungle apparently quite wild. Native names: Rumeniya betul; Rumia; Plum mango. Use: A good fruit, rather acid, but good for cooking.
(2) *B. macrophylla* Griff. Pl. Cantor, 15; *Notulae* iv. 420; *Hook. fil. F.B.I.* ii. 21; *King, l.c. 465.

Large bushy tree about 30 ft. tall. Leaves dark green, shining, coriaceous, oblong-lanceolate, bluntly acuminate, base cuneate or round; nerves 18 to 20 pairs, 5 to 8 in. long, 1.65 to 2.65 in. wide; petioles ’75 to 1 in. long. Panicles axillary, dense, 2 to 3 in. long; branches 1 in. long or less. Flowers yellow 1 in. long; pedicels finely tomentose. Sepals 3 to 4 ovate tomentose. Petals 3 to 4 oblong blunt glabrous. Stamens 3 to 4; anthers ovate. Drupe oblong as long as an egg, yellow pulpy. *Hab.* Villages. Singapore, Malacca to Biserat, Jalar (Yapp). *Native names*: Gondongan; Kondongan. *Use*: Fruit eatable and quite good.

3. **MANGIFERA**, Linn.

Large to vast trees. Leaves simple alternate. Panicles in terminal axils, usually large. Flowers small, green, white, pink or violet, bisexual. Sepals 4 to 5 imbricate. Petals 4 to 5 imbricate. Stamens 1 to 5, rarely 8, one perfect with the others abortive or absent, within or on disc. Ovary 1-celled, oblique; style lateral. Drupe large, pulpy; stone compressed, fibrous. Seed large, flat or convex. About 30 species, tropical Asia, few Africa, chiefly Malayan.

The Mango (*Mangifera indica*) is often planted, and to be seen round villages, but not native. Several of the other well-known cultivated species, such as the Binjai, are probably not native in the peninsula. *Native names* of Mango: Mampelam; Ampelam; Hampelam; also Buah Mangga. The name Pauh is applied also to many species.

*Disc fleshy, swollen.*

Sepals and petals 4; stamen 1.

Panicles pubescent.

Petiole 1 to 1.25 in. long; leaves 4 in. long or more

Petiole 2.25 to 3 in. long; leaves elliptic, subcoriaceous

Petiole 2.25 to 3 in. long; leaves broad elliptic, stiff, coriaceous

Panicles glabrous.

Leaves 6 by 2 in.; nerves fine, blunt; petiole 5 in. long

Leaves 11 by 3.5 in., acute; petiole 2.5 in. long

Leaves 6 by 2 in.; panicles stout

Sepals and petals 5.

Stamens 5 fertile

Stamens 3 fertile, 2 staminodes

Stamen 1 perfect.

Panicle tomentose

Panicle glabrous.

Leaves very coriaceous

Leaves thinly coriaceous, oblong 5 to 8 in. long

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(1) *M. Griffithii*

(2) *M. microphylla*

(3) *M. sclerophylla*

(4) *M. Maingayi*

(5) *M. longipetioliata*

(6) *M. quadrifida*

(7) *M. pentandra*

(8) *M. lanceolata*

(9) *M. indica*

(10) *M. oblongifolia*

(11) *M. longipes*
Mangifera.  

Leaves elliptic-lanceolate 3 to 4 in. long.  

Disc minute or absent.  

Panicles glabrous.  

Flowers 2'5 in. long, yellow, edged rose.  

Flowers 3'5 in. long pink, showy; panicle blood-red.  

Flowers 3 in. long; leaves linear-oblong.  

Panicles puberulous.  

Flowers purple; stamens 5 or 6, perfect; fruit bottle-shaped.  

Panicles tomentose; petals adnate to a cylindric torus.  

Flowers 3 in. long; leaves sessile or nearly sessile 20 to 30 in. long.  

Flowers showy, pale lavender; panicle 12 to 15 in. long.  

Flowers 7'5 in. long with large concave bracts.  

(12) **M. gracilipes**

(13) **M. odorata**

(14) **M. foetida**

(15) **M. macrocarpa**

(16) **M. lagenifera**

(17) **M. kemanga**

(18) **M. caesia**

(19) **M. superba**

(1) **M. Griffithii** Hook. fil. Trans. Linn. Soc. xxii. 168; F.B.I. ii. 14; King, l.c. 468.

Tree 80 to 100 ft. tall. Leaves stiffly coriaceous elliptic or oblong to obovate blunt, narrowed to base; nerves 16 to 17 pairs slightly elevate beneath, 4 to 7 in. long, 1'5 to 2'5 in. wide; petioles 1 to 2'5 in. long. Panicles rough pubescent, 3 to 6 in. long; terminal branches few. Flowers less than 1 in. across. Sepals 4, ovate pubescent. Petals 4, obovate, little longer with one or two thickened ridges near base. Stamen 1, on a 4-lobed disc. Fruit oblong-ovoid, 1'5 in. long, greenish yellow. Stone less than 1 in. long. **Hab.** Open rocky jungle in low country, Malacca (Griffith). Perak, Larut 300 to 500 ft. altitude (Kunstler).

(2) **M. microphylla** Griff. in Hook. fil. F.B.I. ii. 17.

A small tree with a dense head. Leaves coriaceous, elliptic acuminate, base narrowed, blunt; nerves 10 to 12 pairs, 2 to 4 in. long, 5 to 1'5 in. wide; petioles slender, 3 in. long. Panicles 3'5 in. long; branches very short, dense-flowered, pubescent. Flowers 2 in. across, white, short-pedicelled. Sepals 4, ovate pubescent. Petals 4, twice as long, oblong, 3-ridged. Stamen 1. Ovary globose puberulous. Drupe green as big as an egg and egg-shaped. **Hab.** In orchards, Malacca, Chabau (Griffith). Pahang, Kwantan, Dalam (Foxworthy). **Native names:** Rabba-Rabba; Rawa.

(3) **M. sclerophylla** Hook. fil. F.B.I. ii. 15; King, l.c. 469.

Gigantic tree. Leaves very coriaceous, broad elliptic-ovovate, apex sub-acute; nerves 12 pairs, thick, 2'5 to 5 in. long, 1'5 to 2'75 in. wide; petioles stout, 2'5 to 7'5 in. long. Panicles terminal, 9 in. long; branches few, lowest 3 in. long, pubescent, sometimes racemose fascicled. Flowers 1 in. across, sessile in the axil of an ovate bract longer than it. Sepals 4, ovate pubescent. Petals 4, about as large. Stamen 1. Drupe green ovoid, 1'5 in. long. **Hab.** In forests, Singapore, Changi. Malacca (Maingay). Perak (Wray).
(4) **M. Maingayi** Hook. fil. F.B.I. ii. 17; King, l.c. 469.
A vast glabrous tree. Leaves coriaceous, elliptic-oblong acute or obtuse, base cuneate; nerves 15 pairs, reticulations inconspicuous, 4 to 9 in. long, 1'5 to 3'5 in. wide; petioles 8 to 2 in. long. Panicle glabrous, pyramidal, 8 to 9 in. long with slender branches. Flowers 12 in. across, rather scattered; pedicels slender. Sepals 4, ovate, blunt. Petals 4, oblong, twice as long, with 3 to 5 ridges. Stamen 1. Hab. Open country, Malacca, Bukit Sabukor. Muar, Sungei Pauh (Fox). Native name: Sepum.

(5) **M. longipetiolata** King, l.c. 470.
Tree 40 to 60 ft. tall, glabrous. Leaves coriaceous, oblong acuminate, long narrowed to base; nerves 16 to 20 pairs, prominent especially beneath, slender, both sides reticulate, 7'5 to 10 in. long, 2'25 to 3'75 in. wide; petioles 2 to 4'5 in. long. Panicles glabrous, axillary and terminal lax, branching from base; branches few with 8 to 12 flowers at the tip. Flowers 15 in. across, white; pedicels slender. Sepals 4, ovate-lanceolate. Petals 4, elliptic, ridges near base 3, broad vertical. Stamen 1, shorter. Hab. Dense forests on mountains; Perak, Larut Hills, 2500 to 3000 ft. altitude (Kunstler).

(6) **M. quadrifida** Jack. in Roxb. Fl. Ind. (ed. Carey) ii. 440.
Tree 40 to 60 ft. tall, glabrous. Leaves coriaceous, elliptic-oblong to lanceolate sub-acute tapering to base; nerves 16 to 18 pairs, slightly prominent, 5 to 7 in. long, 1'75 to 2'5 in. wide; petioles 7'5 to 2'5 in. long. Panicle in upper axils 6 to 7 in. long with short branches; branchlets very short, cymose. Flowers 15 in. across, white. Sepals 4, ovate obtuse. Petals 4, twice as long, elliptic, 3 ridges in lower half, mid-one thickened at tip. Stamen 1, shorter than petals from inner side of one of the 4 disc lobes. Hab. Forests, Perak, Gunong Bubu and Thaiiping 300 to 1500 ft. altitude (Kunstler). Penang (Jack).

(7) **M. pentandra** Hook. fil. F.B.I. ii. 14; King, l.c. 472.
A big tree 60 to 80 ft. tall. Leaves coriaceous, oblong or oblong-lanceolate rounded or acutely acuminate, base almost rounded; nerves about 14 pairs, reticulations fine, distinct, 4 to 6 in. long, 1'5 to 2 in. wide; petioles 4 to 6 in. long. Panicles 6 to 8 in. long, densely hairy. Flowers very numerous, cream white, densely clustered. Sepals 5, ovate obtuse, hairy. Petals little longer 3-nerved in front. Stamens 5, much shorter, unequal. Disc lobed. Fruit green, oblong compressed. Hab. Lowland country, woods near the sea. Singapore, Changi. Malacca (Maingay). Kedah, Alor Sta. Native names: Mampelam; Manga Dodol.

A tree. Leaves coriaceous, lanceolate obtuse, base narrowed; nerves 12 to 13 pairs, 5 in. long, 1'5 in. wide; petioles 1 in. long, much thickened towards base from middle. Panicles 6 in. long, 5 in. across terminal; rachis pubescent. Flowers 12 in. long,
white; pedicels as long. Sepals 5 ovate-lanceolate, pubescent. Petals twice as long, linear-oblong; nerve 1 trifid at tip. Stamens fertile 3, 2 staminodes. Disc lobed. Ovary papilllose. Fruit elliptic, about 1'5 in. long (not ripe). *Hab.* Kedah at Alor Sta in open country (Ridley).


Tree about 60 ft. tall. Leaves coriaceous, narrow oblong to oblong-lanceolate, acute or acuminate, dark green, base cuneate; nerves 12 to 20 pairs, 5 to 10 in. long, 1'5 to 3 in. wide; petioles '5 to 2 in. long. Panicles 12 in. long or more minutely tomentose. Flowers yellowish green, 2 in wide. Sepals ovate, pubescent. Petals oblong with 3 stout nerves. Stamen 1, from between 2 of the 5 lobes of the disc. Ovary obliquely ovoid. Drupe fleshy green or orange, obliquely pear-shaped or ovoid flattened 3 to 4 in. or in cultivated forms 12 in. long. Stone large, fibrous-coated hard. Cultivated in orchards, abandoned villages, etc. Originally from India. *Native names:* Mangga; Mampelam.

(10) **M. oblidgefolia** Hook. *fil.* F.B.I. ii. 16; *King,* l.c. 473.

Large glabrous tree. Leaves stiffly coriaceous, linear-oblong blunt, base rounded; nerves 18 to 25 pairs slightly elevate on both sides, reticulate above, pale smooth beneath, 6 to 9 in. long, 1'75 to 2'75 in. wide; petioles 1 to 1'5 in. long. Panicles 9 in. long, many branched, sub-terminal, glabrous. Flowers '15 in. long, on pedicels as long. Sepals 5, orbicular. Petals 5, twice as long, elliptic-oblong with 3 to 5 short ridges confluent at base. Stamens 5 (all antheriferous), one fertile longer. Fruit unknown. *Hab.* Malacca (Griffith and Maingay), not seen of late years. *Native name:* Maingay gives Quenee, but that is *M. odorata.*

(11) **M. longipes** Griff. *Notulae* iv. 419; *Hook. fil.* F.B.I. ii. 15; *King,* l.c. 473.

Tree 80 ft. or more tall. Leaves thinly coriaceous, oblong or elliptic-oblong, shortly acuminate, base narrow cuneate; nerves 16 to 20 pairs distinct on both sides, 5 to 8 in. long, 1'5 to 2 in. wide; petioles slender, '75 to 1'75 in. long. Panicles terminal, long, slender lax spreading, glabrous. Flowers nearly 2 in. across in ultimate cymules, with longer pedicels. Sepals 5, ovate acute, hairy on the midrib on back. Petals 5, longer, linear-oblong, tips reflexed, 1 ridge at base. Stamen 1, longer; staminodes several. *Hab.* Forests in south. Singapore on Bukit Timah. Malacca (Griffith). Pahang, Kwantan (Foxworthy). *Native name:* Machang Api.

(12) **M. gracilipes** Hook. *fil.* F.B.I. ii. 16; *King,* l.c. 474.

Large glabrous tree, slender branched. Leaves thin coriaceous, elliptic-lanceolate cuspidate, base long narrowed acute; nerves 10 to 12 pairs, slightly raised on both sides, 3 to 4 in. long, 1 to 1'5 in. wide; petioles '75 to 1 in. long, very slender. Panicles glabrous slender 5 to 6 in. long, terminal; branchlets very short.
Flowers 2 in. across; pedicels slender as long. Sepals 5, ovate. Petals 5, lanceolate, longer, ridges 3 to 5. Stamen 1, shorter; staminodes 4, short. Hab. Malacca (Maingay).

A very distinct plant from its small clove-like leaves, but apparently very scarce; no one seems to have found it again.

(13) **M. odorata** Griff. *Notulae* iv. 417; Hook. *fil.* l.c. 16; King, l.c. 474.

A big tree nearly 100 ft. tall. Leaves coriaceous, oblong or elliptic-lanceolate acute and acuminate, reticulate on both sides, base cuneate; nerves prominent, 20 pairs, 6 to 9 in. long, 2 to 4 in. wide; petioles 1.25 to 1.75 in. long. Panicles 8 in. long with branches 4 in. long terminal, red. Flowers less than 1.25 in. wide; pedicels slender. Sepals 5, ovate-oblong, red. Petals 5, 3 times as long, oblong, yellow edged rose, ridges 3 confluent, yellow. Stamens 2 nearly as long, white; anthers black; staminodes short, white tipped rose. Fruit oblong, yellowish green, flesh yellow. Hab. Orchards. Singapore and Malacca, usually in rather sandy spots. *Use*: The fruit is rather poor eating. *Distrib.* Malay Isles. *Native name*: Kwini.

Blume holds the Kwini to be a variety of *M. faetida*, Jack. It seems to me distinct.


Large tree 60 to 80 ft. tall. Leaves very coriaceous, elliptic-oblong obtuse or sub-acute, base narrowed; nerves 16 to 18 pairs, very bold and nearly horizontal, 8 to 12 in. long, 3.5 to 6 in. long; petioles 1.75 to 2.25 in. long. Panicles stout 8 to 9 in. long, blood red. Flowers 3.5 in. across, pink; pedicels very short. Sepals 5, ovate-lanceolate, subacute. Petals 5, linear-oblong, acute, twice as long, clawed; nerve 2- to 3-fid thickened at the base. Disc cylindric. Stamen 1, perfect; staminodes rather long. Drupe oblong, green, 3 to 4 in. long. Hab. Orchards and villages. Singap. Malacca, and most of the southern part of the peninsula. *Distrib.* Siam, Malay islands. *Native name*: Bachang or M‘bachang.

Fruits much used, especially in curries. Very conspicuous in flower, from its bright red panicles.

(15) **M. macrocarpa** Bl. *Bijdr.* 1158; M. fragrans, *Maing.* in *Hook. fil.* F.B.I. ii. 18; King, l.c. 475.

(16) **M. lagenifera** Griff. Notulæ iv. 414, t. 567, fig. 3; Hook. fil. F.B.I. ii. 18; King, l.c. 476.

A superb tree 80 to 100 ft. tall. Leaves deep green, very coriaceous, oblanceolate blunt, gradually narrowed to base; nerves 16 to 20 pairs, faint, 3 to 6 in. long, 1 to 1.75 in. wide; petioles flat, '3 to '9 in. long. Panicles erect, puberulous reddish, 6 in. long, stout, lax. Flowers '35 in. long, deep violet; pedicels short. Sepals 5 or 6 ovate, pubescent. Petals 5 or 6 much longer, erect, oblanceolate, puberulous. Stamens 5 to 6, all perfect, as long as petals, violet. Drupe 6 in. long, pear-shaped, green, tinted brown or purple. *Hab*. Common in orchards and villages, whole peninsula and islands. The fruit is coarse and not much liked even by Malays. *Native name*: Lanjut.


Big tree 80 ft. high. Leaves crowded at branch-tips, sessile coriaceous, oblanceolate or obovate-oblong, bluntly acuminate, base narrowed to base of petiole; nerves 20 to 22 pairs, conspicuous and raised on both sides, 9 to 15 in. long, 2.5 to 4 in. wide. Panicles 20 to 30 in. long, stout, pubescent, much-branched. Flowers '25 in. long, pinkish purple; pedicels short. Sepals 5, linear-lanceolate. Petals 5, linear-lanceolate, not twice as long, with 1 median ridge. Stamen 1, shorter. Drupe oblong, base gibbous, brown; stone lanceolate. *Hab*. Orchard and villages. Singapore and Malacca. *Distrib*. Malay islands. *Native name*: Kemang.

(18) **M. caesia** Jack in Roxb. Fl. Ind. ii. 441; Hook. fil. F.B.I. ii. 19; King, l.c. 478.


(19) **M. superba** Hook. fil. F.B.I. ii. 19; King, l.c. 478.

A very large tree. Leaves very coriaceous cuneate-oblanceolate, obtuse, narrowed to base of petiole; nerves 30 pairs, prominent, midrib very short, 10 to 16 in. long, 3 to 5 in. wide; petioles '5 to 1 in. long very stout, often winged to base. Panicle terminal over 8 in. long, stout; branches few. Flowers '75 in. long, lilac, crowded in heads at the tips of the branches; pedicels very short. Bracts numerous, large lanceolate. Sepals 5, ovate-lanceolate, pubescent, '35 in. long. Petals twice as long, lanceolate, acuminate
with a thickened ridge at base. Stamen 1; staminodes very small. Style very long, filiform. \textit{Hab.} Malacca (Maingay). Only his specimens known.


Straggling low tree about 20 ft. tall. Leaves coriaceous, obovate, blunt or refulse, base cuneate; nerves 10 to 12 pairs, 4 to 9 in. long, 3 to 5 in. wide; petioles 5 to 7-5 in. long. Panicle 6 or 8 in. long, branched, puberulous. Flowers 17-5 in. long, white turning pink. Fruit about 1 in. long, grey; peduncle 4 in. long, 2 in. wide at top in good fruit, usually very much smaller in the wild form, yellow, flushed pink. \textit{Hab.} Thoroughly established in sandy spots by the sea. Singapore. Pahang River. Tringganu. Setul. \textit{Native names:} The Cashew-nut; Bua Gajus; Janggus; Kaju; Jambu Monyet.

It is rarely, if ever, cultivated now here, but appears to have been introduced from South America in the sixteenth century, and has run wild in sandy places. The peduncle and kernel of seed are eaten.

5. **GLUTA**, Linn.

Trees or shrubs. Leaves oblong, simple. Panicles in terminal axils. Flowers medium-size, white or pink, bisexual. Calyx spathaceous, splitting irregularly, caducous. Petals 4 to 6, imbricate. Disc elongate. Stamens 4 to 6, on disc. Ovary sessile or stipitate, oblique, 1-celled; style lateral. Stigma simple. Drupe large or small, usually fleshy, brown and tubercled or smooth very resinous. About 6 species, Burmese and Malayan. Very poisonous trees, latex clear becoming varnish-like black and producing in many people a severe erysipelas-like poisoning. (See Gimlette, \textit{Malay Poisons}, p. 47, Ridley, \textit{Malay Medical Journal}, ix. 7.)

Petals four times as long as the calyx, white; tree . . . . . . . . (1) **G. Benghas**
Petals twice as long as calyx.
Leaves broad, often cordate at base; shrub; fruit brown, warty . . . . . . . . . . (2) **G. coarctata**
Leaves narrowed to base.
Leaves 3 by 1-25 in.; panicle dense; fruit globose, black . . . . . . . . . . . (3) **G. lanceolata**
Leaves 5-5 by 2-5 in. or less; fruit oblong flattened, black . . . . . . . . . . . (4) **G. elegans**
Panicle lax; leaves stiffly coriaceous, elliptic; fruit oblong red. ... (5) G. Wrayi
Leaves elliptic-lanceolate, 9 by 3 in. Fruit obvoid, brown. ... (6) G. virosa

Large tree 60 ft. tall. Leaves dark, shining green, oblongate-oblong, tip rounded, gradually narrowed to base; nerves 18 to 20 pairs, 4 to 7 in. long, 1·6 to 2·25 in. wide; petioles 3 to 6 in. long. Panicles axillary, puberulous, lax, 6 in. long, 4 in. across; pedicels 3 in. long. Flowers white, 5 in. across. Calyx very short. Petals elliptic, four times as long. Stamens 5, half as long as petals. Gynophore short. Drupe irregular globose or elliptic, warty brown, 1·5 to 2 in. through. Seed 1·5 in. through. Hab. Rare on river-banks in open country. Pahang, Rumpin River. Distrib. Malay islands. Native name: Jitong.

(2) G. coarctata Hook. fil. F.B.I. ii. 22; King, l.c. 482.
Large branching shrub, glabrous except the puberulous inflorescence. Leaves stiffly coriaceous, oblong or oblanceolate-obtuse or sub-acute, narrowed to the blunt often cordate base, dark green (red when young); nerves 13 to 20 pairs, faint, 5 to 9 in. long, 1·75 to 3·5 in. wide; petioles 1 to 2 in. long, thick. Panicles axillary 3 to 4 in. long; branches few, short. Flowers white, 4 in. long. Calyx 2 in. long, bilobed, tomentose. Petals 5, oblanceolate, puberulous. Stamens 5, shorter. Drupe light brown, sub-globose, slightly compressed, tubercled. Hab. Abundant in tidal rivers, forming dense thickets, conspicuous by its bright red young leaves. Whole plant very poisonous. Johor, Scudai and Sempang Kanan Rivers; Kota Tinggi. Pahang, Rumpin (Foxworthy), Malacca (Griffith). Selangor, Klang (Foxworthy). Perak, Teluk Anson. Kedah, Gunong Geriang River. Distrib. Sumatra, Borneo, Anson, Tenasserim.

A big tree. Leaves narrow lanceolate blunt, narrowed to a long petiole, coriaceous; nerves 12 to 14 pairs, faint, 6 in. long, 2 in. wide; petioles 1·5 to 3 in. long. Panicles 4 in. long, dense-flowered axillary and terminal. Calyx half as long as corolla, tubular split on one side, pubescent. Petals linear-oblong obtuse, pubescent, hairy on inner face, 4 in. long. Stamens longer. Ovary glabrous. Fruit globose, glabrous, black. Hab. Penang, Balik Pulau (Ridley).

(4) G. elegans Kurz, Fl. For. Burma, i. 310; King, l.c. 481.
Small tree about 10 to 30 ft. tall, glabrous except inflorescence. Leaves coriaceous, oblong-lanceolate or elliptic-lanceolate acuminate, base cuneate; nerves 10 to 14 pairs, faint, 3 to 6 in. long, 1 to 2 in. wide; petioles. 6 to 7 in. long, slender. Panicles 1·5 to 2 in. long, red. Calyx tubular, split on one side, 2-toothed. Petals

(5) **G. Wrayi** King, l.c. 482; Ridl. Journ. Roy. As. Soc. S. Br. 49, p. 16.

Tree, glabrous except inflorescence. Leaves stiff coriaceous, elliptic sub-acute, narrowed to base; nerves 12 to 14 pairs, invisible above, faint or slightly elevate beneath, 4 to 6·5 in. long, 1·6 to 2·5 in. wide; petioles 6 to 7 in. long. Panicles in upper axils 3 in. long, pubescent. Flowers numerous, 4 in. long. Calyx half as long as petals, pink. Petals 5, oblong blunt, base clawed, puberulous outside, white. Stamens 5, longer. Fruit oblong, laterite red 4 to 5 in. long, 3 in. thick, elliptic smooth. Hab. Forests, Dindings, Lumut. Perak, Sungei Larut (Wray).


A large branching tree 50 to 70 ft. tall. Leaves coriaceous lanceolate, 9 in. long, 2·75 in. wide, acuminate at both ends, blunt; nerves about 18 pairs, slightly raised beneath, reticulations fine, visible; petioles 2 in. long. Panicles axillary towards the branch-tips, 3 to 4 in. long. Calyx-tube spathaceous, red, 2 in. long, split on one side. Petals twice as long, linear-oblong, white. Ovary pubescent. Fruit obovoid, smooth, not polished, rough light brown, 2·5 to 5 in. long and nearly as wide. Hab. Damp forests, Selangor, Rantau Panjang. Perak, Gunong Pondok (Kunstler). Dindings, Simpit. Penang, Telok Bahang and Penara Bukit (Curtis); Moniot’s Road. Native name: Rengas Kerbau Jalang.

Reputed as exceptionally poisonous. The fruit is often as large as an Indian mango, and has a scurfy-brown skin like that of **G. coarctata** and **Bengas**, but not tubercled.

**6. MELANORRHŒA**, Wall.

Trees, very large, resinous and poisonous. Leaves alternate, simple. Panicles in terminal axils. Flowers medium, white flushed pink, unisexual. Sepals united into a cap, deciduous. Petals 5 to 8, linear-oblong, imbricate. Disc hemispheric or columnar. Stamens 5 to 10 or very numerous; filaments slender. Ovary stalked, oblique lenticular, 1-celled; style lateral. Fruit, a dry drupe, sessile or on a long pedicel with the petals developed into long spreading pink wings. About 6 species, Indo-Malayan.

On the poisonous properties of **Melanorrhœa**, see Gimlette, *Malay Poisons*, p. 44.

Petals accrescent in fruit into long pink wings.

Calyx spathaceous falling off like a cap.

<table>
<thead>
<tr>
<th>Petals</th>
<th>Stamens 5; bracts small, deciduous</th>
</tr>
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<tbody>
<tr>
<td>(1) M. Wallichii</td>
<td>(2) M. Woodsiana</td>
</tr>
<tr>
<td>Stamens 5; bracts large, persistent</td>
<td></td>
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</table>
Stamens 10. Fruit wings short.
Stamens numerous; fruit wings short.
Drupe small, long stalked; leaves oblong obovate, hairy beneath.
Drupe large, 1 5 in. through; wings very short, caducous; leaves lanceolate, glabrous.
Calyx withering and persistent as a collar.
Petals not accrescent in fruit.
Petals oblanceolate; leaves 6 to 15 in. long.
Petals elliptic; leaves 4 to 5 in. long.

(3) M. Curtisi
(4) M. pubescens
(5) M. macrocarpa
(6) M. torquata
(7) M. aptera
(8) M. inappendiculata

Fig. 52.—Melanorrhoea Wallichii.

(1) M. Wallichii Hook. fil. F.B.I. ii. 25; King, l.c. 484. M. Maingayi Hook. fil. l.c.; King, l.c.
Tree 80 to 100 ft. tall. Leaves coriaceous, elliptic-obovate obtuse or rounded, narrowed to base, glabrescent; nerves 12 to 16 pairs, prominent on both sides, 3 5 to 6 in. long, 2 to 3 in. wide; petioles 1 to 1 25 in. long. Panicles terminal and axillary at the branch ends, over a foot long, white, softly hairy; branchlets few-flowered. Flowers 5 in. across, white; pedicels 3 in. long. Petals lanceolate, white woolly, disc black. Stamens 5. Fruit oblong, black sessile.

M.M.

An extremely poisonous tree. Timber good, dark red, veined black, and known as Singapore mahogany.

(2) **M. Woodsiana** Scort. in King, *l.c.* 485.

Tree 60 to 100 ft. tall. Branchlets, inflorescence, midrib and nerves beneath ferruginous-velvety. Leaves thickly coriaceous, elliptic-oblong blunt, round or emarginate above, base round glabrous reticulate beneath, tomentose; nerves 15 to 24 pairs, prominent beneath, 4 to 5.5 in. long, 1.75 to 3.5 in. wide; petioles 1 to 1.75 in. long, deep-channelled. Panicles 9 in. long (peduncles 4 in.), densely tomentose. Flowers sub-sessile 25 in., long, enveloped in bud in ovate tomentose bracts. Petals 5 oblong. Stamens 5. Drupe elliptic, sessile, petal-wings narrow elliptic 1.5 in. long, 75 in. broad, red. *Hab.* Forests, rare. Perak, Batang Padang (Kunstler).

(3) **M. Curtissii** Oliver, *Hook. Ic. Pl. t.* 1513; *King, l.c.* 486.

Tree 40 to 80 ft. tall, glabrous. Leaves coriaceous, oblong-lanceolate or oblanceolate blunt, narrowed at base; nerves faint 12 to 16 pairs, 3 to 5 in. long, 1.25 to 2 in. wide; petioles 1 to 1.75 in. long slender. Panicles 4 to 7 in. long; branches 3 in. or less, slender remote puberulous, few-flowered at tip. Flowers 25 in. long; buds narrow. Calyx conic acute calyptrate 1 in. long. Petals 5 linear acute. Stamens 10 shorter. Drupe depressed, globose 1.5 to 1.75 in. long on a stalk 1.35 in. long, black; petal-wings linear, narrowed to the base, 2.25 in. long, 4 in. across, red. *Hab.* Forests in the north. Reputed very poisonous. Perak, Larut Hills 800 to 1000 ft. altitude (Kunstler). Penang, Government Hill 700 to 800 ft. altitude (Curtis). Kedah Peak. *Native name:* Rengas.

(4) **M. pubescens** Ridl.

Tree. Branchlets pubescent. Leaves elliptic to obovate, blunt, coriaceous, glabrous above except midrib, pubescent beneath, especially on midrib and 13 pairs of nerves, base narrowed, cuneate, 5 to 6.5 in. long, 2.5 to 2.25 in. wide; petioles pubescent, not winged, 1 in. long. Panicle pubescent with only 1 or 2-flowered branches, 4 in. long. Flowers not seen. Stamens numerous, hairy. Fruit globose 3 in. long, on a 6 in. peduncle; petal-wings coriaceous 5 in. long, 1 in. wide, strongly veined, linear-oblong with the base of the peduncle sparsely hairy. *Hab.* Malacca, Machang Tebung Road (Derry 1010); only once collected and that in fruit. *Native name:* Kayu Merah K'lueng.


Tree, glabrous. Leaves thinly coriaceous, lanceolate acuminate,
blunt, base long narrowed, glabrous; nerves about 17 pairs, visible above, elevate beneath, 5 in. long, 1.75 in. wide; petioles (and midribs) puberulous, 4 in. long, winged half-way or more. Panicles few, in axils below leaves, in fruit 5 to 6 in. long, puberulous. Fruit transversely elliptic, flattened at both ends, 1 in. long, 1.25 in. wide; gynophore 4 in. long; petal wings deciduous, 5 in. long, 2 in. wide, coriaceous. Hab. Hill forests. Perak, Thaiping Hills at 3000 to 4000 ft. altitude (Curtis 3722). Distrib. Borneo.

The leaves are more lanceolate than in the type, but I think this is Engler's plant. The reticulations of the leaves are fine, but conspicuous beneath. I have only seen fruiting specimens.

(6) **M. torquata** King, l.c. 486.

A vast tree 100 ft. tall, 2 to 4 ft. through. Leaves sessile stiff coriaceous obovate, tips broad round, glabrous, narrowed to base of petiole; nerves 22 to 26 pairs, prominent beneath, 7 to 11 in. long, 4 to 6.25 in. wide. Panicles terminal, stout, tomentose, 6 to 8 in. long branching from base; branchlets crowded at tips, dense-flowered. Flowers 2.5 in. long; pedicels 1 to 2 in. long. Calyx short tubular, 3-toothed, withering and hanging round the pedicel. Petals 5, elliptic 2 in. long, white tomentose. Stamens 5 shorter. Hab. Wet swampy forests. Leafless when flowering. Dindings, Lumut. Perak, Larut within 100 ft. altitude (Kunstler).

(7) **M. aptera** King, l.c. 487.

Glabrous tree 40 to 70 ft. tall, 15 to 2 ft. through, very resinous. Leaves stiffly coriaceous, obovate apex rounded, base narrowed to base of winged petiole; nerves 18 pairs, slender, prominent beneath, as are reticulations, 8 to 15 in. long, 3 to 6 in. wide. Panicles stout, crowded in the upper axils, 9 in. long, few and short to 1.5 in. long branches. Flowers 1 in. across pale red and white. Calyx 5 in. long. Petals 5 to 6, imbricate, lanceolate, silky outside, not persistent. Stamens about 50 on a conic gynophore. Ovary ovoid 1-celled. Drupe not winged depressed-globose with numerous fine ridges, 1.5 in. through, dark brown. Hab. Open forests near water, low country. Perak, Larut (Kunstler). Penang, Telok Bahang (Curtis).

(8) **M. inappendiculata** King, l.c. 488.

Glabrous tree 50 to 60 ft. tall, 10 to 15 in. through. Leaves coriaceous, oblong-oblancoolate blunt rounded or retuse, base narrowed cuneate; nerves 15 to 18 pairs, slender elevate beneath, 3 to 5 in. long, 1.5 to 2 in. wide; petioles winged above, 75 to 1 in. long. Panicles 4 to 7 in. long in upper axils, nude below; flowers 75 in. long in short (1 in. long or less) branches. Petals narrow elliptic, white flushed pink at base. Stamens numerous pink; anthers green. Drupe globular 1 to 1.5 in. through, dark green. Hab. Dense wet jungle lowland up to 1500 ft. altitude on Penang Hill. Perak, Larut (Kunstler). Penang, Government Hill (Curtis); Batu Feringghi (Fox).
7. **SWINTONIA**, Griff.


Bracts in flower-buds large imbricate.
Flowers \(3 \text{ in. wide} \) . . . . . . . . . (1) **S. spicifera**

Bracts small.
Flowers \(5 \text{ in. wide, puberulous} \) . . . . . . . . . (2) **S. puberula**
Flowers \(25 \text{ in. wide; wings of fruit shorter than drupe} \) . . . . . . . (3) **S. Robinsonii**
Flowers very small \(12 \text{ in. wide, panicle lax; wings of fruit } 1 \text{ in. long} \) . . . . . . . (4) **S. penangiana**
Flowers under \(12 \text{ in. wide; wings of fruit } 2 \text{ in. long; leaves thin} \) . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . (5) **S. Schwenkii**
Flowers under \(12 \text{ in. wide; leaves stiff coriaceous} \) . . . . . . . . . . . . . . . . (6) **S. lurida**

(1) **S. spicifera** Hook. fil. F.B.I. ii. 27; King, l.c. 490.
A big tree 30 to 100 ft. tall. Leaves thickly coriaceous, elliptic-lanceolate or oblanceolate acute or blunt, smooth, pale beneath; nerves \(13 \text{ to } 20 \text{ pairs, prominent beneath, } 3^\prime 25 \text{ to } 4^\prime 5 \text{ in. long, } 1^\prime 5 \text{ to } 1^\prime 75 \text{ in. wide; petioles } 6 \text{ to } 1^\prime 25 \text{ in. long. Panicles crowded at tips of branches, rather stout peduncled; branches articulate trichotomous, puberulous. Flowers } 2 \text{ in. long, white. Bracteoles ovate, puberulous. Calyx fleshy, tubular, 5-lobed, puberulous. Petals twice as long, obovate-oblong; Stamens shorter. Drupe ovoid or oblong, green, } 7^\prime 5 \text{ in. long; wings } 2^\prime 5 \text{ in. long, } 4^\prime \text{ in. wide. Hab. Forests on hills. Malacca, Gunong Mering, Mt. Ophir; Ayer Panas. Perak, Larut Hills } 500 \text{ to } 1000 \text{ ft. altitude (Kunstler). Negri Sembilan, Bukit Kayu Arang (Burkill). Kedah, Pulau Song-Song. Penang, Government Hill } 1000 \text{ ft. altitude (Curtis). Native name: } Mupus.

(2) **S. puberula** Pearson, Kew Bulletin 1906, p. 3.
A very lofty tree. Leaves sub-coriaceous, elliptic-lanceolate acuminate blunt, base cuneate; nerves slender \(12 \text{ to } 20 \text{ pairs, } 2 \text{ to } 6 \text{ in. long, } 1^\prime 5 \text{ in. wide; petioles slender } 1^\prime 5 \text{ in. long. Panicles } 6 \text{ in. long, rather stout, spreading, puberulous. Flowers white } 3 \text{ in. across. Calyx obconic. Petals oblong-ovate, puberulous on both sides. Stamens as long. Hab. Forests on the top of a mountain, rare. Perak, top of Bujong Malacca (Ridley).}

Tree. Leaves stiffly coriaceous lanceolate, narrowed slightly at both ends; nerves about \(15 \text{ pairs, } 6 \text{ in. long, } 2 \text{ to } 2^\prime 25 \text{ in. wide; petioles } 1^\prime 5 \text{ in. long. Panicles } 3 \text{ in. long in flower, } 6 \text{ in. long in

(4) S. penangiana King, l.c. 490.
A tall tree with slender branches. Leaves thinly coriaceous, oblong-lanceolate blunt cupulinate, base cuneate; nerves 10 to 12 pairs, 3 to 4.5 in. long, 1.1 to 1.4 in. wide; petioles 75 to 1.25 in. long, slender. Panicles in terminal axils, lax, spreading. Flowers in cymules of 3 at tips of branches; pedicels longer. Calyx campanulate, lobes 5 broad. Petals longer, 5 oblong minutely tomentose. Disc cylindric. Drupe globular 5 in. through; wings narrow oblong, sub-acute 35 in. long, 3 in. wide. Hab. Penang, Waterfall (Curtis).

Tree with slender branches. Leaves sub-coriaceous, oblong-lanceolate or narrow elliptic blunt or shortly acuminate, base narrowed, blunt; nerves slender 14 to 18 pairs, slightly elevate beneath, 3 to 6 in. long, 2.5 to 8 in. wide; petioles slender 1.5 to 2 in. long, dilate at base. Panicles in upper axils slender 4 in. long, peduncled lax spreading. Flowers 1 in. across, shortly pedicelled. Sepals united at base. Petals oblong obtuse, pubescent both sides. Drupe oblong 75 in. long, wings reflexed, linear-oblong 2.25 in. long, 4 in. wide. Hab. Malacca (Griffith, Maingay). Pahang, Kwalal Lipis (Foxworthy). Distrib. Burma, Cambodia, Sumatra. Native names: Balau betina; Membatu.

(6) S. lurida King, l.c. 491. Semecarpus? lurida Hook. fil. F.B.I. ii. 34.
Small tree. Leaves thinly coriaceous, narrow elliptic-oblong, abruptly bluntly acuminate, base cuneate, glaucous beneath; nerves 22 to 24 pairs, fine and faint, 6 to 8 in. long, 1.5 to 2.25 in. wide; petioles thick 0.6 to 7.5 in. long. Panicles in terminal axils, slender, 4 to 12 in. long; basal branches 6 in. long. Flowers very small in small cymes, about 1 in. across, greenish yellow. Calyx cupular, teeth 5 triangular. Petals 5, twice as long, oblong-elliptic, glabrous. Disc 5-lobed. Stamens inserted outside. Hab. Malacca (Maingay). Perak, Kota (Wray).

8. CAMPNOSPERMA, Thw.
Big trees with pale bark, hardly resinous. Leaves alternate, coriaceous simple (very large in young trees, smaller in old ones). Racemes in terminal axils simple or little branched. Flowers sessile very small, unisexual. Calyx 3- to 4-lobed, lobes imbricate. Petals 3 to 6, sub-orbicular, imbricate. Disc urceolate. Stamens

Leaves petioled; big trees.
Male flowers sessile; leaves over 12 by 6 in. 
Male flowers pedicelled; leaves 6 by 3 in. with small auricle at base.
Leaves sessile ob lanceolate, winged to base of petiole.
Panicle very lax; small tree.


Rather a large tree about 80 ft. tall, spreading. Leaves coriaceous, elliptic obtuse, narrowed at base, tip round or emarginate; nerves elevate beneath, 24 to 26 pairs, glabrous above, midrib channelled, pubescent or glabrous beneath, 7 to 15 in. long, 3'5 to 5'5 in. wide; petioles flattened channelled above, pubescent, 1 to 2'5 in. long. Panicles in terminal axils, spreading 12 in. long (shorter in female trees), tomentose. Flowers small, green in clusters, '05 in. across sessile. Fruit ovoid oblique, green '35 in. long. Hab. Common in damp forests. Singapore, Bukit Timah; Jurong. Malacca, Alor Gajah (Griffith). Perak, Larut (Kunstler). Native name: Poko Kelinting.

The leaves of young plants of this are extremely large, often 4 ft. long and lanceolate.

(2) C. auriculata Hook. fil. F.B.I. ii. 41; King, l.c. 495.

Lofty tree 80 ft. tall. Leaves coriaceous, obovate or ob lanceolate-oblong, tip round tapering down the petiole till it ends bluntly with 2 auricles, glabrous on both sides; nerves 9 to 18 pairs, fine elevate beneath, 4 to 9 in. long, 1'75 to 3 in. wide; petioles below the auricles '1 to '2 in. long. Male panicles 10 to 14 in. long axillary, tomentose. Flowers '15 in. across, pedicellate. Fruit ovoid-round, tomentose, '6 in. through, green, speckled white. Hab. Damp swampy lowland forest, common, Singapore, Bukit Timah; Jurong. Johor, Ulu Batu Pahat (Kelsall). Malacca (Griffith). Selangor, Kwala Lumpur (Foxworthy). Distrib. Borneo.

var. Wallichii. C. Wallichii King, l.c. 497. C. Griffithii Hook. fil. F.B.I. ii. 41, not of Marchand.


A small straight little-branched tree. Leaves ob lanceolate, winged to the base sessile, coriaceous, shortly cuspidate, 15 to 42 in. long, 4'5 to 7 in. wide, glabrous; nerves 30 pairs, elevate, as

9. PARISHIA, Hook. fil.

Trees often vast, usually flowering without leaves, unisexual. Leaves pinnate alternate; leaflets coriaceous, usually oblique at base. Panicles large. Male flowers small. Calyx cupular 4-lobed, lobes ovate valvate. Petals 4, oblong imbricate, yellow or pink. Disc annular 4-lobed. Stamens 4, from below disc edge. Female as in male, but ovary sessile, ovoid, 1-celled; style terminal trifid. Stigmas capitate. Fruit globose or conic, hairy, the calyx developed into long linear-oblong wings, usually much longer than drupe. Species 5, Burmo-Malayan.

Wings of fruit 4'-6 to 6 in. long.
Leaves glabrous; leaflets narrow, oblong . . . . (1) P. Maingayi
Leaves pubescent beneath; leaflets elliptic-oblong . (2) P. pubescens
Wings 2'-5 to 3 in. long; leaflets ovate acuminate, glabrous . . . . (3) P. insignis
Wings linear much longer than fruit; leaflets ovate, sub-sessile
Wings 1'-5 in. long, hardly longer than the oblong, beaked red-tomentose fruit; leaflets very coriaceous . . . . (4) P. rosea
Wings 1'-5 in. long, hardly longer than the oblong, beaked red-tomentose fruit; leaflets very coriaceous . . . . (5) P. paucijuga

(1) P. Maingayi Hook. fil. F.B.I. ii. 30; King, l.c. 493.
A tall tree about 60 to 80 ft. tall. Leaves 12 to 15 in. long; leaflets very coriaceous, elliptic-oblong sub-acute or blunt, base rounded or cuneate, glabrous above, slightly puberulous on the back; nerves 15 to 20 pairs, slender, faint, 2'-5 to 3'-5 in. long, 1 to 1'-25 in. wide; petiolules '2 in. long. Panicles pedunculate, 8 to 10 in. long, few-branched; branches 2 to 4 in. long, distant; branchlets 1 in. long pubescent. Flowers '3 in. long. Calyx urceolate, lobes broad ovate blunt pubescent, yellow. Petals linear-oblong, twice as long, creamy yellow. Stamens shorter. Ovary hairy. Drupe ovoid acuminate bristly; wings oblong-linear, tip rounded 7 in. long, 1 in. wide, pubescent. Hab. Forests, Singapore, Garden Jungle by rockery. Malacca (Maingay).

(2) P. pubescens Hook. fil. F.B.I. ii. 30; King, l.c. 493.
A lofty tree. Leaves 12 to 18 in. long; branches and petiole pubescent; leaflets thickly coriaceous, 5 to 7 pairs, sub-sessile, glabrous above, pubescent tomentose beneath, oblong acute or acuminate; nerves strongly elevate, 12 to 16 pairs, 4'-5 to 5'-5 in. long, 1'-5 in. wide. Panicles over 12 in. long with numerous densely fascicled tomentose branches. Flowers '5 in. across. Drupe ovoid
apiculate, '5 in. long, tomentose, wings oblong-linear, blunt, glabrous or nearly so, 4'5 to 5 in. long, '5 in. wide. Hab. Malacca (Maingay).


Gigantic tree 180 ft. tall. Leaves 12 to 20 in. long; leaflets 6 to 9 pairs, thinly coriaceous, obliquely oblong-lanceolate acute, base rounded sub-cordate unequal, glabrous or pubescent beneath; nerves 8 to 12 pairs, 3 to 5 in. long, 1'2 to 2 in. wide; petiolules '1 to '2 in. long. Male panicles 18 in. long, 12 in. across, much branched, tomentose. Flowers '2 in. across, light yellow. Calyx pubescent, lobes triangular, unequal. Petals longer oblique ovate, blunt. Fruit conic, hairy, '5 in. across; wings narrow oblong sub-acute, 2'5 to 3 in. long, '4 in. across glabrous. Hab. Forests, probably not rare, but inaccessible. It flowers when leafless. Singapore, Balaclava, Tanglin, 180 ft. tall. Pahang River. Malacca, Selandor. Penang, Waterfall (Curtis), 20 to 30 ft. tall. Lankawi, Kwah, only 25 ft. tall (Curtis). Native names: Suryan; Sepul.


Large tree 50 to 60 ft. tall. Leaves 12 in. or more long; leaflets thinly coriaceous ovate or oblong-ovate obtuse, base rounded minutely cordate sessile, 4 to 4'5 in. long, 2'5 in. wide. Panicles from upper axils long, slender, 18 in. long with few distinct branches glabrous. Flowers sessile, '1 in. long, pink. Calyx lobes 4, oblong blunt pubescent. Petals longer, oblong. Fruit-wings (very young) linear-pubescent, much longer than fruit. Hab. Lankawi, Pulau Segai (Haniff).

(5) **P. paucijuga** Engler, DC. Mon. Phan. l.c. 309.

A big tree 50 to 60 ft. tall. Leaves 6 in. long; leaflets 5, very coriaceous, glabrous, elliptic, shortly blunt acuminate, base rounded; nerves fine faint, about 12 pairs, 3'25 in. long, 1'5 in. wide; petiolules '5 in. long; petioles 3'5 in. long. Panicles 6 to 8 in. long or shorter, axillary and terminal, woody tomentose. Drupe oblong long-beaked, rugose golden hairy, 1'5 in. long, 1 in. through, wings about as long '3 in. wide, coriaceous pubescent. Hab. Dense forests. Singapore (Maingay). Bukit Timah. Johor, Pinerong (Cantley). Dindings, Lumut. Penang, Pantai Acheh (Curtley).

10. **MICROSTEEMON**, Engler

Leaves tomentose beneath.  
Leaves glabrescent beneath.  

(i) **M. velutina** Engl. DC. Mon. Phan. l.c. 294; King, l.c. 498. Pentaspadon ? velutinus Hook. fil. l.c. ii. 28.

A big tree 80 to 100 ft. tall, 2 to 3 ft. through. Leaves (young claret colour) 6 to 10 in. long; rachis, petioles and undersides of leaflets as well as panicle softly pubescent-tomentose; leaflets 7 to 11, membranous, oblong-lanceolate, acuminate, base rounded or cuneate; nerves 12 to 16 pairs, 2 to 4 in. long, 8 to 15 in. wide; petiolules 15 in. long. Panicles numerous, sub-terminal on peduncles, 3½ in. long tomentose, much-branched, 3 in. long and as wide. Flowers very small, sessile, white. Calyx glabrous. Petals glabrescent outside, tomentose inside. Fruit narrow oblong compressed scurfy; pericarp leathery. **Hab.** Dense forests on rocky streams. Malacca (Maingay). Negri Sembilan. Bukit Tampin (Goodenough). Pahang River. Selangor, Ginting Bidai, Perak, Gunong Bubu 300 to 500 ft. altitude (Kunstler); Sungei Njing, Plus Reserve (Murdoch); Gunong Kerbau (Haniff).

(ii) **M. Curtisii** King, l.c. 498.

A medium-sized tree. Leaves 5 to 7 in. long; rachis puberulous; leaflets 7 membranous, oblong-lanceolate acuminate base round and oblique glabrescent, with scattered hairs at base and tufts of white hairs in the nerve-axils; nerves 13 to 17 pairs, 7½ to 3 in. long, 7½ to 9 in. wide; petiolules 1 in. long. Panicles sub-terminal axillary, peduncled, puberulous. Flowers less than 1 in. long, on short pedicels, solitary or 2- to 4-clustered. Calyx puberulous. Petals elliptic, blunt. **Hab.** Lankawi, by the lake (Curtis).

11. **PENTASPADON,** Hook. fil.


Panicle 3 in. long, 4 in. wide; flowers 9½ in. wide.  
Panicle 6 in. long lax; flowers 1 in. wide.  

(i) **P. officinalis** Holmes, in King, l.c. 499; Journ. Pharm. Soc. l ii. 389.

Tree 60 to 100 ft. tall, 18 to 36 in. through. Leaves 4 to 8 in. long; leaflets 7 to 9, very thinly coriaceous, oblong or elliptic-lanceolate, shortly blunt-acuminate, glabrous except tufts of hairs in the axils; nerves 6 to 9 pairs, raised beneath, 7½ to 2½ in. long, 8 to 2½ in. wide; petiolules 1½ in. long. Panicles 3 to 4 in. long; peduncle 4 in. long, minutely tomentose; branches

(2) P. Motleyi Hook. fil. Linn. Trans. xxiii. 168.


I am somewhat doubtful of the identification. The tree was leafless except for a tuft or two of very young leaves, which were sprinkled with pale hairs. It bore a quantity of unripe fruit 3 in. long. If not this species it must be an undescribed one.

12. RHUS, Linn.

Trees or shrubs. Leaves alternate, simple or pinnate. Flowers small in terminal and axillary panicles. Calyx 4- to 6-lobed, imbricate. Petals 4 to 6, imbricate. Stamens 4, 5, 6 or 10 free at base of disc; filaments subulate. Ovary ovoid or globose, 1-celled, 1-ovuled; styles 3. Stigmas simple or capitate. Drupe dry compressed. About 114 species, both hemispheres.

(1) R. perakensis Scort. in King, l.c. 500.

Slender climber 10 to 30 ft. long. Leaves 8 to 12 in. long; leaflets 6 to 8, thinly coriaceous oblong acuminate blunt, base slightly oblique rounded; nerves 16 to 20 pairs, prominent beneath, 2.5 to 3.5 in. long, 1 to 1.4 in. wide; petiolules 1 to 1.5 in. long, terminal one longer. Panicles axillary and terminal; peduncle 2 to 6 in. long, inflorescence 6 in. long. Flowers yellow less than 1 in. long, numerous crowded on short branchlets, racemose. Calyx-lobes 5, unequal, oblong. Petals longer, elliptic blunt. Stamens 5. Drupes compressed, reniform-orbicular '2 in. across, greenish grey. Hab. Open rocky jungle 300 to 800 ft. altitude. Local, Perak, Larut (Kunstler). Pahang, Pengkalan Manggis, Temerloh (Foxworthy). Native name: Jahor.

13. MELANOCHYLA, Hook. fil.

Leaves hairy beneath.
Leaves oblong broad blunt, tomentose all over back.
Leaves oblong-lanceolate, acute; petioles and nerves tomentose.
Leaves narrow, lanceolate, long-acuminate 6 by 1'5 in., backs glaucous; nerves hairy.
Leaves oblongacuminate 6 by 2'25 in., slightly pubescent on back.
Leaves quite glabrous.
Leaves narrow sub-lanceolate; petioles winged to base.
Leaves 14 by 4 in. oblong-lanceolate.
Leaves 9 by 2 in., linear-lanceolate; petiole not winged.
Leaves 4 by 1'5 in.; inflorescence with large bracts, dense.
Leaves 7 by 2 in.; inflorescence very lax; no bracts.
Leaves elliptic, narrowed at base 6 by 2'5 in.; panicle lax.

(1) **M. densiflora** King, l.c. 503.
Tree 60 to 80 ft. tall, 2 to 3 ft. through. Branches thick, underside of leaves and panicle densely brown-tomentose. Leaves oblong-elliptic blunt, base rounded slightly unequal; nerves strongly elevate beneath 20 to 25 pairs, 6 to 8'5 in. long, 2'5 to 3'5 in. wide; petioles 05 to 1 in. long, thick. Panicle dense, 5 in. long. Male flowers 2 in. long, coffee-brown outside, yellow inside, sessile. Calyx campanulate tomentose; lobes acute. Petals twice as long as lobes, thick elliptic, obtuse. Stamens villous. *Hab.* Very rare, open hilly jungle, Perak, Larut 500 to 1000 ft. altitude (Kunstleri).

(2) **M. tomentosa** Hook. fil. F.B.I. ii. 38; King, l.c. 503.
Tree. Branches, petiole and midrib beneath panicle red-tomentose. Leaves elliptic-oblong acutely acuminate, base rounded, beneath glabrescent except base of midrib; nerves 20 to 30 pairs, elevate beneath, 6'5 to 14 in. long, 2'75 to 4 in. wide; petioles 35 in. long, thick. Panicles 10 in. long lax; branches slender, puberulous, spike-like. Male flowers 1 in. across. Calyx segments ovate, puberulous outside. Petals thick oblong, pubescent outside, villous inside. Drupe sub-globose, pubescent, orange, 1 to 1'5 in. long. *Hab.* Forests, Johor, Pengerang (Cantley). Malacca (Maingay). *Native name:* Laga. *Distrib.* Java.

var. **glabrescens** Koorders. Leaves narrow, 2 in. wide, nearly glabrous. Selangor, Bukit Cheraka, Klang (Foxworthy). Perhaps a distinct species.

(3) **M. Kunstleri** King, l.c. 504.
Tree 80 to 100 ft. tall, 3 to 4 ft. through. Leaves dark glossy-green lanceolate to elliptic-oblong acuminate cuspidate blunt, base narrowed, glabrous except midrib and 18 to 20 pairs of nerves elevate adpressed hairy, 2'75 to 5 in. long, 1 to 1'5 in. wide; petioles
35 in. long, scurfy. Panicles 6 to 7 in. long, minutely tomentose; branches spreading 2 in. long, racemose. Male flowers 15 in. long. Calyx minutely tomentose, dark brown cupular; lobes ovate acute. Petals thrice as long, narrow elliptic, pubescent outside, villous inside, yellow. Stamens shorter slightly villous. Hab. Perak, Larut 500 to 1000 ft. altitude (Kunstler).

(4) M. Maingayi Hook. fil. F.B.I. ii. 39; King, l.c. 504.


(5) M. auriculata Hook. fil. F.B.I. ii. 39; King, l.c. 505.

Stout tree 80 ft. tall, 2 ft. through, glabrous except inflorescence. Leaves sessile, oblancoate-oblong, abruptly acuminate, deep shining green; base narrowed auricled; nerves 30 pairs slender, 12 to 18 in. long, 3.75 to 4.75 in. wide. Panicles terminal, 10 in. long; branches many, 7 in. long. Flowers on short branchlets. Male flowers 1 in. long. Females 2 in. long on thick pedicels as long. Calyx pubescent, grooved; lobes acute green. Petals oblong, villous outside and in, except the glabrous edges, pubescence white. Drupe globose flattened, 12-grooved, greenish brown tomentose, 1.25 in. through. Hab. Low damp country in forest swamps. Singapore, Gardens; Kranji; Chanchukang. Malacca (Maingay); Sempang Jus (Derry). Native name: Mumpian.

(6) M. rugosa King, l.c. 505.

Large tree. Branches pubescent and hairy. Leaves narrow oblong caudate, base cordate, auricled, above glabrous, beneath sparsely hairy on midrib; nerves 25 to 30 pairs, 7 to 15 in. long, 1.6 to 3.25 in. wide; petioles 35 in. long pubescent, thick. Male flowers unknown. Female panicles 6 in. long rusty-pubescent; branches few, short. Flower 3 in. across, sessile. Calyx tomentose, lobes orbicular-ovate acuminate. Petals 5, little longer, triangular pubescent, villous at base inside. Ovary conic, tomentose. Drupe globose, ovoid, red-tomentose, 1 in. long, 9 in. through. Hab. Perak, Tapah (Wray).

(7) M. bracteata King, l.c. 506.

Tree 50 to 80 ft. tall, glabrous except pubescent inflorescence. Leaves oblong-lanceolate, acuminate at both ends; nerves 10 to 12 pairs, 4 to 6 in. long, 1 to 1.6 in. wide; petioles 5 to 7.5 in. long. Racemes or few-branched panicles terminal, pubescent dense-flowered with large ovate bracts. Male flowers 25 in. long. Calyx-lobes ovate. Petals lanceolate acuminate, a villous tuft
on the base inside. Stamens shorter, villous. Drupe ovoid, minutely tomentose '75 in. long, greenish yellow. Hab. Rare in low ground forest, Perak, Larut below 100 ft. altitude (Kunstler).


Tree 30 to 70 ft. tall. Stem 2 to 3 ft. through; branchlets rather slender, thinly tomentose. Leaves oblong or lanceolate-oblong, glabrous, shortly acuminate, base long cuneate; nerves 12 to 16 pairs, prominent beneath, 4'5 to 10 in. long, 1'5 to 4 in. wide; petioles '75 to 1'5 in. long, slender. Panicles (male) axillary and terminal very slender, much-branched, '45 to 18 in. long, 8 in. across or less, minutely tomentose. Flowers yellow, less than '1 in. long. Calyx tubular-campanulate, lobes acute. Petals oblong much longer, pubescent outside, villous inside. Stamens villous. Drupe globose-ovoid, '75 in. long, minutely tomentose. Hab. Forests, Malacca (Maingay). Perak, Larut (Kunstler). Penang, Telok Bahang (Curtis).

(9) M. nitida King, l.c. 507.

Tree 80 to 100 ft. tall, spreading, over 3 ft. thick. Leaves oblong-elliptic abruptly blunt, acuminate, base narrowed, glabrescent beneath; nerves 12 to 16 pairs slightly prominent, 4 to 11 in. long, 2'25 to 3'25 in. wide; petioles 1 to 2 in. long, bases thickened. Panicles terminal, minutely tomentose, 9 in. long; branches few, ascending. Flowers (male) in sessile cymes on spike-like branches, 1 in. long, sessile. Calyx brown-tomentose, campanulate; lobes triangular acute. Petals triangular-oblong, pubescent outside, white with tuft of hairs inside. Stamens villous. Females 2 in. long, pedicelled. Ovary hemispheric, tomentose. Hab. Open hill woods, Perak, Larut 1000 to 1500 ft. altitude (Kunstler). Penang, near Cooly lines at 200 ft. altitude; Highlands; Telok Bahang (Curtis).

14. SEMECARPUS, Linn. fil.

Trees. Leaves alternate, simple, entire. Flowers small, unisexual in terminal or axillary panicles. Calyx 5- or 6-lobed, lobes deciduous. Petals 5 to 6, imbricate. Disc broad, annular. Stamens 5 or 6 at disc-base. Ovary 1-celled; styles 3. Drupe fleshy, oblong or sub-globose, oblique on a fleshy receptacle formed of disc and calyx acrid resinous. Species about 40, tropical Asia and Australia.

Leaves tomentose beneath. . . . . . (1) S. velutina
Leaves with nerves red-hairy beneath, obovate . . . . . (2) S. glomerulata
Leaves yellow-hairy beneath, oblanceolate . . . . . (3) S. cochinchinensis
Leaves glabrous 13 to 16 in. long . . . . . (4) S. Curtisii
Leaves glabrous 4 to 7'5 in. long. . . . . . (5) S. lucens

(1) S. velutina King, l.c. 508.
Tree 50 to 60 ft. tall, 10 to 15 in. through. Bark pale; branches
pubescent. Leaves thick obovate-elliptic oroblanceolate, glabrous above, densely pubescent beneath; midrib depressed above; nerves 20 to 24 pairs, prominent as are reticulations beneath, 6 to 13 in. long, 2.5 to 5 in. wide; petioles 5 to 1.25 in. long. Panicles (male) 5 in. long, red-tomentose; branches 2 in. long. Flowers 1 in. across, pale greenish tomentose, densely crowded. Calyx cupular, flat; lobes 5, triangular acute, pubescent. Petals 5, longer elliptic acute. Stamens 5, longer. Female panicle larger; branches fewer; flowers fewer and larger. Petals and sepals more pubescent. Drupe transversely oblong, 3.5 in. long, 6 in. wide, compressed tomentose, light green. Hab. In lowland forests. Johor, Tanjong Bunga. Selangor, Klang Gates (Burn-Murdoch). Perak, near Gunong Bubu (Kunstler).


Tree of medium size with grey bark. Leaves obovate rounded, base narrowed, glabrous above; nerves 10 to 15 pairs, elevated and red-hairy, as are reticulations beneath, 4 to 8 in. long, 2.5 to 5 in. wide; petioles pubescent, thick, 2.5 to 5 in. long. Panicle (male) 8 to 12 in. long; branches many, 4 to 6 in. long, velvety-pubescent. Flowers in distant clusters, 1 in. across; pedicels pubescent. Calyx-lobes 5, pubescent ovate. Petals glabrous ovate-lanceolate. Stamens glabrous. Disc hairy. Drupes pisiform, 2 in. through, glabrous; peduncles rather long. Hab. Open woods and roadsides in the north, Lankawi, Pulau Niur Stali (Curtis). Perlis, Telor Jambu Kanga (Ridley).

(3) S. cochinchinensis Engler DC. Mon. Phan. t.c. 489.

Small tree 20 to 30 ft. tall. Leaves coriaceous, oblanccolate, shortly acuminate or blunt rounded, edge obscurely crenate at tip, above glabrous, beneath hairy especially on the nerves, 17 pairs, slender elevate and conspicuous reticulations, 9 in. long, 2.75 in. wide; petioles 1 in. long. Panicle lax, spreading, over 12 in. long, thickly hairy; branches long, slender. Flowers in small compact sessile heads, distant on the branches, hairy; pedicels 0, or very short. Sepals ovate acute. Petals oblong, 1 in. across, glabrous. Hab. Setul, Bukit Wang (Haniff). Distrib. Cochin-China.

The only leaf I have seen is shortly acuminate, the older leaves in Pierre's Cochin-China specimens are thicker and quite rounded.

(4) S. Curtisisii King, t.c. 509.

Small tree, glabrous. Leaves oblanccolate-oblong, shortly blunt-acuminate, base narrowed gradually, blunt; nerves 18 to 20 elevate as are reticulations beneath, 13 to 16 in. long, 4 to 5 in. wide; petioles 1.25 to 2 in. long, thick. Panicles terminal, puberulous. Male flowers 15 in. across. Calyx cupular; lobes 5 ovate, minutely tomentose. Petals much longer, elliptic minutely tomentose. Female flowers larger. Drupe transversely elliptic oblique,
Semecarpus.

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(5) S. lucens King, l.c. 510.

Tree 40 to 70 ft. tall, 10 to 15 in. through, glabrous. Leaves elliptic, tip rounded or shortly abruptly acuminate, base rounded or slightly cuneate, slightly oblique, edges thickened; nerves 10 to 16 pairs, broad elevate beneath yellow and reticulations conspicuous, 4 to 7 5 in. long, 2 to 3 25 in. wide; petioles 75 to 2 in. long. Panicles terminal lax, peduncled, 10 in. long; branches slender, 4 5 in. long; branchlets 5 in. long. Flowers yellow 15 in. across, pedicelled, glabrous except disc. Males, calyx cupular flat, teeth 5 ovate acute. Petals 5 ovate-lanceolate acute. Females larger, fewer on smaller panicles. Drupe obliquely ovoid, compressed, rusty-puberulous, about 5 in. across. Hab. Hill forests, Perak, Larut from below 100 to 3000 ft. altitude (Kunstler).

15. DRACONTOMELUM, Bl.


A spreading tree, 30 to 100 ft. tall. Branches tomentose. Leaves 12 to 20 in. long; leaflets 5 to 8 pairs, thinly coriaceous, fight green, elliptic-oblong acuminate, lower ones ovate-oblong, shorter, glabrous except for the midrib, sometimes puberulous beneath with tufts of hair in the nerve-axils; nerves 9 to 12 pairs, 4 to 9 in. long, 1 75 to 2 75 in. wide; petiolules 2 in. long. Panicles 2 ft. long or less, pubescent. Flowers 3 in. long, white. Stamens brown. Drupe depressed-globose, 1 in. through, green. Hab. Low ground by rivers, Malacca (Griffith, Maingay); Panchur; Ayer Panas (Derry); Perak, Ulu Bubong and Chanderiang (Kunstler). Pahang, Raub (Foxworthy). Temengoh, river-bank. Penang Hill (Maingay) possibly planted here. Distrib. Indo-Malaya. Native names: Poko Sakai; Bua Chan Kuang; Sangkuang. Use: The fruit is eaten by Malays with fish. It may have been planted in some of these localities, but I think it is indigenous in most localities given.
Order XLVI. CONNARACEÆ.

Scandent shrubs with pinnate leaves, or trees with simple leaves (one leaflet) (Ellipanthus). Flowers small in axillary racemes, panicles or cymes, rarely unisexual. Calyx 5-lobed, usually persistent, often pink. Petals 5, linear or oblong, white, imbricate. Stamens 5 or 10, those opposite petals shorter and imperfect; filaments connate at base or free. Disc 0 or small. Pistils 5, rarely more or fewer, ovoid, hairy, r-celled; ovules 2; styles filiform. Fruit 1 to 3; follicles often stalked dehiscing on lower edge, usually red. Seed 1 (rarely 2) arillate. All tropics (King, Journ. As. Soc. Beng. lxvi. (2), p. 1).

Pistil 1.
Leaves pinnate; climbers
Leaflets 1; trees
Pistils 5, 1 only perfect; leaves pinnate.
Calyx lobes persistent, accrescent imbricate in fruit
Calyx lobes not accrescent or imbricate
Pistils 2 to 5, perfect.
Calyx imbricate; follicles rugose or tubercled
Calyx valvate; follicles smooth
Pistils 5 to 7; follicles 1 to 3

1. CONNARUS, Linn.

Sarmentose or scandent shrubs. Leaves unequally pinnate; leaflets 5 or 3, rarely more, coriaceous. Panicles terminal or axillary. Flowers small, numerous, white or pink. Sepals 5, imbricate. Petals 5, linear. Stamens 10, 5 shorter, and usually antherless. Ovary 1, pubescent; style slender. Stigma capitate; follicle oblique, stipitate, broadest at the tip, red or yellow, often pubescent inside. Seed 1, flat, oblong, arillate. Species about 80, tropical Asia, Africa and America.

Leaves beneath pubescent.
Leaves above pubescent, beneath densely red-pubescent; follicles tomentose
Leaves above and follicles glabrous; petals glabrous.
Leaves more rigid; petals tomentose
Leaflets quite glabrous, ovate to elliptic lanceolate, 2 to 4 in. long.
Follicles sub-cylindric narrowed to base 1.5 by .25 in.; leaflets ovate stiff.
Follicles flat, rounded, oblong, 1.25 by 1 in.; leaflets elliptic cuspitate, rather thin
Leaves over 6 in. long.

Panicles lax, over 9 in. across; leaflets rather thin; fruit 2 in. long, obovoid, tip recurved.
Panicle about 7 in. long; leaflets stiff coriaceous; pod oblong-cylindric, tip blunt not recurved, 2 in. long

1. C. ferrugineus
2. C. semidecandrus
3. C. Griffithii
4. C. oligophyllus
5. C. villosus
6. C. ellipticus
7. C. grandis

A sarmentose shrub or climber. Branchlets, leaves, except upper surface, and inflorescence red-tomentose. Leaves 8 to 16 in. long; leaflets 5 to 11, oblong-lanceolate, coriaceous, short acuminate, narrowed to rounded base; nerves 6 to 7 pairs, prominent beneath, 3 to 6 in. long, 1.25 to 2 in. wide; petioles 1 to 1.5 in. long. Panicles stout, 12 in. long, woody, peduncled; branches 4 in. long. Flowers 3 in. long; pedicels short. Sepals tomentose, oblong-ovate. Petals linear-oblong glabrous. Stamens 10, alternately long and short.

**Fig. 53.—Connarus semidecandrus.**

Ovary tomentose. Follicle obovoid-oblong, crimson or golden yellow tinged red, tomentose, woody, silky inside, 1.75 to 2.25 in. long, 8 to 1.25 in. wide. Seed oblong, 1 in. long, 6 in. wide, black, half covered with a yellow aril. **Hab.** Open country and borders of woods. Singapore; Bukit Mandai. Malacca, Merlimau; Tanjong Kling (Derry); Chabau. Selangor, Rantau Panjang. Perak, Batang Padang and Ulu Kerling (Kunstler). Penang (Jack). **Distrib.** Sumatra. **Native names:** Akar Tengeh Kuau; A. Sundrup; A. Merah; A. Sakellet; Semilat Bapan; Akar Pulau Hantu; A. Pulis Antan. **Use:** Fruit used for poisoning dogs.

Fl.M.P., l.

Sarmentose shrub. Branchlets puberulous. Leaves 6 to 9 in. long; rachis and underside puberulous or glabrous; leaflets 5 to 7 thinly coriaceous, oblong to elliptic-lanceolate, light green, short blunt acuminate, base rounded or cuneate; nerves 6 to 7 pairs, slender, prominent beneath, 2'5 to 4 in. long, '9 to 2'5 in. wide; petiolules '15 in. long. Panicles terminal 6 to 10 in. long, much-branched, many-flowered. Sepals lanceolate, straw-colour dotted with red glands. Petals lanceolate blunt, white tinted pink, with glandular hairs and red glands on the back, not tomentose. Follicle flattened obovoid '6 in. long, red, smooth. Seed black, aril yellow, fleshy lobed. *Hab.* Open country common. Scented of hay and meadow-sweet. *Singapore, Cluny Road; Bukit Mandai. Pahang, Tahan and Pahang Rivers; Sungei Jelai (Machado). Malacca, Sungei Hudang (Goodenough); Merlimau (Derry). Selangor, Rawang; Kwala Lumpur. Perak, Kwala Wok (Wray); Ulu Kerling (Kunstler); Temengoh. Penang (Jack); Penara Bukit. Tringganu, Bundi (Rostado). Lankawi, Kwah (Curtis). Kelantan, Kampong Kota (Gimlette).* *Distrib. Sumatra, Mergui, Siam.* Native names: Akar Kuaya; A. Tanga Burong; A. Tukor; Poko Nyamok; A. Tupai-Tupai; Hisap mana (Kelantan). *Use:* Root decoction for fever.

(3) **C. Griffithii** *Hook. fil. F.B.I.* ii. 52.

A bush. Young parts and midrib on back of leaf minutely tomentose. Leaves 6 to 8 in. long; petiole three-quarters of the length; leaflets 5 thinly coriaceous, elliptic, shortly acuminate blunt, base rounded above, smooth beneath; nerves 5 pairs, fine elevate, 3 to 4'5 in. long, '75 to 2 in. wide; petiolules '2 in. long, thick, tomentose. Panicle lax 6 to 8 in. long, tomentose; branches slender. *Flowers '1 in. long. Sepals oblong, acute. Petals as long, all minutely tomentose. Hab.* In open country in the north; perhaps only a variety of *C. semidecandrus*, but the leaves are stiff and the petals tomentose. Lankawi, Kwah (Curtis). *Perlis, Chupeng. Setul. Distrib. Mergui.*

(4) **C. oligophyllus** *Wall. in Planchon, Linnaea xxiii.* 427.

Scandent, glabrous except on the inflorescence. Leaves 6 to 8 in. long; leaflets 3 to 5, thinly coriaceous but stiff, elliptic-lanceolate sub-acute or shortly acuminate, base cuneate round; nerves 4 to 5 pairs, slightly prominent beneath, 2'25 to 4 in. long, '1 to 2 in. wide; petiolules '25 to '3 in. long. Panicle much-branched, minutely pubescent, 8 in. long. *Flowers '35 in. long, sub-sessile.* Sepals ovate-lanceolate acute, yellowish hairy. Petals oblong, blunt, puberulous much longer, yellowish white. Follicle elliptic narrowed to base, tip round, not compressed, rose pink, silky inside, '1'5 to 2 in. long, '75 in. through. *Seed black or dark brown, aril red, thick. Hab.* Forest edges and open country. *Singapore,
Changi; Siglap; Bukit Mandai. Pahang River, Kwala Berar. Selangor, Batu Caves. Perak, Asam Kumbang (Wray); Thaiping (Kunstler). Penang (Wallich).


Leaves more distinctly reticulate and stiffer, otherwise quite similar. Malacca (Maingay). *Native name:* Akar Tulang Dayeng.

King’s *C. Maingayi* was apparently based on a Perak plant with minute petals. I have seen no specimen.


Big climber. Branchlets and panicles red-scurfy tomentose. Leaves 6 to 12 in. long, glabrous; leaflets 9 thin coriaceous, oblong or elliptic oblong, base rounded; nerves 4 to 5 pairs, prominent beneath, 2·25 to 4 in. long, 1 to 2 in. wide; petiolules wrinkled, ·25 to 3 in. long. Panicles 6 to over 12 in. long, densely red tomentose, much-branched. Flowers 35 in. long, white. Sepals oblong, half as long as petals, tomentose. Petals glabrous. Follicles broad, oblong rounded both ends flat, 1·25 in. long, 1 in. wide, rose pink. *Hab.* In open forest 800 to 1000 ft. altitude. Perak, Thaiping Hills (Kunstler). *Distrib.* Borneo, Sumatra.

(6) *C. ellipticus* *King, l.c.* 7.

A stout sarmentose shrub, glabrous except branchlets and inflorescence. Leaves 8 to 15 in. long; leaflets 3 to 5 coriaceous, elliptic oblong short acuminate, base rounded; nerves 5 pairs, prominent beneath, 6 in. long, 3 in. wide; petiolules 2 in. long. Panicles very large, spreading 2 ft. long. Branches distant, 3 in. long. Flowers crowded at the ends, 1 in. long. Sepals lanceolate, tomentose. Petals glabrous, linear, about twice as long, acute white. Follicles woody, obliquely obovoid, dorsal suture straight ending in a short point on the back, ventral suture longer, 2·5 in. long, 1·5 in. wide. Seed oblong, flat. *Hab.* Common in open country up to 4200 ft. altitude. Singapore, Chanchu Kang; Bukit Mandai Road. Johor, Sedenah; Ulu Sembrong (Kelsall). Selangor, Kwala Lumpur. Perak, Thaiping Hills (Kunstler), 300 to 4200 ft. altitude. Penang, Waterfall (Curtis). *Native name:* Akar Chinchin.


A stout climber with stiff coriaceous leaves of 5 leaflets 8 in. long. Leaflets oblong obtuse acuminate, very coriaceous, base rounded; nerves 9 to 10 faint, 6 in. long, 2·5 in. wide; petiolules 2 in. long, thick. Inflorescence 4 to 8 in. long, yellow tomentose rather dense. Flowers sessile 25 in. long. Sepals linear-oblong, blunt, cream colour. Petals twice as long, linear, glabrescent, white tipped with yellowish hairs. Follicles oblancoelate, rounded, woody, 2 in. long, 75 in. wide, narrowed abruptly into a thick stalk, 4 in. long. *Hab.* Common in open country. Singapore, Changi; Pulau Ubin. Malacca, Chabau; Merlimau (Cantley);

2. **ELLIPANTHUS**, Hook. fil.


Leaves glabrous . . . . . . . . . . (1) **E. scortechinii**
Leaves hairy beneath.
Leaflets oblong-lanceolate; flowers panicled . . (2) **E. curtisii**
Leaflets ovate to elliptic.
Flowers racemose . . . . . . . . . . (3) **E. Griffithii**
Flowers in dense cymes . . . . . . . . . . (4) **E. gibbosus**

(1) **E. scortechinii** King, l.c. 8.
Small tree. Leaves thinly coriaceous, narrow elliptic oblong, base narrowed, apex caudate, glabrous; nerves 4 pairs, prominent beneath 4.5 to 7 in. long, 1.25 to 2 in. wide; petioles 1 to 1.5 in. long. Cymes tomentose. Calyx lobes ovate, tomentose. Petals little longer. Follicle oblique, elliptic, blunt, abruptly shortly stalked, tomentose, 1.5 in. long, 1.3 in. wide; pericarp thick. Seed oblong. *Hab.* Perak (Scortechini).

(2) **E. curtisii** King, l.c. 9.
Tree. Leaves rather stiffly coriaceous, oblong-lanceolate long acuminate, base cuneate, above glabrous, shiny beneath, pubescent, midrib tomentose; nerves 7 to 8 pairs, prominent beneath, 2.5 to 3.5 in. long, 1.8 to 1.5 in. wide; petioles 3 in. long tomentose. Panicles 4 to 7 in. long, silky. Flowers 1.2 in. long, white. Calyx-lobes ovate-lanceolate, tomentose. Petals more than twice as long, narrow oblong, pubescent. Ovary silky. *Hab.* Penang Hill, road to West Hill and Chalet (Curtis).

(3) **E. Griffithii** Hook. fil. *F.B.I.* ii. 56; King, l.c. 10.
Small tree about 30 to 60 ft. tall. Branchlets tomentose. Leaves thin coriaceous, elliptic caudate acuminate, base rounded above glabrous, shining beneath pubescent, midrib and 9 to 10 pairs; nerves beneath tomentose, 4 to 5 in. long, 1.5 to 2 in. wide; petioles 2 to 2.5 in. long. Racemes 25 in. long, branched, hairy. Flowers 2 in. across cream white. Sepals ovate hairy. Petals oblong, hairy outside. Follicle compressed curved, hardly beaked 1 in. long, 1.4 in. thick, narrowed to base into a stalk 2 in. long, sienna brown tomentose, 7.5 in. long. *Hab.* Dense woods, Singapore, Garden Jungle. Malacca (Griffith); Ayer Panas (Foxworthy). *Use*: Wood hard and durable, squares to 6 or 10 in.
(4) *E. gibbosus* King, l.c. 10.

Small tree 10 to 16 ft. tall, 2 to 3 in. through. Leaves membranous, oblong-elliptic shortly caudate-acuminate, base cuneate edge undulate; nerves 7 to 8 pairs prominent beneath, 4'5 to 6'5 in. long, 1'75 to 2'75 in. wide; petioles 5 to 6 in. long, tomentose. Cymes dense, short, few-flowered, 4 in. long, hairy. Calyx-lobes lanceolate. Petals little longer tomentose outside. Follicle oblong, compressed with a long conical beak, base gibbous above and contracted into a curved stalk, tomentose, 1 to 1'5 in. long, 4 in. wide; stalk 1 in. long. *Hab.* Hill forests; Johor, Gunong Pantai; Perak, Gapis (Curtis); Ulu Kerling; Ulu Slim and Kinta (Kunstler); Tapah (Wray); Waterloo (Curtis).


Large woody lianes. Leaves unequally pinnate; leaflets rarely 1, often numerous, coriaceous. Racemes or panicles axillary, numerous. Flowers small, white; pedicels slender. Sepals 5, orbicular enlarged in fruit. Petals 5, linear-oblong. Stamens 10; filaments connate at base; ovaries 5, 4 usually imperfect; style slender; follicle sessile, curved. Seed arillate. Species about 50, all tropics.

Leaflets not more than 11, petiolulate ovate.
- Leaflet usually 1, rarely 3.
- Leaflet 3 to 9, rarely 11.
  - Leaflets glaucous beneath.
  - Leaflets not glaucous.
    - Leaves 3 to 7 in. long; leaflets ovate-lanceolate; flowers 2'5 in. long.
    - Leaves 3'5 to 5 in. long; leaflets 3 (or 5) broad ovate.
Leaflets very numerous, small, oblong, sessile.
- Leaflets blunt acuminate, 2 to 3'25 in. long, pubescent beneath.
- Leaflets broad at tip, bifid, 5 to 7'5 in. long, sparsely pubescent beneath.
- Leaflets broad round-tipped.
  - Beneath rusty-silky.
  - Beneath glabrous.

(1) *R. anomala*

Big liane, glabrous. Leaves with 1 to 3 leaflets, coriaceous, ovate-elliptic shortly blunt caudate-acuminate, base round broad; nerves 6 pairs, 3 to 4'5 in. long, 1'6 to 2'2 in. wide; petiolules 2 in. long or less. Racemes slender, lax, 3 in. long, several together. Flowers 3'5 in. long, red and white on pedicles as long. Calyx-lobes ovate-orbicular, puberulous outside. Petals linear-oblong, three times as long. Follicle oblique ovoid blunt, yellow tinted red, 1 in. long. Seed-aril red. *Hab.* Perak, Sungei Rayah, Goping (Kunstler).
(2) **R. acuminata** Hook. fil. F.B.I. ii. 48; *King, l.c. 12.*

A lofty liane, glabrous. Leaves 3 to 9 in. long; leaflets 5 to 11, thinly coriaceous, oblong-lanceolate to obovate caudate-acuminate, base round or cordate; nerves 5 pairs, faint, 1.5 to 2.25 in. long, '65 to '9 in. wide; petiolules under '1 in. long. Racemes very slender, lax, several together, 3 in. long. Flowers '3 in. long; pedicels slender as long. Sepals obovate round, pink. Petals oblong, white. Follicle narrow ovate, curved pointed, '75 in. long, red. *Hab.* In dense forests on trees; Singapore (Wallich, *Cnestis acuminata* 8533), Bukit Timah. Perak, Goping and Ulu Bubong (Kunstler).

(3) **R. pulchella** Planch. Linnæa xxiii. 419; Hook. fil. F.B.I. ii. 48; *King, l.c. 13.*

Lofty glabrous liane. Leaves 3 to 7 in. long; leaflets 3 to 7, thin coriaceous, obovate caudate, base round reticulate; nerves 4 to 5 pairs, faint, 1.5 to 3 in. long, '75 to '1.2 in. wide; petiolules '15 in. long slender. Racemes crowded, slender, many-flowered, 2 to 3 in. long. Flowers '25 in. across. Sepals ovate acute, ciliate. Petals twice as long, linear. Pistils 5. Follicles oblong, curved, '6 in. long, red. *Hab.* Forests. Singapore, Garden Jungle; Changi. Malacca, Bukit Bharu (Maingay); Sungei Hudang. Selangor, Bukit Hitam. Perak, upper (Wray). Penang, Balik Pulau.

Allied to *R. humilis*, but the leaves are much smaller.


Slender, glabrous climbing liane. Leaves 3.5 to 6 in. long; rachis slender; leaflets 3 (rarely 5), coriaceous, broad obovate caudate-acuminate, base round; nerves 4 pairs, faint, 1.5 to 3 in. long, 1 to 2.25 in. wide; petiolules 1.2 in. long. Racemes clustered, slender, few-flowered 2 to 3 in. long; flowers '15 in. long. Sepals sub-orbicular. Petals short broad oblong. Follicle cylindric pointed, glabrous, '75 in. long. *Hab.* Forests in lowlands. Pahang River, Sungei Chenei (Fox). Perak, Goping (Kunstler). Penang, Moniot's Road (Curtis). *Distrib.* Sumatra, Borneo. *Native name:* Asam Nyamok.

(5) **R. rugosa** Planch. Linn. xxiii. 422; *Hook. fil. F.B.I. ii. 46; King, l.c. 14.*

Stout climber. Branchlets tomentose. Leaves 12 to 15 in. long; rachis tomentose; leaflets 8 to 15 pairs, sub-sessile oblong shortly blunt-acuminate, base broad, coriaceous, above smooth, beneath reticulate; nerves and reticulations raised, hairy; nerves 8 to 10 pairs, prominent, 2 to 3.25 in. long, '6 to 1.25 in. wide. Panicles 2 to 3 in. long, dense-flowered. Flowers '2 in. long. Sepals round pubescent; follicles '75 in. long, lanceolate obtuse, upcurved, glabrous. *Hab.* Common, climbing on trees in forests. Singapore, Changi. Pahang, Sungei Jelai, Kwala Lipis (Machado).
Malacca, Ayer Panas (Cantley); Sungai Hudang; Brisu (Derry). Negri Sembilan, Gunong Berumbun, and Bukit Danan (Cantley), Tampin Hill. Dindings, Lumut. Perak, Goping and Gunong Bubu (Kunstler); Asam Kumbang (Wray); Temengoh. Penang (Porter); base of Government Hill (Curtis). Tringganu, Bundi (Rostado). Native names: Akar Prijeh; A. Semilat putih; Keluntut Kra; Kelintek Nyamok.


A lofty liane. Branchlets pubescent. Leaves 2 to 6 in. long; rachis pubescent; leaflets sessile, coriaceous, 10 to 22 pairs, opposite, oblong tip broad, retuse, base cordate, shining above, pubescent beneath; nerves 6 pairs, elevated, 5 to 75 in. or more long, 25 to 3 in. wide. Racemes 3-5 to 5 in. long. Flowers white, scattered, many, 2 to 35 in. across, pedicelled. Sepals ovate blunt hairy, pink. Petals oblong, white; follicle obvoid blunt, red, 6 to 7 in. long. Seed elliptic. Hab. Common in woods. Singapore, Bajau; Sungai Buluh; Changi; Kranji. Pahang, Telom. Perak, Thaiping (Kunstler). Kedah, Pulau Song-Song. Penang (Wallich). Distrib. Sumatra, Borneo.

(7) **R. fulgens** Planch. Linneæa xxiii. 423; Hook. fil. F.B.I. ii. 46; King, l.c. 15.

Woody climber, minutely tomentose. Leaves 3 to 5 in. long; rachis and underside of leaflets tomentose; leaflets 12 to 24 pairs, thin coriaceous, oblong blunt, base rounded above glabrous, reticulate; nerves faint, 4 to 65 in. long, 15 to 25 in. wide. Racemes solitary, pubescent; follicles 75 in. long, curved, oblong, obtuse. Hab. Singapore (Wallich and Maingay).

This seems to be rare; I have never met with it.


A woody liane 3 in. through, very lofty. Branchlets pubescent. Leaves 1 to 4 on rachis tomentose densely crowded, young ones rose pink, adults shining light green; leaflets 4 to 15 pairs, coriaceous, sub-sessile, oblong blunt, base cordate, glabrous, back reticulate, 3 to 5 in. long, 15 to 3 in. wide. Racemes slender, 2 in. long, tomentose. Sepals oblong. Petals white. 1 in. long, oblong; follicles red, lanceolate, curved, sub-acute 4 in. long. Hab. Common in woods climbing on high trees. Singapore, Chan Chu Kang; Changi; Kranji; Bukit Timah; Garden Jungle. Johor, Kwala Kahang. Malacca, Batu Tiga (Griffith). Distrib. Sumatra, Borneo. Native name: Semilat. Use: Decoction for colic.

4. **ROUREOPSIS** Planch.

Scandent shrubs. Leaves unequally pinnate with few leaflets. Flowers in axillary racemes, large for the order; pedicels slender
bracteolate. Sepals oblong, enlarged in fruit, not clasping it. Petals linear-oblong. Stamens 10, alternate ones larger. Ovaries 5; styles slender; follicle oblong slightly or not curved. Seed ovoid, arillate. Species 3 or 4, Malayan. Near Rourea, but with fruit but little curved and free persistent sepals not claspign the fruit-base; flowers larger.

Leaves small, pubescent beneath . . . . (1) R. pubinervis
Leaves larger, glabrous . . . . . . (2) R. Scortechinii


Woody climber. Branches pubescent. Leaves 2.5 to 5 in. long; rachis pubescent; leaflets membranous, 5 to 9, terminal one largest, ovate-elliptic, tapering at both ends, glabrous above, midrib puberulous; nerves 4 to 5, slightly prominent beneath, '7 to 1.7 in. long, '5 to '75 in. wide. Racemes slender, crowded, 1 in. long. Flowers white, few on long pedicels, '35 in. long. Sepals oblong obtuse, pilose at tip. Petals linear-oblong. Follicles ovate '5 to '6 in. long, slightly curved, persistent sepals '3 in. long, lanceolate. Hab. In forests, climbing on trees usually low down. Malacca, Sungei Hodgson; Batu Tiga; Bukit Bintang (Goodenough). Selangor, Dusun Tua; Sungei Buluh; Semangkok Pass; Kwala Lumpur (Curtis). Sungei Ujong (Cantley). Perak, Batang Padang (Kunstler). Penang (Wallich); Batu Feringhi (Curtis). Native names: Akar Kalche; A. Kachang betina. Use: Leaves for poulticing in fever.

(2) R. Scortechinii King, l.c. 16.

Slender climber, glabrous except inflorescence. Leaves 6 to 10 in. long; leaflets 7 to 9, thinly coriaceous, ovate-lanceolate long acuminate; nerves 4 pairs, faint, 2.35 to 3 in. long, 1 to 1.25 in. wide; petals '1 in. long, terminal leaf much larger. Racemes slender lax, 1 to 2 in. long, pubescent. Flowers '25 in. long; pedicels slender. Sepals ovate blunt, hairy inside. Petals lanceolate, yellowish. Pistils 5. Follicle ovoid, straight, 1 in. long. Hab. Perak (Scortechinii).

5. AGELEA, Soland.

Big scandent lianes. Leaves 3- rarely 5-foliate. Panicles or racemes short, about 1 in. long, tufted hairy, axillary. Calyx 5-lobed not clasping fruit. Petals lanceolate or ligulate, white. Stamens 5 or 10. Pistils 2 to 5; follicles 1 to 3, coriaceous, rugose or warty, velvety, scarlet. Seed arillate. Species 12 or more, African and Asiatic.

All parts more or less pubescent; stamens 5.
Leaves smaller; nerves 2 to 9 pairs . . . . (1) A. vestita
Leaves larger; nerves 7 to 10 pairs . . . . (2) A. pinnata

All parts except inflorescence glabrous; stamens 10.
Leaves smaller; nerves 2 to 3 pairs . . . . (3) A. Wallichii
Leaves larger; nerves 7 to 10 pairs . . . . (4) A. Hullettii
(1) **A. vestita** Hook. fil. F.B.I. ii. 46; King, l.c. 17.

A big liane. Branchlets tomentose. Leaves 5 to 6 in. long; petiole, rachis and underside tomentose; leaflets 3 membranous, laterals ovate or elliptic acuminate, base oblique, 2'5 to 3'5 in. long, 1'4 to 2'4 in. wide, terminal one nearly twice as big, glabrous above, tomentose beneath; nerves and reticulations elevated; petiolules 1 to 4 in. long (terminal one). Panicles extra-axillary, under 1 in. long, tomentose. Flowers under 2 in. long, pedicelled. Sepals free, linear, tomentose, unequal. Petals linear, white. Follicles 1, rarely 2, ovoid beaked rugose tubercled, velvety scarlet, 6 to 8 in. long. Seed ovoid, black 4 in. long. *Hab.* Very common all over the peninsula in forests. Flowers fragrant. Singapore, Serangoon (Murton); Bukit Timah. Johor, Gunong Pulai. Pahang, Kuantan (Foxworthy). Malacca, Ayer Panas; Merlimau (Derry). Negri Sembilan, Bukit Sulu (Cantley). Dindings, by river (Curtis). Perak, Goping (Kunstler); Batu Togo (Wray). Adang islands, Pulau Rawei. Kelantan, Kwala Lebir. *Distrib.* Sumatra, Borneo. *Native names:* Akar Makachang hitam; A. Kankachang; A. Tulo Bujok; A. Rusa-Rusa; A. Nyamok.

(2) **A. pinnata** King, l.c. 18.

Big liane. Branchlets pubescent. Leaflets 3 to 5, thinly coriaceous, elliptic caudate, base round, above glabrous except midrib, beneath pubescent; midrib and nerves elevated, hairy, 7 to 10 pairs, prominent, 6 to 8 in. long, 3 to 3'5 in. wide; petiolules short, thick. Panicles densely crowded, axillary, under 1 in. long; tomentose. Flowers 3 in. long; pedicels 15 in. long. Sepals free 5, linear acuminate, tomentose. Petals linear acuminate, purple-magenta outside, white inside. *Hab.* Open jungle at below 500 ft. altitude. Perak, Larut (Kunstler). Rare.

(3) **A. Wallichii** Hook. fil. F.B.I. ii. 47; King, l.c. 18.


(4) **A. Hullettii** King, l.c. 19.

Big climber. Branchlets tomentose; leaflets 3 coriaceous, glabrous, elliptic-oblong, tip sub-acute or blunt; nerves 7 to 8 pairs, prominent beneath, reticulations visible, 6 to 9 in. long, 2 to 2'25 in. wide. Panicles under an inch long, tomentose, dense.


(i) **T. Griffithii** Hook. fil. F.B.I. ii. 55; Ic. Pl. 2392; King, l.c. 20.

Branchlets and inflorescence only puberulous. Leaflets elliptic to ovate, tips blunt bifid, base round; nerves 4 to 5 pairs, prominent beneath, 3.5 to 6 in. long, 1.5 to 2 in. wide, terminal largest; peti- lules 15 in. long. Panicles 1 to 3 in. long, fascicled, hairy. Flowers 33 in. across. Follicles 5 to 1 in. long. Hab. In thickets; Johor, Kota Tinggi. Malacca, Pulau Besar (Griffith); Brisu; Bukit Bruang; Bukit Sadanen. Tomoh (Machado). Native names: Akar Kachang Betina; Akar Kachang Purai; Akar Sesudu; Akar China; Akar Berimbong.


(i) **C. ramiflora** Griff. Notulae iv. 432; Hook. fil. F.B.I. ii. 54; King, l.c. 21. C. flaminea Griff. l.c. 433. Connarus igneus Wall. Cat. 8528.

Branches, rachis, underside of leaves, inflorescence tomentose. Leaves (young pink) 8 to 15 in. long; leaflets obtuse or sub-acute, base round, 1.25 to 3 in. long, 4 to 1.5 in. wide. Racemes 2 in. long. Female flowers 35 in. across, males smaller. Sepals pubescent both sides, pink. Petals white. Follicles 1.5 to 1.75 in. long, 8 in. wide. Hab. Common in open country, very attractive from its pink young leaves and scarlet pears. Singapore, Cluny (Hullett); Bukit Timah. Pahang, Temerloh; Kwala Tembeling. Malacca, Sungei Hudang; Jasin. Negri Sembilan, Bukit Tampin. Perak, Tapah (Wray); Larut (Kunstler); Trong (Wray). Penang Hill (Curtis); Kedah, Yan. Distrib. Burma, Malay islands. Native names: Akar Semilat Merah; Akar Semilat Papan; Akar Gesing-Gesing Merah. Akar Perjep. Use: Roots boiled and applied as a poultice for colic.
Order XLVII. Leguminosae.

Herbs, shrubs often climbing, and trees. Leaves stipulate usually alternate, pinnate or digitate, rarely simple; rachis in climbers often ending in a tendril. Inflorescence axillary, leaf-opposed or terminal, racemose or panicked, with bracts and bracteoles. Flowers usually irregular, bisexual. Sepals 5, connate or free, often unequal. Petals 5, fewer to 0, by abortion, usually free, unequal. Stamens normally 10, rarely fewer or indefinite, perigynous or nearly hypogynous; filaments free or connate. Ovary free; ovules i to many on the ventral suture; style simple; stigma capitate or oblique. Pod usually dry, dehiscent, or indehiscent, i to many-seeded, rarely baccate. Species about 8000, whole world, divided into 3 sub-orders, (A) Papilionaceae, (B) Caesalpinieae and (C) Mimoseae (Prain, Journ. As. Soc. Beng. lxvi. (2), No. 1, p. 21).

(A) Papilionaceae. Herbs, climbing or erect, shrubs or trees. Flowers irregular. Calyx gamosepalous beyond the disc. Petals imbricate, upper one erect, spreading (standard), 2 lateral free parallel horizontal (wings), 2 lower connate into a boat-shaped organ (keel). Stamens 10. Disc turbinate or cylindric.

i. Vicieae. Climbers, slender.
Leaves even-pinnate; flowers racemose; stamens 9 and 1 abortive; pod dehiscent; seeds red with a black spot .... 1. Abrus

ii. Genisteae. Shrublets or herbs. Stamens monadelphous; pod dehiscent not jointed; leaves simple or trifoliate.
Anthers uniform; keel-petals scarcely cohering; prostrate annual ... 2. Rothia
Erect shrubby herbs; anthers dimorphous; keel-petals firmly cohering; racemes terminal; pods turgid .... 3. Crotalaria

Climbers; seeds 3 to 8.
Pods with 6 to 8 seeds, not depressed between seeds .... 4. Dunbaria
Pods with 3 to 6 seeds, depressed between each .... 5. Atylosia
Shrubs; pods 1- to 2-seeded, turgid.
Slender twiggy plant; leaves 1-foliate narrow linear; corolla exerted .... 6. Eriosema
Bushes; leaves 1- to 3-foliate, broad; corolla not exerted .... 7. Flemingia

iv. Phaseoleae. Leaves trifoliate not gland-dotted; petals equal; stamens diadelphous.
Style bearded below stigma; slender climbers, rarely bushes; pod many-seeded.
Stigma oblique.
Keel spiral .... 8. Phaseolus
Keel not spirally; style filiform, corolla yellow or purple.  9. VIGNA
Keel not spiral; style flat upwards; corolla blue-violet.  10. PACHYRHIZUS
Stigma terminal; petals very unequal.  11. CLITORIA
Style not bearded below stigma; petals sub-equal; stamens monadelphous.
Stamens alternate, 5 abortive, 5 fertile; flowers small; pod linear.  12. TERAMNUS
Pod oblong turgid, 1 to 2 seeds; woody liane Pod linear, flat; many seeds; wiry climber.  13. DIOCLEA
Upper lip of calyx projecting; herbaceous climber; pod turgid; flowers large, pink.  14. PUERARIA
Pod 1-seeded, winged; lianes.  15. CANAVALIA
Pods jointed; except less shrubby stamens.  16. SPATHOLOBUS

v. ERYTHRINEÆ. Leaves trifoliate; petals very unequal; style beardless; flowers showy; pods usually several-seeded.
Climbers; keel longer than wings and standard.
Trees; standard longer than keel; flowers red.  17. MUCUNA
Flowers yellowish to purple.  18. ERYTHRINA

vi. GALEGEÆ. Leaves odd (rarely even)-pinnate; leaflets numerous, except PSORALEA; stamens 10, 9 united in a sheath split above; pod not jointed bivalved; shrubby plants or herbs.
Anthers apiculate.  19. INDIGOHERA *
Anthers blunt:—
Pod many-seeded; racemes leaf-opposed 20. TEPHROSIA
Pod many-seeded; racemes axillary 21. SESBANIA
Pod 1-seeded; leaves simple, broad 22. PSORALEA

vii. MILLETTIEÆ. Lianes or trees; leaves imparipinnate or simple.
Ovary not stipitate; pods narrow, flat; seeds 3 or more.
Pods many-seeded; racemes leaf-opposed.  23. MILLETTIA
Pods many-seeded; racemes axillary.  24. FORDIA
Pod 1-seeded; leaves simple, broad.  25. ADINOBOTrys

viii. DALBERGIEÆ. Lianes or trees. Leaves odd-pinnate. Pods 1-seeded indehiscent usually thin and winged.
Leaflets alternate.
Pods many-seeded; racemes from old wood or fascicled.  26. PADEBRUGGEA

ix. HEDYSAREÆ. Pod jointed; leaves pinnate; herbes or slightly shrubby at base.
Leaves not stipulate; stamens monadelphous.
Leaflets 4; bracts large, ciliate reniform.  32. GEISSASPIS
Leaves odd-pinnate; joints of pods 2 to 6 muricate; bracts ovate acute.  33. ZORNIA
Stamens in 2 bundles of 5.  34. SMITHIA
Pod twisted 34. SMITHIA
Pod straight exert.  35. ESCHYNOMONE

LEGUMINOSEÆ. 556
Leaves stipellate.
Pods twisted up; shrublets . . . 36. Uraria
Pod not twisted.
Pod flat ovate indehiscent 1-ovuled, climber . 37. Phylacium
Pod joints turgid; erect or prostrate herb . 38. Alysicarpus
Pod joints flat; herbs or shrubs . . . 39. Desmodium

x. Sophoreæ. Stamens free nearly to base.
Shrub; pod moniliform; seeds numerous . . 40. Sophora
Trees; pod short, broad thick; seed 1 . . 41. Ormosia

(B) Cæsalpinieæ. Trees or shrubs climbing or erect. Calyx segments free to disc (rarely gamosepalous, some Bauhinias). Petals imbricate 5 to 0, sub-regular, no standard or keel. Stamens nearly always free.

Anthers basifixed.
Petals 5; leaves even-pinnate; shrubs or trees; fruit a pod . . . 42. Cassia
Petals 5; stamens 5; leaves odd-pinnate; flowers regular; gigantic trees; fruit a samara . . . 43. Koompassia
Petals 2 or 0; stamens 2; fruit baccate globose or ovoid; big trees . . . 44. Dialium

Anthers, versatile.
Leaves bilobed or nearly entire.
Petals 5, showy; fruit a pod . . . . 45. Bauhinia
Leaves odd pinnate; trees.
Petals 5; cymes small; fruit fleshy; trees . . 46. Cynometra

Leaves even-pinnate.
Petals 3; leaflets numerous; tree . . . . 47. Tamarindus
Petal 1; sepals sub-valvate; pod orbicular often spiny; seed 1 . . . . 48. Sindora
Petal 1; sepals imbricate; pod smooth, oblong; seeds 2 or more . . . . 49. Afzelia
Petals 0; calyx showy red or orange pink; stamens 3 to 8 . . . . 50. Saraca
Petals 2, small; stamens 2 . . . . 51. Leucostegane

Leaves odd-pinnate.
Petals 0 . . . . 52. Crudia

Petals 5.
Fruit a samara, winged all round; tree, lower sepal large, hooded . . . . 53. Peltophorum
Fruit a samara, winged on upper edge; thorny climber . . . . 54. Mezoneuron
Fruit a samara, winged at tip only . . . . 55. Pterolobium
Thorny climbers (or bushes); a pod . . . 56. Cæsalpinia

(C) Mimoseæ. Flowers regular 4- to 5-merous; stamens twice as many or numerous.

Leaves bipinnate.
Flowers in balls pendent on long peduncles; tree . . . . 57. Parkia
Flowers yellow, capititate; aquatic herb . . . . 58. Neptunia
Flowers racemose; tree; pods small; seeds red . . 59. Adenanthera
Flowers racemose; climber; pod very large . . . . 60. Entada
Flowers capitate; pod opening whole length; bush

Flowers capitate; pod with persistent sutures, valves segmented

Stamens indefinite, often very numerous, free

Stamens connate in a tube at base.

Flowers large; pod septate between seeds fleshy

Flowers small; pod thin flat

Flowers medium; pod curved, red or brown coriaceous

(A) PAPILIONACEÆ (Genera 1-41).

1. ABRUS, Linn.

Slender climber. Leaves of numerous membranous leaflets. Flowers small, in dense axillary peduncled racemes. Calyx campanulate; teeth very short. Corolla much exsert, standard ovate acute, adhering below to the staminal tube; wings narrow, keel curved. Stamens 9, united in a slit tube; anthers uniform. Ovary sub-sessile, many-ovuled; style short, beardless. Pod oblong, flat or turgid. Seed globose, red or red and black.

Pod oblong, turgid, 3- to 5-seeded . . . . . . (1) A. precatorius
Pod linear, flat 8- to 12-seeded . . . . . . (2) A. pulchellus

(1) A. precatorius Linn. Syst. Veg. ed. xii. 472; Baker, in Hook. fil. F.B.I. ii. 175; Prain, l.c. 34.

Much-branched slender climber, glabrous or thinly silky. Leaves 2 to 3 in. long; leaflets 10 to 20 pairs, glabrous above, silky beneath, ligulate-oblong 1/5 to 1/3 in. long, 1/5 to 1/4 in. wide. Racemes many-flowered 2 in. long. Calyx 1/5 in. long silky. Corolla 1/6 in. long, white tinted pink. Pod oblong, turgid, 1 to 1 1/2 in. long, 1/4 to 1/5 in. wide, 3- to 5-seeded. Seed scarlet with black hilum (rarely white). Hab. Seashores and hedges in dry spots. Common. Singapore, Telok Kurau; Changi, Pahang, Pekan. Malacca, Selandor; Pengkalan Minyak (Cantley). Sungei Ujong. Dindings, Pangkor (Scortechini). Penang, Batu Feringhi (Curtis). Perlis, Kanga. Distrib. Whole world. Native names: Akar Belimbing; Akar Saga betina.

(2) A. pulchellus Wall. Cat. 5819; Baker, l.c. 175; Prain, l.c. 35.

2. ROTHIA, Pers.


3. CROTALARIA, Linn.

Herbs or under-shrubs. Leaves simple, trifoliate or 5- to 7-foliolate. Flowers showy in terminal or leaf-opposed racemes. Calyx tube short, teeth free or connate in 2 lips. Corolla as long or longer, standard round or ovate short clawed; wings obvate or oblong shorter; keel as long, its petals united, incurved, beaked. Stamens monadelphous in a sheath split dorsally; anthers dimorphous, alternately on short filaments versatile and on long filaments basifixied. Ovary sessile or stipitate linear, many-ovuled. Pod sessile or stalked oblong or linear, turgid 2- to many-seeded. About 250 species, tropics and sub-tropics.

Leaves simple.
Stem winged by decurrent stipules; yellow flowers.

Stem not winged.
Pod not longer than calyx; racemes elongate; flowers blue and white.
Flowers few in heads, pale yellow.
Pods much longer than calyx; glabrous.
Diffuse silky plant; racemes lateral; flowers yellow.
Erect stout plants; leaves blunt; bracts and stipules small; flowers yellow.
Erect stout plant; leaves acute, 2 to 6 in. long; stipules large, leafy.
Slender; leaves silky narrow linear or ob lanceolate.
Stout plants; leaves broad rhomboid.
Pod hairy; robust bushy herb; flowers light blue; stipules large.
Pod pubescent; stipules small; flowers yellow.

(1) C. alata
(2) C. sessiliflora
(3) C. chinensis
(4) C. ferruginea
(5) C. retusa
(6) C. sericea
(7) C. albida
(8) C. verrucosa
(9) C. semperflorens
Leaves compound, trifoliate; flowers all yellow.
   Procumbent herb; pods sub-globose pubescent
   2-seeded.
   Erect stout shrubs; pods cylindric, 20 to 30
   seeds.
   Pods hairy.
   Pods glabrous cylindric, sub-sessile.
   Pods glabrous, swollen oblong, stalked.
Leaves 5-foliate or more.

   Shrubby herb, 1 to 2 ft. tall. Stem and leaves beneath silky. Leaves simple oblong-ovate sub-acute, membranous, 1 to 3 in. long, '5 to 1 in. wide. Stipules with a triangular point, forming a wing to the stem below for the whole length. Flowers 2 to 3 on peduncles lateral about 2 in. long, with often one or two ovate leaves on it. Calyx '35 in. long silky; tube campanulate. Corolla as long, yellow. Pod stalked, linear-oblong, 1'25 to 1'75 in. long. Seeds 30 to 40. Hab. Sandy places. Singapore, near Serangoon; Changi. Johor, Sungei Tebrau. Distrib. Indo-Malaya. Native name: Kachang Hantu Darat.

(2) **C. sessiliflora** Linn. Sp. Pl. ed. 2, 1004; Baker, in Hook. F.B.I. ii. 73; Prain, l.c. 36.

(3) **C. chinensis** Linn. Sp. Pl. ed. 2, p. 1003; Baker, in Hook. F.B.I. ii. 73; Prain, l.c. 37.

(4) **C. ferruginea** Grah. in. Wall. Cat. 5398; Baker, l.c. 68; Prain, l.c. 37.
   Perennial branching herb, 1'5 to 2 ft. tall, hairy. Leaves herbaceous, simple, 1'5 to 2 in. long, '5 to '75 in. across, ovate-

(5) C. retusa Linn. Sp. Pl. 715. Baker, l.c. ii. 75; Prain, l.c. 38.


(6) C. sericea Retz, Obs. v. 26; Baker, l.c. ii. 75; Prain, l.c. 38.


(7) C. albida Heyne, in Roth. Nov. Sp. Pl. 333; Baker, l.c. ii. 71; Prain, l.c. 39.

Slender under-shrub branched from base, 6 to 12 in. tall, silky. Leaves simple linear-oblong, blunt silky beneath, 1 to 1'5 in. long, '2 in. wide; petioles '1 in. long. Stipules 0. Racemes terminal, 6- to 20-flowered, 2 to 4 in. long; bracts linear very small. Calyx turbinate, '25 in. long, 2 upper teeth broad, 3 lower linear, silky. Corolla '3 in. long, pale yellow. Pod glabrous sessile oblong-cylindric, '5 to '6 in. long. Seeds 6 to 12. Hab. Very rare in open spaces. Selangor, roadsides at Kwala Selangor (Ridley). Distrib. Indo-China.


Stout bushy herb about 2 ft. tall. Branches angular soon glabrous. Leaves 2 to 6 in. long, 1'5 in. wide, simple, rather thin, ovate blunt, base deltoid. Stipules leafy semilunar. Racemes terminal 6 in. long, 12- to 20-flowered; bracts linear minute. Calyx short campanulate, '3 in. long, teeth lanceolate. Corolla '75 in. long, blue and white, or white, showy. Pods oblong, faintly

(9) **C. semperflorens** Vent. Hort. Cels. 17.


(10) **C. uncinella** Lam. Encyc. Meth. ii. 200.


(11) **C. incana** Linn. Sp. Pl. 716; Baker, l.c. ii. 83; Prain, l.c. 40.

Erect herbaceous shrub, 2 to 4 ft. tall. Branches downy. Leaves trifoliate; petioles 2 to 3 in. long; leaflets membranous, hairy beneath, elliptic to ovate, median largest, rounded, base cuneate, 1.5 to 2 in. long, 1 to 1.4 in. wide or smaller. Stipules minute setaceous. Racemes terminal, 6 to 10 in. long, 12- to 20-flowered elongating downy. Calyx 25 in. long, teeth lanceolate. Corolla 6 in. long exsert, yellow. Pod sub-sessile cylindric, 1 to 1.25 in. long, pubescent, 20 to 30 seeds. Hab. Penang (Curtis). An alien. Rare. Distrib. Of American origin, now over the whole world.


An erect shrub nearly glabrous, about 2 ft. tall or more. Leaves trifoliate; petioles 2 to 3 in. long; leaflets membranous, ovate obtuse, base cuneate, 1.5 to 2.5 in. long, 1.5 in. wide or less. Stipules cuneate. Racemes terminal, 1 to 1.25 ft. long. Flowers 20 to 30.

(13) C. laburnifolia Linn. Sp. Pl. 715; Baker, l.c. ii. 84; Prain, l.c. 41.

Erect branched shrub, 2 to 4 ft. tall, glabrous. Leaves trifoliolate; petioles 2 to 3 in. long; leaflets fleshy-membranous, 1 to 2 in. long, r'25 in. wide or less, elliptic to obovate acute, cuneate. Stipules 0. Racemes terminal and lateral, 6 to 12 in. long with few large flowers. Calyx '3 to '4 in. long turbinate, teeth lanceolate. Corolla 1 in. long, exsert, keel large, yellow, tip red. Pod cylindric, r'5 in. long, '5 in. wide; stalk as long. Seeds 20 to 30. Hab. Seashores. Local. Malacca, Pulau Besar (Griffith, Maingay). Distrib. India and Malaya.

(14) C. quinquefolia Linn. Sp. Pl. 716; Baker, l.c. ii. 84; Prain, l.c. 42.


4. DUNBARIA, Wight and Arnott.


(1) D. Scortechinii Prain, l.c. 44.

Slender climber 10 to 20 ft. long. Branches grey canescent. Leaves 6 in. long; leaflets trapezoid cuspidate, narrowed to round base, laterals oblique, puberulous above, grey pubescent beneath, 2 to 2'5 in. long, r'75 to 2 in. wide; petioles r'5 to 4 in. long.
Stipules lanceolate 1 in. long. Racemes 2 to 3 in. long; peduncles 4 to 6 in. long; pedicels geminate, 2 in. long. Calyx grey pubescent, streaked red, 3 in. long, campanulate, lower tooth lanceolate twice as long as the deltoid connate upper pair. Corolla 5 in. long, standard outside purple 6 in. wide orbicular; keel green, the rest yellow. Pod 2·5 in. long, 25 in. wide, linear, grey, 6- to 8-seeded. Hab. Open places, Pahang, Pekan (Evans). Perak, Dipang (Scortechini); Ulu Bubong (Kunstler). Province Wellesley, Sungei Krai. Perlis, Bukit Lagi, Kanga. Distrib. South Siam.

5. ATYLOSIA, Wight.

Herbs or shrublets erect or twining. Leaves trifoliate, gland-dotted beneath. Flowers axillary, racemed. Calyx teeth distinct, lowest longest. Corolla exsert; keel not beaked. Stamens diadelphous. Ovary sessile; ovules 3 or more; style incurved glabrous. Pod linear or oblong, turgid with deep horizontal grooves between the seeds, hairy. Seeds conspicuously strophiolate. About 25 species, Mauritius to Australia.

Leaves 2 in. long pinnate.
Flowers 75 in. long . . . . . (1) A. crassa
Leaves 5 to 1·5 in. long, digitate.
Flowers 4 in. long . . . . . (2) A. scarabæoides

(1) **A. crassa** Prain, l.c. 45.
Twiner tomentose. Leaves 3 to 6 in. long, trifoliate pinnately; leaflets trapezoid cuspidate-acuminate, laterals oblique, base narrowed blunt, 2 to 3 in. long, 1·75 to 2·25 in. wide; nerves prominent, reticulations conspicuous, puberulous beneath; petioles 1·5 to 2·5 in. long, pubescent. Racemes 2 to 3 in. long, lax; peduncles short. Bracteoles large, round, red, 6 in. long. Calyx grey-downy; 4 in. long. Corolla 75 in. long, yellow. Pod 1·5 in. long, 5 in. wide, viscid puberulous, 3- to 5-seeded. Hab. Open heath country. Perlis, near Kanga (Ridley). Distrib. India, Burma, Cambodia.

(2) **A. scarabæoides** Benth. Pl. Jungh. 243; Prain, l.c. 46.
Slender downy twiner. Leaves trifoliate digitately, 1 in. long; leaflets obovate or elliptic, 5 to 1·5 in. long, downy all over, 2 to 6 in. (median one) wide; petioles 4 in. long. Flowers 1 to 6 in a raceme; peduncles 3 to 4 in. long. Calyx grey-downy, 2·5 in. long. Corolla 4 in. long, yellow. Pod 75 to 1 in. long, 25 in. wide, brown silky depressed between the 4 to 5 seeds. Hab. Sandy seashores; rare. Malacca, Pulau Besar (Griffith, Maingay). Distrib. Mascarenes, Indo-Malaya, Cambodia, China.

6. ERIOSEMA, DC.

Under-shrubs or herbs. Leaves 1- to 3-folate. Flowers solitary or racemed axillary. Calyx campanulate; teeth 5, as

(1) *E. chinense* Vogel. *Pl. Meyen*. 31; *Baker, in Hook. fil.* F.B.I. ii. 219; *Prain*, l.c. 44.

Shrub 1 to 1½ ft. tall, branched, pubescent. Leaves 1 to 2 in. long, 3 to 1¼ in. wide, 1-foliate, linear-oblong to linear-lanceolate, sub-coriaceous sparsely hairy above, grey-tomentose beneath; nerves brown-tomentose. Stipules linear, ½ in. long. Flowers 1 to 2 axillary, sub-sessile or on pedicels ½ in. long. Calyx pilose, ½ in. long. Corolla yellow, 4 in. long, hairy outside. Pod oblong, ¼ in. long pubescent with red hairs. *Hab.* Rare, possibly an alien. Malacca (Griffith). Perak (Wray). *Distrib.* Tropical Asia, Australia.

7. **FLEMINGIA**, Roxb.


Leaves 1-foliate.

Flowers in small cymes in large folded bracts in long terminal racemes . . . . . . (1) *F. strobilifera*

Leaves 3-foliate.

Flowers in axillary racemes; bracts small . . (2) *F. congesta*


(2) **F. congesta** Roxb. Hort. Beng. 56; Baker, l.c. ii. 288; Prain, l.c. 43.

Shrublet 4 to 5 ft. tall. Branchlets silky. Leaves trifoliolate, 2.5 to 3.5 in. long; leaflets membranous, ovate acute, obliquely round (terminal one cuneate) at base, puberulous above, silky beneath, 3 to 5 in. long, 1.5 to 3 in. wide; petiolules 25 in. long. Stipules scarious velvety, 4 in. long. Racemes dense 1 or more in axils 2 in. long. Bracts lanceolate, 25 in. long or less, silky. Calyx 35 in. long, silky. Corolla white striped pink; wings purple, 4 in. long. Pod oblong, 5 in. long, 25 in. wide tomentose. *Hab.* Common; open dry country. Malacca, Bukit China; Panchur (Derry). Pahang, Pekan; Kwala Tembeling. Dindings, Pangkor. Perak, Kampong Kota (Wray); Temengoh. Penang, Pulau Betong, etc. (Curtis). Kelantan, Kampong Kota (Gimlette), Setul and Perlis. *Distrib.* India, Cambodia, Siam, Java. *Native name:* Serengan.

8. **PHASEOLUS**, Linn.

Herbaceous twiners rarely sub-erect. Leaves trifoliolate. Flowers in axillary racemes yellow or purple. Calyx campanulate, lowest tooth longer than the connate upper two. Corolla much exsert, keel prolonged into a long beak ending in a spiral. Stamens diadelphous; anthers uniform. Ovary sessile, many-ovuled; style filiform twisted with keel bearded beneath. Pod linear (rarely oblong) sub-terete or compressed, septate. Species 60, tropics.

**P. lunatus** Linn. Sp. Pl. 724; Prain, l.c. 48. The haricot bean, Kachang China, Kachang Serinding, with greenish yellow flowers and a pod 3 in. long, is occasionally cultivated.

Stem twining; flowers yellow.

- Pods glabrous
- Pods hairy
- Pods glabrous; flowers rose pink, keel yellow 1 in. long
- Sub-erect with deep purple flowers

(1) **P. calcaratus** Roxb. Hort. Beng. 54; Baker, *in Hook. fil.* F.B.I. ii. 203; Prain, l.c. 50.

A twining annual or perennial, pubescent 6 to 10 ft. tall. Leaves 4 to 5 in. long; leaflets 3, membranous sparsely pubescent all over, ovate to lanceolate acute or acuminate, rarely faintly repand, base of terminal leaflet acute, laterals truncate or lobed, 2 to 4 in. long, 1 to 2.5 in. wide; petioles 2 to 4 in. long. Stipules 2 to 25 in. long, lanceolate. Racemes 75 to 15 in. long, on peduncles 5 to 8 in. long pubescent. Flowers 2 or 3 together in distant groups. Calyx 15 in. long, teeth deltoid. Corolla yellow, 5 to 25 in. long. Pod 2.5 to 3 in. long, 2 in. wide, recurved glabrous. Seeds 10 to 12. *Hab.* Open country.


(2) **P. Mungo** Linn. Mantissa i. 101; Prain, l.c. 50.

Annual pubescent, 6 to 10 ft. tall. Leaves 8 to 10 in. long; leaflets membranous ovate acute, base truncate, lateral ones oblique pubescent both sides, 3 to 5 in. long, 2·5 to 4 in. wide; petioles 5 in. long, hairy. Racemes dense; flowers few, yellow; peduncles 4 in. long, pubescent. Calyx 15 in. long; teeth triangular, except the lowest lanceolate. Corolla 5 in. long. Pods erect densely hairy 1·5 to 2 in. long, 25 in. wide, compressed, 6- to 8-seeded. Seed flat oval, 15 in. long. *Hab.* Occurs occasionally as an alien, much cultivated in India. Province Wellesley, Prai Dock (Curtis). Perak, Goping (Kunstler). Distrib. Old World.

(3) **P. adenanthis** G. W. Mey, Prim. Flor. Esseq. 239; Prain, l.c. 48.

Slender long climber, sub-glabrous. Leaflets stiffly membranous, broad lanceolate, lateral ones broad oblique-based, 2·5 to 4 in. long, 2·25 to 2 in. wide; petioles 2·5 in. long. Stipules ovate appressed. Racemes axillary with numerous flowers, but one or two only open at once. Calyx 25 in. long, campanulate, teeth lanceolate half as long as tube. Corolla 1 in. long, rose pink, keel yellow. Pod 4 to 6 in. long; sutures rather thick sub-torulose. Seeds 10 to 16, brown, 3 in. long. *Hab.* Rare on bushes in open country, Kelantan, Tumpat, Kota Bharu (Ridley). Distrib. Tropics generally.

(4) **P. semi-erectus**. L. Mantiss, i. 100; Baker, l.c. ii. 201; Jacq. Coll. Pl. Rar. iii. 558.


The figure in *Bot. Reg.* t. 743, if really of this plant, is quite unrecognisable.


Twiners. Leaves trifoliolate. Racemes many-flowered; bracteoles conspicuous. Calyx campanulate, upper teeth often connate. Corolla exsert yellow; keel truncate or exsert not spiral. Stamens
diadelphous. Ovary sessile many-ovuled; style filiform, bearded along inner face. Pod linear septate sub-terete. Species 40 to 50, tropical.

\textit{V. Catjang Walp.} Linnaea xiii. 533. With very long cylindric pods as much as 2 ft. long, '3 to '4 in. through, is often cultivated. \textit{Native name:} Kachang Pr'rut Ayam.

Leaves hairy; flowers purple; leaflets lanceolate acuminate.  
Leaflets hairy on nerves; stems hairy; leaflets smaller ovate rhomboid; flowers yellow. (1) \textit{V. pilosa}

Leaves glabrous; flowers yellow. 
Leaflets orbicular ovate blunt; flowers '5 in. long. (3) \textit{V. retusa}

Leaflets lanceolate to ovate acute; flowers '25 in long. (4) \textit{V. parviflora}

(1) \textit{V. pilosa} Baker, in Hook. fil. F.B.I. ii. 207; Prain, l.c. 53.  
Twiner hairy. Leaves 5 to 8 in. long; leaflets downy all over, ovate acute, 3 to 6 in. long, r5 to 25 in. wide, base truncate, lateral leaflets oblique; petioles 2 in. long. Stipules '1 in. long lanceolate. Racemes 2 to 3 in. long; peduncles '5 to 2 in. long; pedicels '1 in. long, downy. Calyx campanulate oblique silky, '3 in. long, lower tooth lanceolate. Corolla purple, '75 in. long. Pod 4 to 5 in. long, sub-cylindric, '25 in. wide, hairy sepalate. Seeds 8 to 12 sub-reniform truncate black. \textit{Hab.} Lankawi, Kwala Kwah (Haniff). \textit{Distrib.} India, Indo-China.

(2) \textit{V. hirtella} Ridl. Journ. F.M.S. Mus. x. 132.  
Stem slender, hairy. Leaves, petioles 2 in. long, hairy; leaflets ovate acute, lower ones rhomboid and often slightly lobed; nerves beneath hairy, 2 in. long, r1 to r5 in. wide; petiolule of upper one '5 in. long. Peduncles slender hairy, 25 in. long; pedicels very short. Flowers '5 in. long, yellow. Bracts at base linear acute. Calyx campanulate with very short broad teeth. Corolla, standard obovate round broad, with two short points at base; wings broadly rounded at tip; keel short broad, curved. Style plumed below tip on lower edge; ovary glabrous. Pod narrow linear glabrous, 2 in. long, '1 in. wide. Kelantan; bank of river, Chânning. \textit{Distrib.} Timor Laut.

Description of pod taken from the Timor Laut plant, which, I think, is the same, but the pod is unripe.

(3) \textit{V. retusa} Walp. Rep. i. 778; Prain, l.c. 51. V. lutea Gray Bot. Wilkes Exped. i. 452; Baker, l.c. ii. 205.  
Trailing and twining perennial, glabrous. Leaves 3 to 4 in. long; leaflets ovate, thinly fleshy obtuse or retuse, base cuneate or round, 2 in. long, r5 in. wide; petioles r5 in. long; petiolules r5 in. long. Racemes 12- to 20-fid; peduncles 2 to 6 in. long. Flowers 1 or 2 together. Calyx campanulate puberulous, r12 in. long. Corolla yellow, '5 in. long. Pod r5 in. long, '4 in. wide, '25 in. thick, glabrous. Seeds 4 to 8. \textit{Hab.} Sea coasts; common. Singapore, Telok Kurau; Blakang Mati. Johor, Jambu Larang


Stems slender. Leaflets lanceolate to ovate acute, tip narrow, base of lateral ones oblique membranous, 2 in. long, 5 in. across; petiolules 1 in. long or less, hairy; petioles slender, 1.5 to 2 in. long. Peduncles 1 in. long, slender. Flowers few, crowded at tip, 25 in. long; pedicels 1 in. long. Corolla yellow; keel beaked. Pod sword-shaped acuminate, 2.25 in. long, 25 in. wide. Seed oblong, black, truncate both ends, 2 in. long, hilum long. *Hab.* Sandy places; Pahang, Kota Tongkat (Evans). Negri Sembilan, Seremban. Perak, Tanjong Malim; Kbal. Kangsa; Kbal. Temengoh (Ridley).


Climber. Leaves trifoliate. Racemes long, nodes tumid. Calyx 2-lipped, upper lip emarginate, lower 3-lobed. Corolla large, petals sub-equal, keel blunt. Stamens diadelphous. Style long, circinate at top bearded down inner side beyond the oblique stigma. Pod linear, turgid, depressed between seeds. Species 2 or 3; the others Mexican and Angolan.

(1) *P. angulatus* Rich. *DC. Prodr.* ii. 402; *King* l.c. 53.

Stout climber. Root tuberous. Leaves 8 to 9 in. long; leaflets glabrous, 4 in. long and wide, deltoid more or less lobed above; petiolules 2 in. long. Racemes 6 to 10 in. long on 12 in. long peduncles. Bracts lanceolate, 25 in. long, silky. Corolla 1 in. long, purple. Pod 6 to 9 in. long, 5 in. wide. Seeds 7 to 12, brown. *Hab.* Cultivated and an occasional escape. *Native names:* Kachang Bengkuang or Sengkuang. *Use:* The tuber and young pods eaten. The ripe beans are very poisonous.

11. **CLITORIA**, Linn.

Climbers or erect shrubs. Flowers showy. Leaves 3- to 7-foliate; leaflets stipellate. Calyx tubular; teeth deltoid or lanceolate. Corolla large, standard orbicular spurred at base, wings and keel much shorter. Stamens monadelphous or diadelphous; anthers uniform. Ovary stalked; ovules many; style bearded along the inner side. Pod linear flattish, or turgid. Seeds numerous. Species 27, tropics of both worlds chiefly the New.

(1) *C. Ternatea* Linn. *Sp. Pl.* 753; *Prain*, l.c. 56.

A common garden plant with large deep blue or white or light blue flowers and both single and double forms. Only occurs in gardens, and occasionally escapes into hedges. *Native name:* Kachang Telang.

(2) *C. cajanifolia* Benth. *in Mart. Flor. Braz.*, xv. 121; *Prain*, l.c. 57.
Shrub about 3 ft. tall, branched pilose. Leaves 2 to 3·5 in. long; petioles 1 in. long; leaflets 3, elliptic obtuse, base cuneate, coriaceous, finely reticulate, grey hairy beneath, 2 to 3 in. long, ·75 to 1 in. wide. Flowers 1 to 2 on axillary peduncles 2 in. long, reversed. Calyx ·75 in. long. Corolla 1·5 to 2 in. long; standard 1·5 in. wide, pale violet to white with purple spot at base. Pod turgid, 1·25 in. long, ·35 in. wide, glabrous, a rib along each valve-face. Seeds 5 to 7 globose, viscid adhesive. Hab. Common by roadsides in Singapore. Johor, Tebrau. Malacca, Bukit Sabukor. Selangor, Langat. Negri Sembilan, Rembau (Cantley). Native names: Beluntas Padi; Rumput Sabusuk; Rumput Turi.

A native of Brazil, but now introduced into Java, Siam and Borneo by cattle, to whose hair the viscid seeds adhere. Earliest date 1844 Malacca (Griffith).

12. TERAMNUS, Sw.

Twining herb. Leaflets 3. Calyx campanulate, teeth sub-equal. Corolla little exsert; petals about equal; standard not spurred. Stamens monadelphous, alternate; anthers abortive. Ovary sessile; ovules many; style short, beardless. Pod linear hooked at tip by the style flattened, septate between seeds. Species 4, tropics.

(1) T. labialis Spreng. Syst. iii. 235; Baker, l.c. 184; Prain, l.c. 79.

Slender twiner sparsely hairy. Leaves 2·5 to 4·5 in. long; petioles 1·5 in. long; leaflets 3, membranous ovate-oblong, base round, tip sub-acute or obtuse, terminal 1 to 2·5 in. long, ·75 to 1·5 in. wide, laterals smaller sparsely hairy beneath. Racemes lax axillary 8- to 12-flowered, 2 to 3 in. long; pedicels 2 in. long, fascicled above. Calyx 1·5 in. long. Corolla 2·5 in. long, reddish; standard emarginate. Pod glabrous linear recurved, 1·5 to 2 in. long, ·2 in. wide. Seeds 8 to 12. Hab. Open rocky spots, rare. Penang (Wallich 1822, No. 5518). Perlis, Kanga. Distrib. Tropics.

13. DIOCLEA, H.B.K.

Woody climbers. Leaves trifoliate sub-coriaceous. Flowers often appearing without the leaves in elongate racemes, blue or pink. Bracts long caducous. Calyx campanulate; teeth short, upper 2 connate. Corolla large; keel incurved not beaked. Stamens monadelphous, upper stamen free below, connate with the others in the middle; anther perfect, the other anthers alternately perfect and abortive. Ovary sub-sessile, hairy; style incurved glabrous. Pod oblong, turgid, 1- to 3-seeded, flattened along upper suture. Species 17 to 18, all tropical American except these two.

Leaflets glabrescent; flowers ·75 in. long . . . (1) D. reflexa
Leaflets velvety beneath; flowers 1 in. long . . . (2) D. javanica

Liane 20 to 30 ft. long. Leaves 9 in. long; leaflets sub-coriaceous glabrous above and nearly so beneath when adult, ovate acuminate, base rounded truncate, 5 in. long, 3 in. across; petioles 4 in. long; petiolules 25 in. long. Stipules lanceolate. Racemes over a foot long, gradually lengthening, often produced when the plant is leafless, tomentose. Flowers sub-sessile. Bracts linear pubescent reflexed caducous, 5 in. long. Calyx campanulate, 14 in. long. Corolla pink or violet and white, 75 in. long; standard orbicular emarginate. Pods 1- or 2-seeded, oblong-obovate flattened, 3 to 4 in. long, 2 in. wide, 5 in. thick along the top edge, yellowish silky becoming glabrous. Seed discoid, dark brown, 25 in. across. **Hab.** Thickets and rocky open spots. Singapore, Reservoir. Pahang, Kwala Pahang. Malacca (Maingay). Perak, Chanderiang (Kunstler). Perlis, Bukit Lagi, Kanga. **Distrib.** India, tropical Africa and America. **Native name:** Kachang Laut.

Scented of musk.

(2) **D. javanica** Benth. Pl. Jungh. 236; Prain, l.c. 60.

Big woody climber. Leaves 6 to 7 in. long; leaflets ovate rather smaller than in the last species, velvety beneath, as are the petioles and petiolules. Racemes as in *D. reflexa*, but more velvety. Calyx teeth one-third length of tube. Corolla rose pink or pinkish blue. Selangor, Batu Tiga (Curtis). Perak, Ulu Bubong (Kunstler); Ayer Larut (Wray). **Distrib.** Ceylon, Burma, Java.

14. **PUERARIA**, DC.

Twining shrubs or herbs. Leaves trifoliolate. Flowers fairly large in fascicles on long racemes. Calyx and teeth long or short, upper two connate. Corolla exsert; standard spurred at base as long as the blunt wings and keel. Stamens monadelphous. Ovary sessile, many-ovuled; style filiform, much incurved beardless. Pod linear, flattish. Species 12, Indo-China.

(1) **P. phaseoloides** Benth. in Journ. Linn. Soc. ix. 125; Baker, l.c. ii. 199; Prain, l.c. 161.

Slender twiner 20 to 30 ft. long, pubescent hairy. Leaves 6 to 8 in. long; leaflets membranous thinly hairy above, velvety-tomentose beneath, triangular ovate, base cuneate broad, laterals oblique, blunt or sub-acute, 3 to 4 in. long, 2 to 3 in. wide; petioles 3 to 4 in. long. Stipules lanceolate small. Racemes 1 ft. long, puberulous (peduncle 5 in. long). Flowers in scattered pairs. Calyx campanulate, 25 in. long, hairy, upper teeth broad, lateral ones triangular, lower lanceolate, all setaceous. Corolla mauve and white, 6 in. long; standard orbicular, spurred, white with a blue spot. Pod eventually glabrous, narrow linear flat, 35 in. long, 2 in. wide. Seeds 16, dark brown, 15 in. long, 1 in. wide.

15. CANAVALIA, DC.

Large climbing or creeping plants. Leaves trifoliate. Flowers large pink, fragrant in racemes. Calyx tubular, 2-lipped, upper lip entire or emarginate, lower 3-toothed. Corolla large; standard round, keel blunt incurved. Stamens monadelphous. Ovary sub-sessile many-ovuled; style incurved, beardless. Pod large, linear or oblong, flat or turgid with a ridge along each edge of upper suture. Species 10 to 12, chiefly American.

Pod long, flattened, double channelled along the dorsal suture.

Pod 1'5 to 2 in. across, many-flowered (cultivated). (1) C. gladiata
Pod 5 to '75 in. across, few-flowered (trailer, seashore).

Pods short broad turgid, flat along the upper suture (climber wild). (2) C. obtusifolia

(3) C. turgida


A glabrous climber. Leaves 10 to 12 in. long; leaflets ovate acute, base rounded, 5 to 6 in. long, 2'5 to 4 in. wide; petioles 6 in. long. Racemes 3 to 8 in. long on peduncles 4 to 6 in. long. Flowers 12 to 20. Calyx puberulous, upper lip oblong emarginate. Corolla rose pink (rarely white), 1'5 in. long. Pod linear-oblong, dorsal suture grooved between 3 keels, turgid cylindric or broad and flat, 12 to 24 in. long, 1'5 to 2 in. wide. Seed white, grey or red, 1'25 in. long, '5 to '75 in. wide. Hab. Cultivated. Native name: Kachang Parang. Use: Pods eaten.

DeCandolle correctly separated the Asiatic species C. gladiata from the American C. ensiformis, but Baker unfortunately put them together, adding one or two other species to it. Its origin seems to be unknown; I have seen none but cultivated plants.

(2) C. obtusifolia DC. Prodr. ii. 404; Baker, in Hook. fil. F.B.I. ii. 196. C. lineata Prain, l.c. 63, not of DeCandolle.

A trailing plant on sand-hills, with long creeping stems. Leaves 8 to 9 in. long, light green fleshy membranous; petioles 3 to 5 in. long; leaflets ovate or orbicular blunt or rounded, occasionally slightly retuse at tip, base cuneate, 2 to 3 in. long and as wide; petiolules '25 in. long. Racemes of 4 to 6 flowers; peduncles 6 to 10 in. long. Calyx '6 in. long, upper lip oblong entire reticulate. Corolla rose pink to deep mauve, 1 in. long; standard emarginate. Pod linear-oblong, strongly three-keeled, 3 to 5 in. long, '75 in. wide; epicarp not separating from pericarp. Seed '5 in. long,

There has been a quite unnecessary confusion by botanists as to the name of this and the next species. De Candolle based his *C. obtusifolia* on the excellent figure of *Katu isjandii* in Rheede’s *Hortus Malabaricus*, vol. 8, pl. 43, but unfortunately added references to some South American species. *C. lineata* DC., given for this plant by Prain, is a Japanese plant quite distinct.

(3) *C. turgida* Grah. *Wall. Cat. No. 5534A.* *C. obtusifolia* Prain, *l.c. 63, not of De Candolle.*

Climbing plant, glabrous. Leaves 10 to 12 in. long (petioles 6 in. long) ovate, acutely acuminate, base round, 5 to 6 in. long, 3'5 to 4'5 in. wide. Racemes 3 to 8 in. long; peduncles 6 to 12 in. long. Calyx not reticulate, '5 in. long, upper lip rounded hardly emarginate. Corolla rose pink, 1 in. long; standard orbicular hardly emarginate. Pod short, turgid, dorsal sutures hardly keeled, not grooved between, 3 to 5 in. long, 1'75 to 2'25 in. wide; epicarp separating from pericarp. Seeds 3 to 6, brown, yellow-streaked, '75 in. long. *Hab.* Climbing on trees and bushes near the sea. Seeds poisonous. Singapore, Changi; Toas; Pulau Ubin (Hullett). Pahang, Pekan; Pulau Manis, Pahang River. Malacca, Chenana Putih and Bukit Panchur (Cantley). Perak, Telok Anson (Kunstler). Penang (Wallich). Kelantan, Kamposa. *Distrib.* Indo-China and Malaya. *Native names:* Kachung Rang-Rang; Kachang Hantu.

### 16. SPATHOLOBUS, Hassk.

Very large lianes. Leaves 3-foliate stipellate. Flowers small in large terminal and axillary panicles. Calyx campanulate, teeth lanceolate or deltoid, upper 2 connate. Corolla exsert dark pink or white; petals sub-equal, keel straight. Stamens diadelphous. Ovary 2-ovuled; style incurved, beardless. Pod flat, thin, indehiscent with one seed at the tip. Species 10, 1 African, the rest Malayan.

Big lianes; leaflets 4 to 5 in. across, red-tomentose; flowers black purple.
- Leaflets puberulous above, tomentose beneath . (1) *S. ferrugineus*
- Leaflets glabrous above; nerves only tomentose beneath . . . . . . . (2) *S. gyrocarpus*

Slender lianes.
- Bracteoles longer than buds; leaflets 3'5 in. across, pubescent . . . . . . . . (3) *S. bracteolatus*
- Bracteoles inconspicuous.
  - Leaflets 2 in. across, glabrous above, pubescent beneath; flowers pink . . . . . . . . (4) *S. acuminatus*
  - Leaflets 2'3 in. across, glabrous above, pubescent beneath; flowers white . . . . . . . . (5) *S. dubius*
Leaflets glabrous; flowers white.

Leaflets oblong; calyx glabrescent (6) S. Maingayi
Leaflets oblanceolate; calyx pubescent; panicle lax (7) S. Ridley

(I) S. ferrugineus Benth. Pl. Jungh. 238; Prain, l.c. 75.
A very big liane over 100 ft. long, and 6 in. through. Branchlets tomentose. Leaves 9 in. long; leaflets coriaceous puberulous above, rusty-pubescent beneath, terminal one ovate blunted or rounded at both ends or base cuneate, laterals oblique, terminal one 5 to 6 in. long, laterals shorter; nerves 5 to 7 pairs and reticulations prominent below; petioles 3 to 4 in. long. Stipules triangular, 25 in. long. Panicles 8 to 10 in. long, lax red pubescent; branches 4 to 6 in. long. Calyx 2 in. long; teeth deltoid. Corolla 25 in. long, deep blackish pink; standard oblong, notched. Pod 3 to 5 in. long, 7 in. wide, dilate toward the tip, pubescent, yellowish brown. Hab. Common, forests. Singapore, Garden Jungle; Bukit Timah; Johor, Bukit Serom. Malacca, Bukit Bruang (Derry). Perak, Batang Padang (Kunstler). Province Wellesley, Kubang Ulu (Curtis). Distrib. Sumatra, Java, Borneo. Native names: Akar Guayah; Akar Jangat; Akar Sejangan; Akar Sekoet.

var. sericophyllus Ridl.

Leaves 6 in. long; petioles 3 in. long softly tomentose; leaflets elliptic, rounded at base, tip blunt, laterals oblique; nerves 7 pairs finely silky, hairy on both surfaces especially on nerves, reticulations not prominent, 3 in. long, 175 in. wide. Panicles lax, 4 to 8 in. long, silky tomentose. Flowers small, silky. Hab. Singapore, Kranji and Bukit Timah (Ridley).

(2) S. gyrocarpus Benth. Pl. Jungh. 238; Baker, in Hook. fil. F.B.I. ii. 193; Prain, l.c. 76.
Big liane 150 ft. long, 5 to 7 in. through, rusty-pubescent. Leaves 12 in. long (petioles 4 to 6 in. long); leaflets coriaceous, terminal one sub-rhomboid, laterals oblique elliptic, base narrowed, tip sub-acute above, glabrous beneath; nerves and reticulations strongly elevate, hairy; petiolules velvety. Stipules ovate-lanceolate. Panicles lax, 12 in. long, pubescent; branches 6 to 8 in. long, panicled. Calyx white silky-pubescent, 1 in. long, teeth deltoid. Corolla deep blackish pink, 15 in. long. Standard orbicular, notched. Pod 3 to 5 in. long, 1 in. wide, velvety. Hab. Forests in the north of peninsula. Perak, Ulu Bubong and Goping (Kunstler); Penang (Wallich 5442). Distrib. Philippines.

(3) S. bracteolatus Prain, l.c. 76.
Woody climber 15 to 30 ft. long, sparsely pubescent. Leaves 10 to 12 in. long, coriaceous ovate acute, mucronulate glabrous except a few hairs on the nerves on both sides; nerves prominent, 8 to 9 pairs, reticulations not prominent, 8 to 9 in. long, 3.5 in. wide; petioles 2 to 2.5 in. long, velvety; petiolules thick, 3 in. long tomentose; leaves at ends of branches often i-foliate.
Panicles axillary and terminal, 1.5 to 2 ft. long; branches 3 to 4 in. long hairy. Bracts lanceolate hairy acuminate, 1 in. long. Calyx 1.5 in. long, brown pubescent. Corolla small. Hab. Dense jungle 3000 to 4000 ft. altitude, near rocks; Perak, Gunong Batu Putih (Kunstler). Province Wellesley. Bukit Mertajam; a form with the leaves very hairy beneath; on the top of the hill.

(4) **S. acuminatus** Benth. Pl. Jungh. 238.

Stout liane, glabrous. Leaves 8 or 9 in. long; petioles slender, 3 in. long; leaflets oblong; cuspidate obtuse, base round, coriaceous, glabrous except midrib beneath puberulous; nerves very fine and reticulations visible, but not elevate, 4 to 6 in. long, 1.5 in. across. Panicles axillary, 6 to 8 in. long; branches 1.5 to 2 in. long. Calyx puberulous 1.5 in. long. Corolla 4 in. long. Yellowish white (Wallich), purple (Phillips). Pod 3 to 5 in. long, velvety, semi-transparent, 7 in. long; 3 in. wide at tip. Hab. Penang Hill (Wallich 8082) (Phillips), apparently rare, as no one has found it of late years. Distrib. Andamans and Martaban.

Wallich’s specimens only in young flower, Phillips’ in fruit.

(5) **S. dubius** Prain, l.c. 78.

Liane 100 to 150 ft. long, 4 to 8 in. through. Leaves 6 to 8 in. long (petioles 1 to 3 in. long puberulous); leaflets ovate lanceolate acuminate, base rounded, bright green coriaceous, glabrous above; nerves 5 pairs with reticulations beneath slightly raised, pubescent, 2 to 6 in. long, 1.5 to 3 in. wide. Stipels subulate, 1.5 to 2 in. long. Panicles spreading, 8 in. long, slender, sometimes 2 to 3 together. Calyx 1.2 in. long, teeth short, upper bifid pubescent. Corolla 2.6 in. long, pure white. Pod oblong falcate rounded at tip, lower suture curved, glabrous, 4.25 in. long, 1 in. wide. Hab. Forests. Perak, Gunong Bubu range at 800 to 1200 ft. altitude (Kunstler). Penang Hill (Curtis).

(6) **S. Maingayi** Prain, l.c. 79.

Woody climber about 60 ft. tall, glabrous. Leaves 4 to 5 in. long (petioles 2 in. long); leaflets ovate acute, base rounded; nerves 5 to 6 pairs, reticulations fine, conspicuous, 2 in. long, 1.75 in. wide. Stipels subulate 1 in. long, stipules ovate. Panicles 6 to 8 in. long. Bracts minute; rachis puberulous. Calyx 1.2 in. long, puberulous, campanulate, teeth short rounded, pink. Corolla white or pinkish white, 25 in. long; standard orbicular emarginate. Pods oblong curved, tip round, 4 in. long, 1 in. wide, thicker than in most species. Hab. Open rocky jungle and lowland forests. Singapore, Bukit Timah Road; Garden Jungle. Johor, Sungei Tebrau (flowers rose). Malacca (Maingay). Perak, Goping and Ulu Bubong (Kunstler); Tapah (Wray).

(7) **S. Ridleyi** Prain, l.c. 80.

Big liane over 100 ft. long, glabrous. Leaves 6 in. long; petioles 1.5 in. long; leaflets ob lanceolate acuminate, base cuneate;
nerves 9 pairs, fine ascending, 3 to 3·5 in. long, 1 to 1·25 in. wide. Stipels small rigid; stipules lanceolate 2·5 in. long. Panicles 2·5 in. long; branches few 1 in. long. Calyx campanulate 1·2 in. long pubescent, teeth rounded upper truncate. Corolla 2·5 in. long, white or yellow; standard orbicular, reflexed. Pod 4 in. long, 1 in. wide, oblong dilate towards tip, rounded puberulous. 

**Hab.** Singapore on a Kempas tree in Botanic Gardens and at Chan Chu Kang. Apparently very local.

**Excluded Species**

S. crassifolius Benth. Pl. Jungh. 238; Prain, l.c. 78; ? Penang (Wallich 5913).

It has not again been found in Penang, and Wallich puts a ? to the locality. His other specimens were from Sylhet.

17. **MUCUNA**, Adans.

Perennials or annuals. Leaves large trifoliate. Flowers large deep purple, or yellow and white drying black. Calyx campanulate bristly, upper teeth connate lower longer. Corolla long exsert; standard half as long as keel (beaked). Stamens diadelphous; anthers dimorphous. Ovary sessile; ovules many; style incurved, beardless. Pod oblong or linear, rather thick, large, covered with very irritating bristles. Species 30, tropics. The cowhage plants.

Pods flat; seeds large with a hilum extending all round.

Pods with plaits across the sides.

Flowers light dull purple . . . . . (1) **M. biplicata**

Pods without plaits.

Racemes short corymbose; bracts large boat-shaped; flowers fawn and white . . . . . (2) **M. acuminata**

Racemes long peduncled; bracts minute; flowers pale yellow . . . . . . . . . . (3) **M. gigantea**

Pods swollen, hooked; bracts minute oval; hilum small.

Flowers purple . . . . . . . . . . (4) **M. pruriens**


A large climber 30 to 40 ft. long, glabrous. Leaves 9 to 12 in. long; leaflets ovate-oblong cuspidate, base round (lateral oblique), 6 to 8 in. long, 5 in. across; petioles 4 to 6 in. long. Inflorescence corymbose 2 in. long, 15- to 18-flowered, velvety; pedicels 2 in. long. Calyx greenish brown densely pungent-bristly, 35 in. long, campanulate, teeth minute. Corolla light dull purple, 1·75 in. long; standard 7·5 in. wide. Pod oblong 3·5 in. long, 1·75 in. wide. covered with close-set oblique plaits, edges of pod double reflexed. 

**Hab.** River banks and forests. Johor, Kota Tinggi. Pahang, Kwala Tembeling. Malacca, Mt. Ophir (Maingay). Perak, near Gunong
Bubu and Sungei Rayah (Kunstler); Temengoh; Gapis Pass (Curtis). Penang, Government Hill (Fox). Lankawi, Kesap (Curtis). Distrib. Sumatra, Borneo.

(2) M. acuminata Grah. Wall. Cat. 5621; Prain, l.c. 67.

Slender climber 20 to 30 ft. long. Leaves 6 to 10 in. long; leaflets glabrous above, sparingly puberulous beneath, ovate-oblong abruptly acuminate, base rounded, laterals oblique, 2\(\frac{5}{10}\) to 4 in. long, 2 to 3\(\frac{5}{10}\) in. wide; petioles 4 to 6 in. long pubescent. Inflorescence in small corymbs, 2 to 3 in. long; peduncles grey-pubescent. Calyx pale brown, densely pungent bristly, \(\frac{5}{10}\) in. long, tube wide, teeth unequal, upper ones truncate, lateral wide deltoid, lower linear, longer. Corolla 1\(\frac{7}{10}\) to 2 in. long, pale green or fawn and white. Pod 3 in. long, 1\(\frac{5}{10}\) in. wide, broad winged down sutures, not plaited, bristly. Seeds 3. Hab. Woods and thickets. Singapore, Chan Chu Kang. Selangor, Batu Caves. Perak, Gunong Malacca, Kinta (Kunstler). Penang (Wallich). Distrib. Java.

(3) M. gigantea DC. Prodr. ii. 405; Baker, in Hook. fil. F.B.I. ii. 186; Prain, l.c. 68.

Long slender climber, glabrous. Leaves 5 to 9 in. long; leaflets glabrous, oblong cuneate, bases cuneate, laterals oblique, 4\(\frac{5}{10}\) in. long, 3\(\frac{5}{10}\) in. wide. Inflorescence a short umbelliform corymb of pale yellow flowers on a slender peduncle 4 to 18 in. long. Calyx \(\frac{5}{10}\) in. long, green with pungent bristles, teeth short, upper truncate, the others triangular. Corolla 1\(\frac{2}{10}\) to 1\(\frac{5}{10}\) in. long; standard \(\frac{7}{10}\) in. long. Pod winged down both sutures, smooth or with oblique cross ridges (not plaits), bristles yellow brown, 3\(\frac{5}{10}\) to 6 in. long, 2 in. across. Seeds 2 to 4. Hab. Thickets, especially on sea coasts. Singapore, Blakang Mati. Johor, Bekok river-bank. Muar, Sungei Pauh (Fox); Malacca, Tanjong Kling. Pahang, Pekan. Dindings, Brunas. Lankawi, Kwah (Curtis). Distrib. Indo-Malaya, China, Polynesia.

(4) M. pruriens DC. Prodr. ii. 405; Baker, l.c. 187; Prain, l.c. 68.

Annual climber, pubescent. Leaves 6 to 9 in. long; leaflets ovate-rhomboid, glabrous above, grey, silky beneath, shining, laterals very oblique, 3 to 5 in. long, 2 to 3 in. wide; petioles 2\(\frac{5}{10}\) to 4\(\frac{5}{10}\) in. long, silky. Racemes pendulous to 1 ft. long, 3- to 30-flowered; rachis silky. Calyx 4 in. long with few pungent bristles, campanulate, upper teeth triangular, lower lanceolate. Corolla 1\(\frac{2}{10}\) to 1\(\frac{5}{10}\) in. long, purple; standard \(\frac{6}{10}\) in. long and as broad. Pod 2 to 3 in. long, \(\frac{5}{10}\) in. wide, turgid, apex hooked, ridged longitudinally, densely pungent bristly. Seeds 5 to 6. Perak, Kampong Kota (Wray). Distrib. All tropics. Native names: Kachang Babi; Kachang Karkaras Gatal (applied to all species).
18. **ERYTHRINA**, Linn.

Trees, often big, thorny. Flowers large, red, in dense racemes, usually produced before the leaves. Leaves trifoliolate, large. Calyx oblique, spathaceous, splitting to base or campanulate 2-lipped. Petals very unequal, slender, much longer than wings and keel. Upper stamen free nearly to base or connate with the others half-way; anthers uniform. Ovary stalked, many-ovuled; style incurved, beardless. Pod linear, turgid, torulose. Seed hard, brown or black. Species 25 to 30, tropics of both worlds.

Those occurring inland and south of Kedah are probably remains of cultivation. *E. indica*, *E. ovalifolia*, *E. stricta* and *E. lithosperma* have all been planted for ornament, shade for cocoa, and for stakes for pepper, and the plants of these species seen in the south of the peninsula have probably been planted for some such reason. They are popularly known as "Dadap" by Malays.

Pods turgid and seed-bearing throughout their length; hilum large, oval.
Calyx spathaceous, not 2-lipped.
Calyx oblique 5-toothed; flowers bright red; standard broad
Calyx cup-shaped, entire; flowers black red
Calyx oblique retuse; standard narrow
Calyx 2-lipped.
Pod 6-seeded
Pod 1-seeded; base of pod flat; one seed at tip
Pod turgid, beaked, 1 seed in middle

(1) **E. indica** Lam. Encyc. Meth. ii. 291; Baker, in Hook. fil. F.B.I. ii. 188; Prain, l.c. 70.

A big tree. Bark grey prickly, 60 ft. tall. Leaves 8 to 12 in. long; petioles 4 to 6 in. long, pubescent when young as are the leaves; leaflets, terminal sub-reniform, lateral oblique triangular, tip cuspidate, base truncate 4 to 6 in. long and about as broad, with 2 ovate glands (stipels). Stipules lanceolate. Racemes dense 4 to 6 in. long on woody peduncles 3 to 4 in. long; pedicels '25 in. long soon glabrescent. Calyx 1 to 1.25 in. long, oblique splitting down the back, teeth 3, 2 or 3 subulate '2 in. long, the others shorter. Corolla scarlet 2 to 2.5 in. long; standard 1 in. across. Pod 6 to 12 in. long; stalk '75 to 1 in. long, black torulose 6- to 8-seeded. Seed '6 in. long, brown. **Hab.** Seashores generally, often planted in towns. Perak (Scortechini). Kedah, Alor Sta; Gunong Geriang, apparently wild here (Ridley). **Distrib.** India, Malay, Polynesia.


A low tree. Branches thorny. Leaves (deciduous in flowering season) 6 in. long; leaflets ovate-obtuse, base round, coriaceous, glabrous; rachis and midrib on back armed, 3 in. long, 2 in. across.

(3) E. suberosa var. horrida Ridl.


Prain says, l.c. p. 73, that the flowers are exactly those of E. suberosa, but the branch is much more thorny than in the Tenasserim form. I therefore make it a variety of E. suberosa, at least till the foliage has been collected.

(4) E. ovalifolia Roxb. Hort. Beng. 53; Baker, l.c. ii. 189; Prain, l.c. 72.

Big tree. Bark grey prickly. Leaves 8 to 12 in. long; petioles 4 to 5 in. long, prickly; leaflets sub-coriaceous, glaucous beneath, glabrous, terminal one ovate, 4 to 6 in. long, 2-5 to 3-5 in. wide, laterals smaller, base round or broad cuneate; stipels 2 ovate glands. Racemes lax, 8- to 20-flowered, 3 to 6 in. long; peduncles 5 to 8 in. long. Buds narrow ovate. Calyx 5 in. long, 2-lobed, 6 in. across. Corolla dark velvety brown tinged scarlet; standard 1-5 in. wide, emarginate. Ovary grey puberulous, stalked. Pod 6 to 8 in. long; stalk 5 in. long, valves dehiscing. Seeds 6 to 8, brown, sub-reniform. Hab. Low country, probably the remains of cultivation. Malacca (Maingay). Perak, Kinta (Kunstler). Distrib. India to Malaya and Polynesia. Formerly cultivated here as a shade-tree for coffee.

(5) E. lithosperma Miq. Fl. Ind. Bat. i. 209 (not of Blume); Baker, l.c. ii. 190; Prain, l.c. 73.

Tree 40 to 60 ft. tall. Stem prickly. Leaves 10 to 12 in. long; petioles 4 to 5 in. long, sometimes prickly; leaflets membranous, glabrous when adult, triangular-ovate cuspidate, terminal one wide cuneate at base, 4 to 6 in. long, 3 to 4 in. across; stipels 2 oblong glands, 1-5 in. long. Stipules ovate acute, puberulous. Racemes dense, 3 to 4 in. long; peduncles 5 to 8 in. long. Buds ovate. Calyx 3 in. long, puberulous, equally 2-lipped. Corolla 1-5 in. long. Standard oblong obtuse, crimson red, wings and keel 5 in. long. Pod 4 to 8 in. long, 1-25 in. wide at base, which is flat and seedless, 6 in. wide in the upper 1- to 3-seeded part. Seeds 75 in. long, black. Hab. Dubiously wild here, formerly planted as a shade for cocoa and persisting in abandoned estates. The speci-
mens from Singapore (Hullett) were planted in waste ground near Tanglin post-office. Hab. Perak, Waterloo estate (Curtis); Gunong Malacca, Kinta (Kunstler). Penang (Wallich). Distrib. Indo-China and Malay islands.

(6) **E. rostrata** Ridl. n. sp.
Much-branched tree about 40 ft. tall. Young parts scurfy velvety. Leaves 9 in. long; petioles 3 to 4 in. long unarmed; leaflets thin, membranous, deltoid-ovate, terminal one with very broad cuneate base, apex acuminate, sub-acute, 5 in. long and as wide at base; nerves 4 pairs, laterals smaller, base broad very inaequilateral, rounded; petiolules 2 in. long, all glabrous, glands globose oblong. Calyx spathaceous, not bifid, split on upper side, 5 in. long (in fruit) ribbed. Pod stipitate; stipes 7 in. long; 1-seeded at base above stipes, dilate fusiform, 2 in. long, 1 in. through, tip long-beaked, beak 2 to 2.5 in. long, narrowed to the point. Seed one oblong, 5 in. long, pinkish red; hilum narrow. Hab. Pulau Adang seashore (Ridley).

I have seen no other specimen like it from anywhere, and no petals. Nearest perhaps to *E. indica*, but with only one seed and both ends of the pod narrowed.

**19. INDIGOBERA, Linn.**

Herbs and shrubs, more or less covered with appressed hairs and compound odd pinnate leaves. Flowers small numerous in axillary racemes. Calyx campanulate; teeth 5. Corolla standard ovate; keel straight not beaked, spurred at base. Stamens diadelphous; anthers apiculate. Ovary sessile; style short, incurved. Stigma pinnate. Pod linear-cylindric several-seeded. Species 250, tropics.

Herb very hairy; pod hairy; flowers rather large, red
Half shrubby, nearly glabrous; pod glabrous.
Calyx deep cleft; flowers small; pods narrow-straight 1 in.; flowers yellow
Calyx short-toothed; pods ascending 3 in. long; flowers pink

(1) **I. hirsuta** Linn. Sp. Pl. 751; Baker, in Hook. fil. F.B.I. ii. 98; Prain, l.c. 81.
An annual branching brown-hairy herb, 1 to 3 ft. tall. Leaves 2 to 5 in. long; rachis brown-hairy; leaflets elliptic to obovate, base narrowed, tip rounded, silky on both sides, 1'25 in. long, 6 in. across; petiolules 1 in. long. Racemes axillary, 7 to 8 in. long, elongating, hairy. Flowers very numerous, small. Calyx 1'5 in. long, densely pubescent. Corolla 2 in. long, red. Pod 5 to 7 in. long, straight, densely pubescent, 6- to 8-seeded. Hab. Sandy seashores. Singapore, Tanjong Katong. Pahang, Pekan; Malacca, Pulau Besar. Penang (Curtis). Kelantan, Kampo. Distrib. Tropical seashores.

A shrub 2 to 4 ft. tall. Branches slender erect. Leaves 1 to 2 in. long; petioles 5 to 1 in. long; leaflets thin, membranous, 4 pairs, obovate-oblong, 5 to 1 in. long, 2 to 3 in. wide, glabrous above, silky appressed beneath. Racemes 2 to 4 in. long, lax, sub-sessile. Flowers numerous, very small. Calyx 04 in. long, teeth acute. Corolla 15 to 2 in. long, reddish yellow exsert. Pod 7 to 1 in. long, cylindric, straight, slender, 1 in. thick. *Hab.* An occasional escape from cultivation. Singapore. Malacca (Griffith), Pahang near the Sultans’ tombs. Pekan. Dindings, Pangkor (Scortechini). *Distrib.* Asia, origin doubtful. *Native names:* Nila; Tarum. The indigo plant.

The indigo cultivated by the Chinese extensively from cuttings is, I believe, *I. Anil*, Linn. It has short falcate fruit. I have only seen very poor fruit of it, as it is always cut before fruiting. It is a more woody plant than *I. tinctoria*, and is a native of South America.


A tall shrub rising to 8 ft. Branches at first pubescent, then glabrous. Leaves 8 to 12 in. long; petioles 5 to 2 in. long; leaflets 6 to 12 pairs, oblong blunt, 5 in. long, 3 in. wide or bigger, membranous, green above, glabrescent beneath and appressed hairy. Racemes 2 to 3 in. long, dense-flowered. Calyx 04 in. long, hoary; teeth deltoid short. Corolla pink or pale red, 4 to 5 in. long. Pods glabrous cylindric, straight beaked, erect fastigiate, 2.5 to 3 in. long. Seeds 15 to 18. *Hab.* Sporadic, but apparently wild. It is not cultivated as Prain suggests. Malacca (Griffith). Pulau Tuman (Burkill). Perak, Bukit Bungarang (Kunstler). Lankawi (Curtis). *Distrib.* Indo-Malaya.


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<th>Pod Description</th>
<th>Species</th>
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<tr>
<td>brown hairy</td>
<td><em>T. subamœna</em></td>
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<tr>
<td>glabrescent</td>
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<tr>
<td><em>T. purpurea</em></td>
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(1) **T. subamœna** Prain, *l.c.* 86. T. Hookeriana *var. amœna* Prain, *l.c.* 85.

A branched bushy herb slightly downy, about 2 ft. tall. Leaves 4 to 8 in. long; leaflets 6 to 9 pairs, narrow oblanceolate truncate, glabrous above, thinly silky beneath, 1 in. long, 2 in. wide. Stipules setaceous. Racemes lateral 6 to 14 in. long.
wings inside rosy, '35 to '5 in. long; standard silky with a rosy centre. Pods 2 to 2'5 in scimitar-shaped 2 in. long, '2 in. wide, brown hairy. Seeds 8 to 10. *Hab.* Waste ground; Singapore, Bidadari. Malacca, Bukit Sabukor; Bukit Bruang (Derry); Malaka Pindah (Cantley). Penang, Payah Trobong (Curtis); Batu Feringhi; Jelutong; Pulau Tikus. *Distrib.* North India. Native name: Kachang Buluh.

(2) *T. purpurea* Pers. *Synops.* 329; *Prain*, *l.c.* 85.


**Excluded Species**

*T. candida* *DC.*; *Prain*, *l.c.* 84.

Singapore (Hullett), not native. All the specimens were from a plant in the Botanic Gardens now dead.


Shrubs or small trees or herbs. Leaves narrow even-pinnate with numerous linear leaflets. Flowers in racemes, axillary. Calyx campanulate 2-lobed or 5-toothed. Corolla exsert; petals all clawed; standard broad, keel straight, blunt or curved beaked. Stamens diadelphous. Ovary stipitate linear; style filiform incurved. Pod long and narrow septate between the numerous seeds. Species 40, cosmopolitan.

Pod twisted pendulous; flowers '75 in. long
Pod straight, ascending; flowers '5 in. long

(1) *S. paludosa* Roxb. *Hort.* Beng. 56; *Prain*, *l.c.* 82.

Tall annual herb up to 12 ft. tall, pithy. Leaves 4 to 12 in. long, sessile; leaflets 10 to 30 pairs, sparsely hairy. Racemes drooping 8- to 12-flowered, 4 to 5 in. long. Flowers few, yellow, dotted purple, '75 in. long. Pods 10 to 12 in. long, pendulous, twisted. *Hab.* Marshy open ground, Kedah, near ricefields (Kunstler). *Distrib.* India, Burma, China, Java.

(2) *S. cannabina* Pers. *Syn.* ii. 316; *Prain*, *l.c.* 83.

Slender herb, 3 to 6 ft. tall. Leaves 2 to 3 in. long, sessile; leaflets 8 to 20 pairs, glabrous, '3 in. long, '1 in. wide, dark green. Racemes about '1 in. long, slender; flowers few, '4 in. long yellow; standard streaked red. Pods cylindric, 8 in. long, '1 in. through.

EXCLUDED SPECIES

S. GRANDIFLORA Pers. Synops. ii. 316; Prain, l.c. 84. Agati grandiflora Desv. Journ. Bot. i. 120, t. 4.
Tall slender tree 20 to 30 ft. high, 8 to 10 in. through. Leaves 6 to 12 in. long; leaflets 16 to 30 pairs, linear-oblong. Racemes 1 in. long. Flowers 2 to 4, white. Corolla 3 to 3 1/2 in. long. Pods 20 in. long. Cultivated for its leaves, eaten as a vegetable and in Kelantan at Kota Bharu as props for pepper-vines. Singapore, Perak, Kelantan. Distrib. Mascarene isles to North Australia. Native name: Turi.

S. COCCINEA Poir Encyc. vii. 127.
A low shrub with similar leaves and deep rose-coloured flowers as large. Pods shorter, occasionally cultivated in gardens. Origin unknown.

22. PSORALEA, Linn.

Herbs or under-shrubs. Leaves simple (or pinnate) gland-dotted. Calyx-tube campanulate, 5-toothed. Corolla little exert; petals all clawed, upper stamen free; anthers small uniform. Ovary sessile or short-stalked. Pod ovoid or oblong, 1-seeded indehiscent; pericarp adhering to seed. Species 100, chiefly S. Africa, N. America and Australia.

Herbaceous annual branched, about 2 ft. tall, hairy all over and black, gland-dotted. Leaves simple ovate denticulate, base shortly cuneate or round, tip sub-acute, 4 1/2 in. long, 3 1/2 in. wide; petioles 1 1/4 in. long. Racemes axillary; peduncles 3 in. long. Flowers crowded in racemes 1 1/2 in. long, yellow, 10 to 30. Calyx 1 1/2 in. long, sessile; teeth lanceolate. Corolla hardly exert. Pod 2 in. long, black, globose. Hab. Sporadic in waste ground. Singapore, Alexandra Road. Perak, Kamuning (Ridley). Distrib. India, Africa.

23. MILLETTIA, W. and Arn.

Prain, l.c. 86; Dunn, Journ. Linn. Soc. xli. 123.
Climbing shrubs or trees. Leaves imparipinnate 2 (rarely 1) to many leaflets. Panicles large or reduced to racemes of fascicles. Calyx campanulate; teeth short. Petals white or pink; standard ovate or orbicular; wings oblong. Stamens monadelphous (rarely diadelphous); filaments free at tip. Ovary sessile, rarely stipitate, 3- to many-ovuled. Pod linear or oblong, coriaceous or woody,
flattened or thick. Seeds lenticular or reniform. Species 134, Africa, Indo-Malaya, China, Australia.

Woody climber; calyx silky; corolla mauve; pod velvety. Trees; leaves simple; pod velvety. Leaflets 3 to 5 pairs; pod brown velvety; flowers white. Leaflets 3 to 5 pairs; pods glabrous. Leaflets quite glabrous; pod not winged. Leaflets silky pubescent beneath; pod not winged.

(1) **M. sericea** Benth. Mgq. Pl. Jungh. 248; Baker, in Hook. fil. F.B.I. ii. 104; Prain, l.c. 88; Dunn, l.c. 169.

A big woody climber. Leaves about 8 in. or less long; petioles 3\textquoteleft 5 in. long; leaflets 3 to 4 pairs, elliptic shortly acuminate blunt, base rounded, coriaceous, coppery golden beneath with minute scales; nerves fine, conspicuous beneath, 3 to 4 in. long, \textquoteleft 2 in. wide. Racemes axillary 5 to 6 in. long. Flowers numerous, pedicelled. Calyx tubular, \textquoteleft 15 in. long, brown silky. Corolla \textquoteleft 5 in. long; standard brown outside, violet mauve darker at base, with yellow green central bar; wings mauve. Pod 3 to 7 in. long, \textquoteleft 1 in. across, brown velvety turgid when ripe. Seeds 1 to 3, dark brown, \textquoteleft 75 in. through. **Hab.** Common in woods. Johor, Kwala Sembrong (Kelsall). Malacca, Ayer Panas; Batu Tiga. Selangor, Kwala Lumpur. Negri Sembilan; Bukit Tampin, Perak, Larut (Kunstler); Simpang (Wray); Goping (Kunstler). Penang, Penara Bukit at 1000 ft. altitude (Curtis). **Distrib.** Sumatra, Java. **Native names:** Akar Mumbo; Akar Mumbol. var. *malaccensis* Prain, l.c. Leaflets larger, 6 to 8 in. long, coppery beneath and rather less rigid. Pods longer, flat. Singapore (Lobb). Malacca (Hervey, Maingay).

(2) **M. unifoliata** Prain, l.c. 93.

Glabrous tree 20 to 30 ft. tall. Stem 10 to 15 in. through. Leaves simple, coriaceous oblong-lanceolate acuminate or caudate, base cuneate reticulate, midrib and 6 to 9 pairs of nerves elevate, 5\textquoteleft 5 to 7 in. long, 1\textquoteleft 5 to 2\textquoteleft 5 in. wide; petioles \textquoteleft 1 to \textquoteleft 2 in. long thick. Racemes 3 to 6 in. long axillary with fascicles of 3 to 4 flowers, distant. Flowers white. Calyx \textquoteleft 2 in. long, campanulate, hairy inside; teeth short blunt. Pod linear 6 in. long, 1 in. across, flat, yellowish-velvety. **Hab.** Forests, local. Dindings, Lumut; Pangkor (Curtis). Perak, Goping (Kunstler).

(3) **M. albiflora** Prain, l.c. 92.

Tree 40 to 50 ft. tall, 2 to 3\textquoteleft 5 in. through. Leaves deep shining green 8 to 12 in. long; leaflets coriaceous 3 to 6, lanceolate acuminate, base cuneate, glabrous, finely reticulate 5 to 10 in. long, 1\textquoteleft 5 to 2\textquoteleft 5 in. wide (lower ones smaller); nerves 6 to 9 pairs elevate; petioles \textquoteleft 1 in. long. Panicles slender shortly branched, at ends of
branches 1 to 1'5 ft. long, puberulous. Calyx 25 in. long, cam-panulate; teeth triangular, brown. Corolla pure white 75 in. long. Pod linear, dark velvety-brown, 7 to 13 in. long, 1'5 to 2 in. wide, flat, woody.  

_Hab._ Woods, river-banks; a very handsome tree. Pahang, Tahan River; Malacca (Maingay); Selangor Petaling; Klang Gates (Burn-Murdoch); Perak, Larut; Goping (Kunstler). Penang, old pass to Ralow (Curtis). _Native names_: Urat Rusa (deer-sinew); Kayu Rindu.

(4) **M. decipiens** Prain, _l.c._ 172.

Big tree, 40 to 60 ft. tall. Stem 2 to 3 ft. through, glabrous. Leaves 8 to 9 in. long; leaflets 4 to 5 pairs, membranous, elliptic acuminate (lowest ovate acuminate), beneath glaucous 2 to 3'5 in. long, 1'25 to 1'5 in. wide; petiolules 2 in. long. Racemes axillary 6 in. long, puberulous to glabrous; pedicels 2 in. long. Calyx wide cup-shaped, obscurely toothed 1'5 in. long. Corolla 4 in. long, pink or white tinged pink; standard orbicular, silky outside.  

_Hab._ River-banks, woods. Perak, Kwala Dipang (Scortechini); Temengoh. Pahang, Telor Sesih, Kwantan (Foxworthy). _Native name_: Jedar.

(5) **M. pterocarpa** Dunn, _l.c._ 175. _M. glaucescens_ Prain, _l.c._ 89 _not of Kurz._

Large glabrous tree. Leaves 6 to 8 in. long; petioles 1'5 in. long; leaflets 3 to 4 pairs, membranous lanceolate caudate (lowest ones ovate) cuneate, glaucous beneath, 3'5 in. long, 1 in. wide (lowest 1'5 in. long); petiolules 1 in. long. Racemes axillary 6 in. long. Corolla 4 in. long; standard orbicular bicalloste at base steel blue. Pod linear glabrous 6'5 in. long, 1 in. wide, sutures narrowly winged.  

_Hab._ Perak, Kapayong, Kinta (Wray); Ipoh.

(6) **M. Hemsleyana** Prain, _l.c._ 90; Dunn, _l.c._ 176.

Tree 20 to 90 ft. tall, to 15 in. through. Branchlets puberulous. Leaves 6 to 8 in. long; rachis pubescent; leaflets 3 to 4 pairs, membranous, bright green, glabrous above, glaucous and pubescent beneath, the midrib and bases of nerves beneath conspicuously bearded, elliptic-ovate (lowest ovate) acuminate 2 to 3'5 in. long, 1'25 to 1'5 in. wide; petiolules 2 in. long; stipules 2'5 in. long deciduous. Racemes axillary, slender 2'5 to 4 in. long, puberulous; pedicels 2'5 in. long. Calyx shallow, tubular, pubescent, obscurely toothed, 1'5 in. deep, red or green tinged red. Corolla 4 in. long, white or tinged pink; standard orbicular bicalloste at base. Pod linear-oblongate, base narrowed, glabrous, 6 in. long, 75 in. wide.  

_Hab._ Forests, not rare in Perak. Pahang, Kwala Tembeling; Kwala Lipis (Foxworthy). Negri Sembilan, Johol. Perak, Ulu Slim (Kunstler); Plus River (Wray); Pulau Kamiri (Wray); Temengoh. _Native name_: Jada.

The fruiting specimens were referred by Prain to _M. decipiens._

Small trees with imparipinnate leaves of 8 to 12 leaflets. Flowers in stiff racemes borne on the old wood, or in small axillary fascicles. Calyx campanulate. Corolla pink or white, rather small. Ovary 2-ovuled. Seeds strophiolate. Species 6, China, Borneo, Sumatra.


A slender shrub 6 to 8 ft. tall, *4* in. through. Leaves *18* in. long, in a terminal tuft; leaflets 5 pairs membranous glabrous, lower ovate, upper elliptic, all caudate, base rounded or cuneate, lower *1.5* to *3.5* in. long, *1.4* in. wide, upper *4* to *6* in. long, *1.6* to *2* in. wide; nerves depressed above, elevate beneath; petiolules *1.5* in. long; rachis pubescent or glabrous. Flowers 2 or 3 in a short fascicle on the stem. Calyx *2* in. long. Corolla pink or white silky *3* in. long. Pods solitary curved, linear acuminate, narrowed at base, *4.5* in. long, *75* in. wide, thin. *Hab.* Rocky woods, chiefly limestone. Perak, Larut (*Kunstler*); Lenggong, on limestone rocks (*Ridley*).

25. **ADINOBOTrys**, Linn.


Climber; flowers golden velvety with large bracts. (1) **A. erianthus**

Big tree; flowers glabrous, deep purple. (2) **A. atropurpureus**

(1) **A. erianthus** Dunn, l.c. 194. Millettia eriantha *Benth.* Pl. Jungh. 250; *Prain*, l.c. 88.

Woody climber almost glabrous except inflorescence. Leaves 8 to 11 in. long; leaflets, 2 to 3 pairs obovate-oblong or elliptic cuspidate, 2 to 4 in. long, *1.25* to *2.5* in. across, dark green, stiffly coriaceous; petiolules *25* in. long. Racemes numerous, crowded, at first cone-like with large (deciduous) golden silky ovate acute bracts, 2 in. long, eventually *6* in. long; pedicels *15* in. long. Calyx campanulate, *4* in. long, brown red with bronze fur. Corolla standard rich coppery red, centre greenish yellow, outside dull red with golden fur. Stamens pink. Pod ovoid flattened, turgid *2* in. long, *1.75* in. wide, woody rugose hairy, beaked. Seed *1*. *Hab.* Woods. Singapore, Bukit Mandai; Garden Jungle. Malacca, Batu Tiga (*Holmberg*); Jus (*Goodenough*). Pahang, Pulau Jellam, Pahang River. Negri Sembilan, Bukit Tumiang (*Cantley*), Penang, Telok Bahang (*Curtis*). *Native names:* Akar Pua; Akar Koyah; Akar Kuayah; Akar Pera.

A very large tree 60 to 80 ft. tall with a large head. Leaves 15 to 18 in. long, glabrous; leaflets 3 to 4 pairs, coriaceous deep shining green, narrow-oblong, base round, tip short cuspitate, 4 to 6 in. long, 1'5 to 2 in. across; petiolules 2'5 in. long. Racemes copious in a dense tomentose panicle 6 to 8 in. long. Bracts ovate, '1 in. across; pedicels 2 in. long. Calyx 2'5 in. long campanulate, teeth small 2 upper truncate, others acute, silky. Corolla black purple, '5 in. long. Pod about 4 in. long, 2 in. wide, 1- to 2-seeded, dark brown. Seeds 1 or 2, large thick brown. *Hab.* Common in forests and on river-banks, often covering the ground with its flowers. Pahang River, Malacca, Bukit Bruang; Sungei Hudang (Cantley). Negri Sembilan, Tampin Hill; Bukit Kandang (Cantley). Selangor, Ulu Selangor, Lankawi, Kesap (Haniff). Province Wellesley, Krian. Penang Hill (Curtis). Kedah, Yan. Jalor, Biserat (Gwynne Vaughan). *Distrib.* Tenasserim, Borneo, Sumatra. *Native names:* Tulong Daeng; Chicha; Girah Payah; Merbong.


Woody climbers with imparipinnate leaves. Flowers panicled, axillary, rather small, white or pink. Calyx campanulate; teeth short; standard orbicular, short-clawed; wings clawed, auricled. Ovary stipitate, 2-ovuled. Flowers flat, ovate, very woody, wrinkled, large velvety. Species 2, Malay Peninsula and Java.

- Panicles 3 in. long, 1'5 in. wide
- Panicles 6 in. long, 3 in. wide


Big climber. Branchlets glabrous. Leaves 6 to 8 in. long; leaflets 4 to 6 pairs, oblong rounded at both ends, glabrous above as is rachis, pubescent beneath, 2 to 3 in. long, 1 to 1'5 in. wide; petiolules 2 in. long. Stipels setaceous. Panicles axillary, 3 in. long, 1'5 in. across, only slightly puberulous. Calyx 2 in. long campanulate, puberulous; teeth obscure. Corolla white, tinged pink, '5 in. long. Standard orbicular, base auriculate, puberulous. Pod obovate, woody, woody rounded, 4 in. long, 2'5 in. wide, dark brown velvety somewhat rugose. *Hab.* Perak, Batu Togoh (Wray). *Distrib.* Java.


A long woody liane twining round trees, about 2 in. thick. Leaves 8 to 10 in. long; leaflets 5 to 8 pairs, oblong, base round, tip round or sub-acute, 1'5 to 2 in. long, 1 in. across, coriaceous, velvety beneath; petiolules 2 in. long with persistent stipels

27. DALBERGIA, Linn. fil.


Trees or climbing shrubs. Leaves with alternate sub-coriaceous leaflets. Flowers numerous, small in terminal axillary panicles, generally white. Calyx campanulate; teeth 5, short. Corolla exert; standard broad, keel blunt; petals joined only at tip. Stamens 9 to 10, monadelphous with the tube split only above or diadelphous, split also below; anthers minute, basifixed, the cells back to back. Ovary stalked; ovules few; style short incurved, glabrous. Pod oblong or strap-shaped, usually thin and flat, not winged, 1- to 4-seeded, indehiscent. Species about 70, Tropics generally.

Standard erect; flowers small; inflorescence dichotomous.

Pod falcate reniform, thick; leaflets sub-coriaceous 2.5 by 1 in. . . . . (1) D. parviflora

Pod samaroid, thin flat; panicles terminal; leaves pubescent beneath.

Leaflets 11 to 15, 7 to 15 in. long; pods stiff . . . . . . . . (2) D. Scortechinii

Leaflets 7 to 9 in. long; pods thin.

Leaflets nearly 2 in. long . . . . . . (3) D. Curtisiis

Leaflets smaller, 5 in. long; flowers foetid, 5 in. long . . . . . . (4) D. stercoracea

Pod widely ovate, elliptic, thin; leaflets numerous '25 in. long . . . . . . (5) D. phyllanthoides

Standard bent back, wings sagittate; panicles cymose axillary; flowers '25 in. long.

Pod cymose axillary; flowers minute, white . . . . . . . . (6) D. Hulletti

Pod pubescent; leaves 4 by 2 in. coriaceous; flowers rather large . . . . . . (7) D. rostrata

Pod falcate reniform.

Leaflets 3, acute, 3 in. long, lanceolate . . . . . . . . (8) D. menoeides

Leaflets 5 to 7, blunt, 1.5 in. long, obovate, seashores . . . . . . . . (9) D. torta

Pod ligulate; leaflets 3 or 4.

Ovary glabrous; flowers minute, white . . . . . . . . (6) D. Hulletti

Ovary pubescent; leaves 4 by 2 in. coriaceous; flowers rather large . . . . . . (7) D. rostrata

Pod falcate reniform.

Leaflets 3, acute, 3 in. long, lanceolate . . . . . . . . (8) D. menoeides

Leaflets 5 to 7, blunt, 1.5 in. long, obovate, seashores . . . . . . . . (9) D. torta

Pod ligulate.

Leaflets numerous, 24 to 41, '25 in. long . . . . . . . . (10) D. tamarindifolia

Leaflets 13 to 17, glabrous beneath, 1 in. long . . . . . . . . (11) D. velutina

Pod falcate reniform, thick corky.

Leaflets coriaceous oblong-ovate, 4 by 2 in. . . . . . . . . (12) D. Kunstleri

Liane 80 ft. long. Main stem spiny. Leaves 6 to 8 in. long; leaflets 5 to 9, ovate-lanceolate, tip blunt acuminate retuse, base rounded glabrous; nerves and reticulations very fine, 2 to 3·5 in. long, '75 to 1·5 in. wide. Panicles 3 to 4 in. long and as wide; branches and pedicels puberulous. Flowers minute secund. Calyx campanulate; teeth obtuse, upper 2 connate. Corolla white; petals short clawed; standard narrow obovate. Stamens 10, monadelphous, vexillar y one shorter. Ovary glabrous; style short. Pod turgid, obovoid flattened, 1- to 2-seeded indehiscent, '75 to 2 in. long, '6 in. wide. Seed reniform. Hab. River-banks and forests. Pahang, Ayer Hitam, Pekan; Temerloh. Perak, Matang Jambu (Wray); Goping (Kunstler). Kedah, Kulim (Haniff). Distrib. Tenasserim, South Siam, Malay Archipelago.


Climbing shrub, glabrous. Leaves 6 to 8 in. long; leaflets 11 to 15 elliptic, blunt or retuse, glabrous except midrib above, puberulous beneath, '7 to 1·5 in. long (rarely larger), '35 to '75 in. wide; rachis and petioles puberulous. Flowers minute, white. Panicles terminal, 2 to 4 in. long, 1·5 to 3 in. wide, pubescent. Calyx teeth short, blunt, lowest longer lanceolate. Corolla white, petals short clawed. Stamens 9 in 2 bundles of 5 and 4, vexillary filaments free. Ovary pubescent, short, stipitate. Pod ovate-lanceolate, glabrous, stipitate, 1·5 to 2 in. long, '5 in. wide. Seed 1 to 3, reniform. Hab. Forests. Singapore, Bukit Timah. Malacca (Maingay). Perak, Bujong Malacca (Scortechini). Penang, Ayer Hitam (Curtis). Distrib. Bangka, Borneo, Java.

(3) D. Curtisii Prain, l.c. 58; Ann. Bot. Gard. Calc. x. 41, pl. 16.

Climbing shrub. Leaves 6 to 7 in. long; leaflets 7 to 9, oblong or elliptic, base cuneate, tip rounded emarginate, glabrous above, puberulous except midrib beneath, 1·5 to 2 in. long, 1 in. wide; rachis and petiolules puberulous. Panicles 4 to 5 in. long, 3 in. wide pubescent. Flowers minute, white secund inodorous. Calyx campanulate; teeth short, blunt. Corolla white; petals short-clawed; standard wide oblong emarginate. Stamens 9 in one sheath split above. Ovary long, stipitate pubescent; style none. Pod glabrous. Hab. Lowland woods. Malacca (Maingay). Perak, Teluk Anson. Penang, Penara Bukit Road at 500 ft. altitude (Curtis). Distrib. Sumatra.


Climbing shrub 15 to 30 ft. long. Leaves 3 to 4 in. long; leaflets 7 to 9, oblong or elliptic, base cuneate, tip round truncate


Climing shrub 60 to 80 ft. long. Branchlets pubescent. Leaves 1.5 to 3 in. long; leaflets 9 to 15, elliptic-oblong, tip rounded, base cuneate, green glabrous above, glaucous hairy beneath, '25 to '4 in. long, '2 to '3 in. wide; rachis pubescent. Panicles axillary small, 3 in. long, 1 to 2 in. across. Flowers minute secund. Calyx teeth blunt except the lowest acute. Corolla white; petals short-clawed; standard oblong or obovate emarginate. Stamens 9, usually in one sheath split above. Ovary glabrous or nearly so, short stipitate. Pod glabrous thin, membranous green, tip blunt, base cuneate, stipitate, 1- rarely 2-seeded, 2 to 5 in. long, 1 in. wide. Hab. Woods at hill bases. Perak; Waterfall, Thaiping (Wray); Penang, Waterfall (Curtis). Distrib. Java, Borneo.


A shrub or treelet. Branchlets black puberulous, leafless when in flower. Stipules ovate acute, '25 in. long. Leaves unknown. Flowers white in short clustered racemes, 1 to 1.5 in. long, axillary with tufts of triangular pubescent bracts at base; pedicels slender, '3 in. long. Calyx campanulate rusty-tomentose, '15 in. long; teeth acute half as long as tube. Corolla petals long-clawed, standard orbicular reflexed, wings and keel-petals hastate. Stamens 9, rarely 10 in one sheath. Ovary glabrous, stipe long pubescent; ovule 1. Hab. Open swampy ground. Rare. Flowers when leafless. Singapore, Thomson Road (Hullett); Selitar (Ridley).


Woody climber 15 to 25 ft. long, glabrous, occasionally erect tree-like. Leaves 6 in. long; leaflets stiffly chartaceous, 3 to 4 (rarely 5 or 2) oblong, base narrowed cuneate or round, tip cuspidate;
nerves fine inconspicuous, glabrous, 2 to 4 in. long, i to 2 in. wide (terminal largest). Panicles lax axillary corymbose, grey downy, 2'5 to 3'5 in. long and as wide; pedicels '15 in. long. Calyx cam-


Woody climber. Leaves 5 in. long; leaflets 3, sub-coriaceous, glabrous above, glaucous appressed puberulous beneath, lanceo-
late or ovate-lanceolate, base round or cuneate acute, 3 to 3'5 in. long, i to i'5 in. wide. Flowers few, sessile in very short axillary racemes, '15 to '25 in. long. Calyx teeth obtuse sub-equal, pubes-
cent. Corolla white, petals long-clawed; standard sub-orbicular emarginate, reflexed. Stamens 10 monadelphous. Ovary stipitate glabrous; ovule i. Pod semilunar glabrous firm, 1'5 in. long, '75 in. wide. Seed i reniform. Hab. Perak, Krian (Scortechini). Rare.


Climbing shrub. Leaves 3 in. long; leaflets 5 (rarely 3 or 7) obovate-oblong blunt or retuse, glabrous dark greenish above, appressed pubescent beneath, '6 to '8 in. long, '4 to '6 in. wide. Panicles sessile congested axillary i to 2 in. long, slightly puberulous. Calyx glabrescent, teeth short, triangular, blunt. Corolla white, '2 in. long; petals long-clawed; standard oblong reflexed. Stamens 9 (or 10) monadelphous. Ovary stipitate, glabrous; style subulate; ovules i to 2. Pod flat, brown, rather thick, falcate rounded, '9 in. long (1-seeded) or i'5 in. long (2-seeded), '5 in. wide. Hab. Littoral scrub; common. Singapore, Pulau Ubin; Kranji; Pulau Damar. Johor, Tana Runto; Pulau Tinggi (Feilding). Malacca, Tanjong Kling. Dindings. Perak, Matang (Scortechini). Lankawi (Curtis). Distrib. East Asia to Polynesia.


Climbing shrub (or erect tree 20 to 40 ft.). Branches densely pubescent. Leaves 5 to 6 in. long; leaflets 24 to 41, thin pubescent all over, paler beneath trapezoid-oblong, '6 to '75 in. long, '3 in. wide. Stipules lanceolate, '2 in. long. Panicles sessile or short-
peduncled, corymbose dense, densely puberulous, '5 to 2 in. long,


Climbing shrub. Branches red-pubescent. Leaves 6 to 8 in. long; leaflets 13 to 17 oblong blunt or acute, membranous, dark green, rusty-velvety beneath, 1.5 to 2 in. long, '6 to '8 in. wide; rachis velvety. Stipules obovate to linear lanceolate, '6 in. long. Panicles dense, axillary corymbose, 4 in. long, 2.5 in. wide, velvety. Calyx pubescent, base gibbous, upper teeth acute, lower obtuse. Corolla white or spotted pink, '2 in. long; petals long-clawed; standard orbicular reflexed. Stamens 9 to 10, monadelphous, or tube partly split above on lower face; filaments alternately long and short. Ovary glabrous; ovules 2 to 3, stipitate, stipes pubescent; style long. Pod stipitate thin, brown, 1- to 2-seeded, 2 to 3 in. long, '6 to '7 in. wide. Hab. Forest edges.

var. Maingayi. Leaves glaucous, glabrous above, beneath branches, rachis, stipules and calyx rusty pubescent. Flowers pink or white. The commonest variety in the peninsula. Singapore Changi, near Tampin. Malacca (Maingay both varieties), Lankawi, Kwah (Curtis), (typical form). Distrib. Type form, Burma, Assam: var. Maingayi Tenasserim, Malay islands.


Liane 40 to 60 ft. long, 3 to 4 in. through. Branchlets pubescent. Leaves 10 to 12 in. long; leaflets 7 to 9, dark green, glabrous above, pubescent beneath, coriaceous elliptic acuminate, base round, 4 to 6 in. long, 2 in. wide; rachis and petiolules at first pubescent. Panicles 4 to 6 in. long, 3 to 4 in. wide, puberulous. Calyx teeth ovate-lanceolate blunt (except lowest, lanceolate). Corolla "dark blue" (probably dark pink); petals all long-clawed; standard orbicular emarginate. Stamens 10 usually in one sheath, which is sometimes split on both sides. Ovary long stipitate, pubescent. Style long, slender; ovules 2 to 4. Pod thick corky, pubescent falcate 1- (or 2-)seeded, 1.5 to 2.5 in. long, '9 in. wide, '4 in. thick. Seed reniform. Hab. Limestone rocks. Perak, Goping and Kinta River (Kunstler).

28. PTEROCARPUS, Linn.

Big trees. Leaves of about 7 coriaceous; leaflets alternate, racemes axillary panicked. Flowers light yellow. Calyx turbinate,
teeth short. Petals exsert, long-clawed; standard and wings crisped. Staminal sheath split above and often below; upper stamen free. Ovary stalked, 2-ovuled. Pod orbicular, 1-seeded, winged all round with the point near the base. Species 15, tropics.

(1) **P. indicus** Willd. Sp. Pl. iii. 904; Prain, l.c. lxvi. 123.

Tree 60 to 80 ft. or more. Stem 4 to 5 ft. through. Leaves 8 to 10 in. long; leaflets 5 to 9, ovate, base rounded or short cuneate acuminate, 2 to 4 in. long, 1.5 to 2 in. wide, terminal a little larger. Panicles 6 in. long. Calyx 25 in. long, brown silky. Corolla golden yellow, 6 in. long. Pod 1.75 to 2 in. across, pubescent. Hab. Common as a roadside tree all over the peninsula, and probably wild in rocky places near the sea and rivers, as in Malacca and Ulu Selangor (Kunstler). Penang (Wallich in 1822). **Native name**: Angsana. **Distrib.** Tenasserim, Malay islands, Java, Borneo.

### 29. PONGAMIA, Vent.

A tree. Leaves odd-pinnate. Flowers racemose, medium size pink. Calyx campanulate sub-truncate. Corolla much exsert; standard broad silky, keel blunt; petals cohering at tips. Stamens monadelphous, upper filament free low down; anthers versatile. Ovary sub-sessile 2-ovuled; style glabrous. Pod woody, oblong, turgid indehiscent. Species 1, seashores from Mascarene isles to Polynesia.

(1) **P. glabra** Vent. Jard. Malm. i. 28; Baker in Hook. fll. F.B.I. ii. 240; Prain, l.c. 94.

Tree about 40 to 60 ft. tall. Stem 2 to 3 ft. through. Leaves 8 to 10 in. long; leaflets 5 to 7, oblong or ovate acute, base cuneate, 3 to 7 in. long, 1 to 3.5 in. wide, thinly coriaceous, light green, glabrous. Racemes 4 to 6 in. long; peduncles 1 to 1.5 in. long; rachis puberulous. Calyx 12 in. deep. Corolla 35 to 5 in. long. Standard orbicular 2-auriculate at base. Ovary pubescent. Pod light brown, 1.5 to 2 in. long, 8 to 1.5 in. wide. Seed 1, testa white marked with brown lines.

var. typica. Leaflets 5, rarely 7, oblong-ovate, 2.5 to 3.5 in. wide. Racemes simple. **Hab.** Sea coasts in sandy spots, common all over the peninsula. The variety *xerocarpa* usually occurs further inland.

var. xerocarpa. Leaflets 7 to 9, lanceolate 1 to 1.35 in. wide. Racemes 2 to 3 together. **Hab.** Inland. Singapore, Bukit Timah Road. Malacca, Merlimau (Derry). Province Wellesley, Tasek Gelugur. Perak, Trong (Wray), Kedah. **Native name**: Malapari.

### 30. DERRIS, Lour.

Large woody climbers, rarely trees. Leaves odd-pinnate; leaflets exstipellate. Flowers pink, white or violet, showy in axillary or terminal panicles or racemes. Calyx campanulate nearly truncate. Corolla much exsert; standard broad, keel blunt. Stamens usually monadelphous, the upper one free in § *Aganope*;

F.M.P., i.
anthers versatile. Ovary sessile; ovules few; style incurved filiform. Pod thin flat, indehiscent oblong (r-seeded) strap-like (few-seeded) winged on upper or lower sutures. About 40 species, tropics.

Standard without calli at base:—

Vexillary stamen free throughout; flowers panicked (§ Aganope).

Pod winged on the upper edge only and sinuate; flowers 5 in. long; green and white.

Pod winged both sides; flower under 3 in. long, white.

Vexillary stamen united with the others; flowers fascicled on tumid nodes (§ Eu-derris).

Pods winged along upper edge only; narrow pointed with ends; seeds several.

Climber; flowers white in long narrow panicles, white.

Tree; leaflets numerous, 25 to 30; flowers in dense panicles, violet.

Pods sub-orbicular or oblong; seeds few; climbers.

Pods glabrous; flowers pale pink.

Pods pubescent; flowers white, tipped pink.

Pods winged on both edges.

Flowers white.

Flowers pink.

Standard with 2 calli on the base.

Leaves and pink petals pubescent.

Leaves and pink petals glabrous.

Pod thick woody unwinged dehiscent; fruit unknown.

Flowers in slender racemes.

(1) D. sinuata

(2) D. thyrsiflora

(3) D. scandens

(4) D. dalbergioides

(5) D. uliginosa

(6) D. elegans

(7) D. affinis

(8) D. amoena

(9) D. elliptica

(10) D. malaccensis

(11) D. Yappii


Woody sarmentose shrub. Leaves 10 to 16 in. long; leaflets 5 to 7, coriaceous, glabrous ovate to ovate-oblong, shortly cuspidate blunt, base round or deltoid; nerves 5 to 7 pairs, 4 to 5 in. long, 2 to 3 in. wide. Panicles of long racemes 6 to 12 in. long. Flowers distant; pedicels 2 in. decurved. Calyx cup-shaped, silky 2 in. long, green. Corolla 6 in. long; keel and wings white; standard orbicular, 5 in. wide, base cordate, apple green, ecallose. Stamens diadelphous, vexillary one free to base. Ovary pubescent. Pod strap-shaped, sinuate between the seeds, upper suture narrow-winged, 4 to 8 in. long, 15 in. wide. Hab. Tidal rivers, common. Singapore, Yo Chu Kang; Pulau Ubin. Malacca (Griffith). Pahang, Kwala Lipis (Machado); Rumpin River (Evans). Distrib. India, Ceylon, Indo-China, Malaya.


Sarmentose bush rarely climbing. Leaves 8 to 15 in. long;

(3) D. scandens Benth. Journ. Linn. Soc. iv. Supp. 103; Baker, l.c. ii. 240; Prain, l.c. 100.

Lofty climber up to 100 ft. tall. Leaves 4 to 6 in. long, dark green shining; leaflets 9 to 19, rigid, sub-coriaceous obovate-oblong to oblong acute, cuneate or rounded at base, 2 in. long, '75 in. wide, glabrous above, grey-pubescent beneath. Racemes short-peduncled to 15 or 18 in. long, pubescent. Calyx '12 in. long, silky campanulate. Corolla white or pale rose, '35 in. long. Stamens monadelphous. Pod 1 to 3 in. long, '4 to '5 in. wide, narrowed to both ends, narrowly winged above grey-silky, 1- to 4-seeded. Hab. In woods usually near the sea. Singapore, Pulau Merambong. Pahang, Pekan. Penang, Batu Feringhi and Telok Bahang (Curtis and Ridley). Lankawi, Terutau (Haniff). Distrib. Indo-Malaya, Australia.


A tree 30 to 40 ft. tall. Branchlets pubescent. Leaves 6 to 8 in. long; leaflets 25 to 39, linear, rounded at both ends, tip emarginate, pale beneath, 1 in. long, '35 in. wide; rachis and petioloies pubescent. Racemes numerous 3 to 6 in. long, about '75 in. across; rachis pubescent. Calyx '15 in. long, brown-silky, teeth deltoid. Corolla '45 in. long, violet; standard oblong-cordate 2-glandular. Stamens monadelphous. Ovary pubescent. Pod 1- to 5-seeded narrowed to both ends, 1 to 2.5 in. long, winged along upper suture. Hab. Open country, a very pretty tree. Pahang, Kwala Sekim, Rumpin and Bunchah, Kwala Lipis (Foxworthy). Malacca, Batu Gajah; Machap Road; Bt. Panchur (Derry). Negri Sembilan, Tampin Hill. Perak, Padang Rengas; Tomoh (Machado). Setul. Distrib. Tenasserim. Native names: Munjai hutan; Berak Atai.

(5) D. uliginosa Benth. Pl. Jungh. 252; Baker, l.c. ii. 241; Prain, l.c. 102.

Black-stemmed slender woody climber 40 or more ft. long, glabrous. Leaves 5 to 8 in. long; leaflets 5 (or 3) stiff coriaceous,
ovate acuminate or caudate, base round 3 to 5 in. long, 1.5 to 2.5 in. wide, polished. Racemes 3 to 5 in. long of several flowers. Calyx 1.5 in. wide campanulate, edge ciliate. Corolla pale rose pink or white pink-tinted, 4 in. long; standard orbicular sub-cordate ecallose. Stamens 1-adelphous. Ovary puberulous. Pod round or oblong, 1 to 2 in. long, 1.25 in. across, rather thin and flat, yellowish. Seed flat, 1 in. long and as wide. Hab. Climbing over bushes in mangrove swamps, common. Singapore, Kranji; Jurong; Pulau Ubin (Hullett). Johor, Tana Runto; Pulau Dayong (Feilding). Malacca, Pulau Besar (Griffith). Pahang,


(6) D. elegans Benth. Pl. Jungh. 252; Baker, l.c. ii. 242; Prain, l.c. 103.

A slender liane about 60 ft. long. Branchlets pubescent. Leaves 8 to 12 in. long; leaflets green coriaceous 5 (rarely 3 to 7), terminal one largest, oblong to lanceolate, 3 to 8 in. long, 1.5 to 4 in. wide, glabrous above, red-pubescent beneath when young or always red-pubescent; nerves 6 to 8 pairs, prominent beneath. Racemes solitary or fascicled 2 to 3 in. long, villous. Calyx 1.5 in.
long, pubescent, black purple. Corolla white tipped pink, \( \frac{1}{4} \) to \( \frac{1}{5} \) in. long; standard orbicular-oblong eglandular. Stamens monadelphous. Ovary villous. Pod rounded-oblong, \( \frac{1}{15} \) in. long, \( \frac{1}{1} \) in. wide flat pubescent. Seed \( \frac{1}{1} \), rarely 2.

var. *typica*. Leaflets ovate to lanceolate acute, sub-glabrous beneath. Flowers \( \frac{1}{5} \) in. long. Selangor, Ulu Gombak (Burn-Murdoch). Perak, Gunong Bubu and Larut (Kunstler).

var. *vestita* Prain. Leaflets oblong-acuminate to ovate acute, always densely rusty-red-velvety beneath. Flowers \( \frac{1}{4} \) in. long. Malacca (Maingay). Perak, Larut and Gunong Bubu (Kunstler).

*Distrib.* Tenasserim, Sumatra.


Glabrous woody climber. Leaves 6 in. long; leaflets 5, stiffly chartaceous, ovate acute, base round, \( \frac{1}{25} \) in. long, \( \frac{1}{2} \) to \( \frac{1}{25} \) in. wide, glabrous; nerves 10 pairs hardly prominent. Panicles 6 to 12 in. long, sparingly branched; branches \( \frac{1}{5} \) in. long or less; rachis puberulous. Calyx campanulate \( \frac{1}{12} \) in. long, edge sinuate-toothed, sub-glabrous. Corolla white, \( \frac{1}{35} \) in. long; standard orbicular ecallose. Stamens monadelphous. Ovary sparsely hairy. *Hab.* Perak, Larut (Scorcheni). Penang (Wallach). *Distrib.* Java.


Large climber. Black stem 50 ft. long. Leaflets 7 (or 9 or 5) sub-coriaceous or coriaceous, ovate-oblong cuspidade, base rounded or cuneate, 2 to 4 in. long, 1 to 2 in. wide; nerves indistinct. Panicles fastigiate, branched 6 to 9 in. long. Calyx campanulate \( \frac{1}{12} \) in. long, glabrescent, mouth sinuate, toothed. Corolla \( \frac{1}{3} \) in. long, rose pink; standard ecallose. Stamens monadelphous. Ovary puberulous. Pod thin, ligulate-oblong, 3 to 4 in. long, 1 to \( \frac{1}{15} \) in. wide; upper wing \( \frac{1}{25} \) in. wide, lower narrow. Seeds 2. *Hab.* Climbing high on trees in lowland forests.


Scrambling shrub. Stems black; shoots pubescent. Leaves 9 to 15 in. long; leaflets 9 to 13, membranous, at length sub-coriaceous, oblong to oblong-lanceolate cuspidade, 3 to 6 in. long, 1 to \( \frac{1}{13} \) in. wide, glabrous (adult) above, pubescent beneath. Racemes 9 to 10 in. long, tomentose. Calyx \( \frac{1}{25} \) in. long, campanulate, pubescent. Corolla rose pink (rarely white), \( \frac{1}{65} \) in. long;
standard orbicular, back silky, base bicallose. Stamens monadelphous. Ovary villous. Pod oblong to lanceolate, 1- to 4-seeded winged on upper suture, slightly on lower, 1'-5 to 3'-5 in. long, '75 in. wide. Hab. Scrambling over rocks. Often cultivated by Chinese as an insecticide. I am doubtful as to its occurring wild, though it may be so in a few places where it grows over rocks, as at Penara Bukit in Penang (Curtis) and in Perlis, Distrib. Cambodia, Siam to Malay isles. Native name: Akar Tuba. Use: For drugging fish and killing insects on crops; a solution of the root bark used. Poisonous. (See Gimlette, "Malay Poisons," p. 92.)


Climbing shrub 30 to 50 ft. long, glabrous. Leaves 9 to 15 in. long, bright green; leaflets 5 to 7 (or 9) sub-coriaceous elliptic, base round, caudate-acuminate glabrous, 4 to 6 in. long, 2 to 2'-5 in. wide. Racemes solitary axillary, 4 to 6 in. long. Calyx '15 in. long, reddish campanulate, edge ciliate, sinuate. Corolla rose pink (or white), '65 in. long; standard orbicular truncate or orbiculate, base bicallose. Stamens monadelphous. Ovary pubescent. Pod oblong, winged or not, 1- to 4-seeded, 2 to 3 in. long. Hab. Forests, Singapore, Chan Chu Kang. Selangor, Ulu Selangor (Goodenough); Sempang Track, Semangkok Pass. Perak, Goping (Kunstler). Penang, Waterfall (Curtis). Distrib. Tenasserim, Siam, Borneo.

var. aptera Prain, l.c.c. and var. millettioides Prain.

Only fruiting specimens of these are known. They differ from D. malaccensis in having the pod thick and woody without any wing, and in the specimen labelled millettioides pointed at both ends and dehiscent, as in Pongamia; the leaflets are rather more coriaceous and round at the base, seldom even slightly narrowed. In malaccensis the pod is quite thin, strongly nervated and winged, the leaves thinner and often narrowed distinctly to the base. A specimen from Wray, Sempang plains, Perak, while having the thick pod of aptera, has a trace of wings, and the leaves are thin and narrowed at the base. Till flowers of this variety aptera are obtained, it must, I think, be placed as a variety of malaccensis, but I expect it to turn out an entirely distinct plant. The specimens were obtained from Perak, Ulu Bubong, Larut and Goping by Kunstler.


Branchlets grey, pustulate, when young hirsute. Leaves 8 in. long; leaflets 7, glabrous chartaceous, ovate or elliptic, cuspidate-caudate, base rounded or narrowed, 3 to 4'-25 in. long, 1'-6 to 2 in. wide; nerves prominent beneath, 10 pairs; petiolule '2 in. long. Racemes fascicled or solitary 1 to 3'-5 in. long; rachis red-hairy. Calyx truncate, puberulous '1 in. long. Corolla '25 in. long. Standard orbicular emarginate. Stamens monadelphous; anthers
uniform. Ovary sessile, pubescent, 4-ovuled. Hab. Kelantan, Kwala Aring (Yapp).

31. KUNSTLERIA, Prain.

Big lianes. Leaves unequally pinnate, 1- to 7-foliate, extipellate; stipules small. Panicles large thyrsoid, terminal and in upper axils. Flowers abundant, small, dark purple to nearly black. Calyx campanulate, teeth lanceolate, upper 2 connate. Corolla exsert; standard ovate entire, keel boat-shaped; petals slightly cohering. Stamens 10-diadelphous, upper one free and adnate to the standard claw; filaments alternate, long and short; anthers versatile. Ovary sessile; ovules free; style filiform, incurved. Pod thin, strap-shaped, membranous or coriaceous, indehiscent not winged. Seeds 1 to 3 oblong, flat. Species 5, Malay Peninsula and Sumatra.

Leaflets solitary.
Leaflets 3.
Leaflets 5, thickly coriaceous, dense, red-velvety beneath.
Leaflets 5, chartaceous, glabrous.
Leaflets 7.

(1) K. Curtisi i Prain, l.c. 110.

Liane. Leaves 5 to 8 in. long; leaflets solitary, peltate ovate-lanceolate, coriaceous, 4 to 6½ in. long, 2½ in. wide, acute, base rounded; nerves 4 to 5 pairs, prominent as are reticulations beneath, above glabrous, beneath red-tomentose; petiolae 7½ to 1½ in. long; petiolules 2½ in. long. Panicles terminal and axillary, 8 to 12 in. long, 5 to 8 in. across, rusty-pubescent. Calyx campanulate pubescent, 1½ in. long; teeth triangular, upper deltoid bifid. Corolla 2½ in. long, purple, standard ovate-oblong. Pod thin, flat red-velvety, 5 in. long, 1 in. wide. Seeds 2 to 3.


var. laxiflora. Leaves beneath, petioles and petiolules, rachis and pods densely red-velvety. Hab. Dindings, Telok Serah (Curtis).


Liane over 100 ft. long. Leaves 5 to 8 in. long, trifoliate, glabrous; leaflets ovate-lanceolate, 4 to 6 in. long, 1½ to 2 in. wide, tip acute, base of terminal one cuneate, of laterals rounded; nerves 5 to 6 pairs, prominent beneath, as are reticulations, thinly coriaceous; petiolae 1½ to 2½ in. long; petiolules 2 in. long. Panicles 8 to 12 in. long, 5 to 8 in. across, pubescent. Calyx campanulate, pubescent, 1½ in. long; teeth triangular, upper deltoid bifid. Corolla black, tipped red, 2½ in. long. Pod reticulate brown-pubescent, 2 to 4 in. long, 6 in. wide, 1- to 2-seeded. Seeds
oblong, 1'25 in. long, dark brown. Hab. Dense jungle at 800 to 1500 ft. altitude. Perak, Larut Hills (Kunstler).

(3) F. Forbesii Prain, l.c. III.

Woody climber 6 to 10 ft. tall. Branches rusty-pubescent. Leaves 8 to 10 in. long; leaflets 5, elliptic, coriaceous stiff, glabrous above, red-tomentose beneath, base rounded peltate, tip acute; nerves 6 to 9 pairs, elevate beneath, 3'5 to 5 in. long, 2 to 2'5 in. wide; petioles 3'5 in. and petiolules 2'5 in. long, red-pubescent. Panicles strict velvety, 12 to 18 in. long, 5 to 6 in. wide. Calyx campanulate, velvety, 1'5 in. long; teeth lanceolate, upper triangular bifid. Corolla lake-red, 2'5 in. long. Hab. Perak, Selama (Kunstler). Distrib. Sumatra.

(4) K. Ridleyi Prain, l.c. III.

A very big liane. Branchlets puberulous. Leaves 6 to 8 in. long; leaflets 5, elliptic coriaceous, glabrous, base rounded, tip blunt; nerves 5 to 6 pairs, slender prominent, reticulations conspicuous, fine, 2 to 3'5 in. long, 1'25 to 2 in. wide (terminal one much the largest); petioles 2 to 3 in. long; petiolules 2 in. long pubescent. Panicles 12 to 18 in. long, 4 to 6 in. across pubescent. Calyx campanulate rusty, 1'5 in. long; teeth triangular, upper deltoid bifid. Corolla 2'5 in. long, purple black. Pod golden-pubescent reticulate 6 in. long, 1'25 in. wide. Hab. In lowland woods, not rare but local. Singapore, Garden Jungle; Selitar (Ridley).

(5) K. Derryi Prain, l.c. III.

Liane. Branchlets rusty-pubescent. Leaves 6 to 8 in. long, 7'5 to 1'5 in. wide, base of terminal deltoid, of laterals rounded, tip cuneate; nerves 6 to 7 pairs prominent beneath, stiff chartaceous, pubescent on nerves above, entirely so beneath; petioles 2'5 to 3 in. long. Panicles strict, 12 to 15 in. long, 2 to 3 in. wide, pubescent. Calyx campanulate, 1'5 in. long; teeth triangular, upper notched. Corolla dark purple, 2'5 in. long. Hab. Malacca, Machap-Tebung Road (Derry).

32. GEISSASPIS, Wight and Arnott.


Densely cespitose trailing. Branches 5 to 2 ft. long. Leaves 5 in. long; leaflets obovate reteuse, 4 in. long, 2 in. wide. Heads 1 in. long; bracts 5 in. long, 2 to 3 in. wide, reniform green to brown with red cilia. Flowers very small, yellow. Pod joints 1 to 2'15 in. long. Hab. Sandy open country, edges of rice-fields in the

33. **ZORNIA**, Gmel.

Annual herbs. Bracts large coriaceous; leaflets 1 to 2 pairs, dotted. Flowers in lax racemes. Calyx minute; upper teeth short, connate, lowest shorter. Corolla exert yellow; standard broad. Stamens monadelphous. Ovary sessile; ovules many. Pod of several flattened, muricate joints, r-seeded. Species 10, all but 2 American.

(1) *Z. diphylla* Pers. *Synops.* ii. 318; *Baker, in Hook. fil. F.B.I.* ii. 147; *Prain, l.c. 126.*


34. **SMITHIA**, Ait.


35. **AESCHYNYOMENE**, Linn.

Stems slender much branched; flowers small; pod narrow, smooth.

Stem little branched; flowers large; pod broad, warded.

(i) *Æ. indica* Linn. Sp. Pl. 713; Baker, in Hook. fil. F.B.I. ii. 151; Prain, l.c. 128.

Slender annual herb 1 to 3 ft. tall, glabrous. Leaves 2 to 3 in. long; leaflets 20 to 30 pairs linear obtuse, '2 in. long, '05 in. wide. Stipules lanceolate, auricled, '3 in. long. Racemes axillary 1- to 4-flowered; peduncles 1 in. long. Calyx '2 in. long, glabrous; teeth unequal, 2 upper ones sub-connate. Corolla '45 in. long, thin yellow, tinged pink or orange. Pod 1 to 1'5 in. long, straight, '12 to '15 in. broad, upper edge straight, lower dented, joints 8 to 10. Hab. Ponds and wet spots in open country. Singapore, Galang, Johor, Batu Pahat. Province Wellesley, Bukit Seraya. Perak, Temengoh. Perlis, Kanga. Jalar, Biserat (Gwynne-Vaughan). Distrib. Tropics.

(ii) *Æ. aspera* Linn. Sp. Pl. 713; Baker, l.c. ii. 152; Prain, l.c. 128.

Shrubby, pithy, 3 to 12 ft. tall, 3 in. through, unbranched. Leaves 3 to 6 in. long; leaflets 30 to 50 pairs, linear obtuse '2 to '5 in. long, '05 in. wide. Stipules lanceolate, auricled. Racemes axillary, sometimes branched, 2- to 4-flowered, 2'5 in. long. Calyx hairy, unequally toothed. Corolla '75 in. long, yellow. Pod 2 to 2'5 in. long, '3 in. wide, indented both sides, edges and faces echinate, joints 4 to 8. Hab. Very rare in wet spots, only once collected and possibly a temporary alien. Malacca (Griffith). Distrib. S.E. Asia and Africa. “Sola” used in making pith hats.


Shrublets. Leaves of 1 to 9 leaflets. Flowers small very numerous in a dense hairy raceme. Calyx-tube short, two upper teeth short, lower ones setaceous white hairy. Standard broad, wings adhering to keel. Stamens diadelphous; anthers uniform. Ovary sessile or short-stalked; ovules few. Pod of 2 to 6 small turgid 1-seeded joints. Species 15, tropical Asia.

Erect plants; leaves 5- to 9-foliate; heads cylindric.

Leaflets oblong; heads thick, 8 to 18 in. long.

Leaflets narrow, lanceolate under an inch wide; head slender.

Creeping plant; leaflets 1 to 3; heads dense, short, oblong 1 to 2'5 in. long.


(i) Shrubby plant about 1'5 to 3 ft. tall. Stems downy, hardly branched. Leaves, petioles 2 to 3 in. long; leaflets 2 to 5 pairs oblong to ovate acute, base round, sub-coriaceous, glabrous above rachis, midrib and nerves elevated, beneath hairy, 3 to 4 in. long, 1'5 in. wide. Stipules lanceolate acuminate, '6 in. long puberulous.
The lower leaves and those of young plants are trifoliate. Racemes dense, cylindric, 5 to 12 in. long, 1 to 1.5 in. through; bracts scarious, deciduous; pedicels '45 to '65 in. long with long bristles. Calyx '2 in. long, teeth plumose. Corolla '3 in. long, light blue. Pod puberulous, joints 4 to 6, black, '13 in. long, '1 in. wide. Hab. Common in open ground, banks, etc. Singapore, Orchard Road. Johor, Kwala Sembrong (Kelsall). Malacca, Pulau Sepang; Sungei Hudang; Brisu. Pahang River; Pianggu, Endau (Evans). Selangor, Rantau Panjang (Kloss); Batu caves; Kerling. Perak, Temengoh. Patani, Tomoh (Machado). Penang, Balik Pulau (Curtis). Kelantan, Lebeh River (Yapp). Setul. Distrib. Indo-China, Malaya. Native names: Poko Ekor Anis; Ekor Kuching; Seringau; Pua Acoraging.

(2) **U. picta** Desv. Journ. Bot. i. 123, t. 5, fig. 19; Baker, in Hook. fil. F.B.I. ii. 155; Prain, l.c. 130.

Tall, little-branched shrublet 3 to 6 ft. tall. Young stems downy. Leaves 2 or more in. long; leaflets 2 to 4 pairs, linear-lanceolate acuminate obtuse, coriaceous, green with a white central band finely reticulate, pubescent beneath as is rachis, 2.5 to 3.5 in. long, '2 to '3 in. wide; nerves beneath elevate. Racemes dense cylindric, 6 to 12 in. long, '5 in. through; pedicels '25 in. long, bristly. Bracts ovate-acuminate, bristly. Calyx '2 in. long. Corolla violet pink exsert, '3 in. long. Pod glabrous lead-colour, joints 3 to 6, '13 in. long, '1 in. wide. Hab. Open sandy country, rare. Pahang River. Province Wellesley, Tasek Gelugur; Permatang Bertam. Jalor, Biserat, paddy-fields (Gwynne-Vaughan). Distrib. India, Cambodia, Malaya.

(3) **U. lagopoides** DC. Prodr. ii. 324; Baker, l.c. ii. 156; Prain, l.c. 131.

Creeping and ascending woody shrublet, 1 to 3 ft. long. Leaves 1 to 2 in. long; rachis pubescent; leaflets solitary or one pair and a larger terminal one oblong rhomboid rounded, base truncate or cordate, thickly membranous, glabrous above, reticulate, hairy beneath, 1 to 2 in. long, '75 to '1 in. wide; petioles '5 to '75 in. long. Stipules lanceolate setaceous. Racemes dense oblong, 1 to 2.5 in. long, '8 in. through; bracts lanceolate silky, acuminate. Calyx '12 in. long, plumose. Corolla white. Pods glabrous, joints reticulate, '15 in. long, '8 in. wide. Hab. Open sandy country. Pahang River; Raub track (Machado). Selangor, Batu Caves. Perak, Tambun, Ipoh; Kwala Kangsa; Temengoh. Province Wellesley, Pagar Tras; Tasek Gelugur. Perlis, Kanga. Setul. Jalor, Biserat (Gwynne-Vaughan). Distrib. India, China, Malaya.

**37. PHYLACIUM**, Benn.

Twining herbs. Leaves trifoliate. Stipules small, persistent, linear; leaflets stipellate. Racemes axillary; pedicels short, completely enveloped in a large boat-shaped bract. Calyx tubular,
2-lipped, 4-toothed. Standard ovate retuse, base bi-auriculate; wings oblong, long-spurred; spurs incurved, keel straight, short spurred. Stamens diadelphous, upper filament adnate to slender claw. Ovary short-stalked, base surrounded by a disc; style inflexed. Pod round, acute, stalked. Species 2, Indo-China and Malayan.

(1) **P. bracteosum** Benn. Pl. Jav. Rar. 159, t. 33; Prain, l.c. 129.

Twenty to 30 ft. long. Young parts and leaves beneath hairy; leaflets ovate-oblong, blunt, base rounded, herbaceous, 2 to 3 in. long, 1'5 in. wide; petioles 1'5 in. long. Racemes 2 to 10 together, 1'5 to 2 in. long. Bracts pale green, 1 to 1'5 in. long, hairy inside. Calyx 1'5 in. long. Corolla 3 in. long, white tinted pink. Pod 2'5 in. long, hairy. Hab. Rare, in open jungle. Perak, Gunong Pondok (Kunstler). Distrib. Malay isles.

### 38. **ALYSICARPUS**, Neck.


<table>
<thead>
<tr>
<th>Herb</th>
<th>Prostrate herb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 2 ft. erect</td>
<td>all leaves oblong; flowers</td>
</tr>
<tr>
<td>upper leaves lanceolate;</td>
<td>purple</td>
</tr>
</tbody>
</table>

(1) **A. vaginalis** DC. Prodr. ii. 353. Miq. Fl. Ind. Bat. i. 231; Prain, l.c. 132.

Wiry erect or ascending herb, 1 to 2 ft. tall, glabrous. Leaves 1-folate; petioles 1 to 2 in. long; leaflets lower, oblong obtuse, base cordate 5 in. long, 2 in. wide, upper narrow lanceolate, subacute 1'5 in. long, 1 in. wide. Stipules lanceolate papery, 3 in. long. Raceme at end of branch, 1'5 in. long. Flowers 8 to 12, yellowish white or brown. Calyx 12 in. long, glabrescent, teeth setaceous. Pod terete reticular veined, 5 to 75 in. long, joints 6 to 8. Hab. Dry open places. Singapore, Changi. Malacca, Pulau Besar (Maingay). Dindings, Lumut; Pangkor (Scorchedi). Perlis, Kanga. Distrib. India, Africa, China, Malay.

(2) **A. nummularifolius** DC. Prodr. ii. 353. A. vaginalis var. nummularifolius Miq. l.c.; Baker, l.c.; Prain, l.c. 133.

A hairy dwarf prostrate herb creeping in grass-turf. Leaflets all oblong obtuse cordate, 5 to 1'2 in. long, 2 to 7 in. wide; petioles 2 in. long. Stipules lanceolate-acuminate, 3 in. long. Racemes short, dense. Flowers dark purple, small. Pod 6 in. long. Hab. In turfy spots, common. Singapore, hospital grounds; Tanjong Katong. Malacca, Pulau Besar (Maingay); Malacca Hill (Griffith); Pengkalan Minyak (Cantley). Dindings, Lumut.

The two species are usually made varieties of one (Prain, *l.c.*), but are so different in general appearance when typical that I think it advisable to follow Linné and others in keeping them separate. *A. nummularifolius* is prostrate, the branches often a foot long with purple flowers, *A. vaginalis* erect with nearly white flowers.

**39. DESMODIUM,** Desv.

Herbs or shrubs. Leaves 1- or 3-foliate, stipellate. Flowers small, white, pink, blue or yellow in racemes. Calyx campanulate, upper two often sub-connate. Corolla exsert; standard broad; wings adherent to keel; upper stamen free from the other united 9. Ovary sessile or stalked; style incurved. Stigma minute capitate. Pod of several 1-seeded joints compressed, the joints separating. Species 150, cosmopolitan.

1. *Sagotia:*—Prostrate herbs with 1 to 3 axillary flowers; leaves trifoliate.
   Pedicels hardly exceeding petioles; leaflets obovate truncate 25 in. long . . . (1) *D. triforum*
   Pedicels 5 in. long; leaflets oblong or obovate, round 5 in. long . . . (2) *D. heterophyllum*
   Pedicels 5 in. long; leaflets obovate, round, 1½ in. long, 7½ in. wide . . . (3) *D. trifoliastrium*

   Plant downy; leaves glabrous above . . . (4) *D. pulchellum*
   Plant velvety downy all over . . . . (5) *D. vestitum*

3. *Dendrolobium:*—Shrubs, bracts small deciduous; flowers small umbelled axillary.
   Leaflets smooth; pods glabrous . . . . (6) *D. umbellatum*
   Leaflets rugose; pods strigose . . . . (7) *D. rugosum*

4. *Euædesmodium:*—Erect herbs or shrublets; leaves 1- to 3-foliate; flowers in racemes; bracts deciduous.

Big shrubs; racemes elongate.
   Racemes often panicked; corolla violet . . . (8) *D. megaphyllum*
   Racemes simple; flower white; pod joints narrowed both ends . . . . (9) *D. laburnifolium*

Slender wiry shrublets.
   Racemes lax; flowers pink; leaflets ovate acuminate, 4 to 6 in. long . . . . (10) *D. laxum*
   Racemes lax; flowers scarlet; leaflets ovate blunt, 2 in. long . . . . (11) *D. scalpe*

Racemes dense.
   Leaflets silky beneath, white, obovate cuneate . . . . (12) *D. capitatum*
   Leaflets not silky beneath, obovate cuneate; flowers deep purple, rarely white . . . . (13) *D. polycarpum*
   Leaflets elliptic or round, base round, white, silky beneath; flowers pale lavender . . . . (14) *D. ovalifolium*

Leaves 1-foliate; racemes terminal lax.
   Petioles not winged.
   Joints of pod narrowed at the ends, sticky; flowers white . . . . (15) *D. ormocarpoides*
Pods indent on upper suture only not sticky.

Raceme sub-glabrous; pods sub-glabrous; flower yellow .......... (16) D. gangeticum

Raceme tomentose; pods pubescent; flowers pink ............ (17) D. virgatum

Petioles winged ................................................. (18) D. triquetrum

v. Pleurolobium:—Erect under-shrubs; flowers racemed.

Pods not segmented, dehiscing along ventral suture ........ (19) D. gyroides

(1) D. triflorum DC. Prodr. ii. 334; Baker, in Hook. fl. F.B.I. ii. 173; Prain, l.c. 135.


(2) D. heterophyllum DC. Prodr. ii. 334; Baker, l.c. ii. 173; Prain, l.c. 135.

Trailing herb 2 to 3 in. to 2 ft. long, diffuse hirsute. Leaves 1 to 1.5 in. long, trifoliate; petioles 5 in. long; leaflets membranous, oblong or obovate, tip rounded, terminal one 5 to 1 in. long, 3 to 5 in. wide, laterals half as big. Stipules lanceolate. Flowers 1 to 2, axillary or racemose; pedicels hairy 5 to 8 in. long. Calyx 15 in. long, densely hairy. Corolla rose pink turning blue, 25 in. long. Pod 5 to 75 in. long, 18 in. wide, joints 4 to 5, glabrescent except lower edge, lower suture indented, upper straight. Hab. Very common in grass plots, edges of roads and other turfy spots. Singapore, everywhere. Pahang, Pekan. Malacca, Bukit Panchur (Cantley); Town. Perak, Thaiiping. Penang (Wallich 5701). Tringganu (Yapp). Legeh, Tremangan (Gwynne-Vaughan). Distrib. S.E. Asia. Native names: Omba-Omba; Akar Sisik Naga; Akar Telinga Tikus.

(3) D. trifoliastrium Miq. Fl. Ind. Bat. i. (1), 248.

(4) *D. pulchellum* Baker, in Hook. fil. F.B.I. ii. 162; *Prain, l.c. 136.*

Bushy shrublet 4 to 5 ft. tall, downy. Leaves trifoliolate 5 to 6 in. long; petioles 1/4 to 4 in. long, coriaceous rugose glabrous above, downy beneath, ovate-lanceolate sub-acute, 3 to 4 in. long, 1-5 in. wide; petiolules 1/15 in. long, lateral pair much smaller, 1/25 in. long, 1/75 in. wide. Inflorescences numerous, 8 to 18 in. long, in racemes or flowers solitary in the axils of 1- to 3-foliolate, orbicular leaf-like bracts, 1 to 5 in. long and nearly as wide. Calyx 1/1 in. long, hairy, teeth lanceolate. Corolla yellow, 1/25 in. long. Pod 2 to 3 in. long, puberulous indented on both sides, joints 2, rarely 3, 1/12 in. wide. *Hab.* Open sandy heaths. Johor (Kunstler). Pahang River, open heaths. Malacca (Griffith). Perak, Telor Pinang; Kwaia Kangsa; Kota Bharu (Kunstler). Kedah, Alor Sta. *Distrib.* India and Siam.

(5) *D. vestitum* Baker, l.c. ii. 162.

Bush, velvety downy all over. Leaves 1/4 in. long; petioles 1/2 in. long; leaflets 3, ovate-elliptic, obtuse, terminal, 2-3 in. long, 1-2 to 2-3 in. wide, base rounded, laterals shorter; nerves 4 pairs prominent on both sides; petiolule, terminal 1/4 in., lateral 1/1 in. long. Corymbs 3- to 4-flowered with membranous ovate orbicular thin bracts, 1 to 1/25 in. long, 1 in. wide. Calyx 1/2 in. long, teeth deltoid. Corolla 4 in. long, mauve. Pod 1/5 in. long, joints 3, hairy. *Hab.* Adang islands, Pulau Rawei (Ridley). *Distrib.* Tenasserim.

(6) *D. umbellatum* DC. Prodr. ii. 235; *Baker, l.c. ii. 161; Prain, l.c. 137.

Big shrub 5 to 6 ft. tall or more. Branchlets downy. Leaves 5 to 7 in. long, trifoliolate; petioles 1 in. long; leaflets sub-coriaceous, glabrous above, paler puberulous beneath, ovate-oblong obtuse (rarely acute), terminal one 3 to 3-1/4 in. long, 2 to 2-1/4 in. wide, laterals smaller. Stipules large, 3 in. long. Corymbs umbelli-form axillary 3 in. long on peduncles as long. Flowers 6 to 12, white. Calyx 1/15 in. long, teeth lanceolate, pubescent, silky. Corolla 1/5 in. long. Pod 1/5 to 2 in. long, 1/25 in. wide, glabrous, thick coriaceous of 4 (1 to 3) joints. *Hab.* Seashores, tidal mud and sand. Very common. Whole peninsula from Singapore to Perlis. *Native name:* Dedulang.

(7) *D. rugosum* Prain, l.c. 137.

Big shrub, much-branched puberulous. Leaves 5 to 7 in. long, trifoliolate; petioles 1 in. long; leaflets coriaceous rugose, midrib and nerves above puberulous and on under-side densely puberulous, obovate acute, terminal one 4 in. long, 2-1/4 in. wide; nerves 10 to 12 very prominent, as are reticulations; petiolules 1/5 in. long. Inflorescence axillary; peduncles 1/25 in. long; corymbs 3- to 6-flowered. Calyx 1/2 in. long, pubescent. Corolla 1/5 in. long, white. Pod 1/5 in. long, joints 4, 1/3 in. long, 1/25 in. wide, thick,

(8) D. megaphyllum Zoll. Nat. en Geneesk. Arch. iii. 58; Prain, l.c. 139.

A fine bushy shrub about 8 ft. tall. Branchlets tomentose. Leaves 7 to 9 in. long, trifoliate; petioles 2 to 2'5 in. long; leaflets sub-coriaceous, puberulous above, grey woolly beneath, rhomboid ovate-acuminate, terminal one cuneate at base, 4 to 6 in. long, 2'5 to 3'5 in. wide; petiolules 1 to 1'5 in. long; laterals smaller, base obliquely rounded. Stipules 1'5 in. long, lanceolate. Racemes often panicked, terminal and axillary 8 to 10 in. long; flowers fascicled, in 25 to 30 fascicles. Bracts 5 in. long. Calyx 1'5, teeth triangular. Corolla violet, 3 in. long. Pod dull crimson, 2 to 2'25 in. long, 6- to 8-jointed, joints 2'5 in. long, 2 in. wide, puberulous, indented on lower suture. Hab. Local in forest. A very handsome shrub. Perak, Batang Padang Valley at 2000 ft. altitude and upwards (Wray, Ridley). Distrib. Tenasserim, Java.

(9) D. laburnifolium DC. Prodr. ii. 337; Baker, l.c. ii. 163.

A stout woody shrub, nearly glabrous. Leaves trifoliate 3 to 4 in. long; petioles 5 to 1 in. long, flattened; leaflets sub-coriaceous ovate to lanceolate, base narrowed, apex narrowed sub-acute or blunt, glabrous above and nerves invisible; nerves elevate hairy, 4 pairs, terminal leaflet 2 to 4 in. long, 1 in. wide; petiolule 5 in. long, flat; laterals about half as large; petiolules 0'5 in. long. Racemes axillary and terminal, 4 to 6 in. long. Flowers numerous. Calyx 12 in. long, hairy, teeth lanceolate, lower linear. Corolla white, 2'5 in. long. Pod 2 to 3 in. long, green, joints flat, elliptic narrowed at both ends, 6 in. long, 2 in. wide, adhesive hairy. Hab. Johor, Kota Tinggi (Ridley). Apparently very rare here, I only once saw it. Distrib. Indo-Malaya, China.

(10) D. laxum DC. Prodr. ii. 336.

A slender wiry plant 2 to 4 ft. tall. Leaves 5 to 8 in. long, trifoliate; petioles 1 to 2'5 in. long; leaflets membranous, glabrous above, sparsely hairy beneath on nerves, terminal one narrow ovate, 4 to 6 in. long, 1'5 to 2 in. wide, narrowed to tip, base cuneate; petiolule 7'5 in. long; nerves 3 pairs; lateral leaflets smaller, 3 to 4 in. long, bases slightly oblique. Stipules linear-lanceolate, 5 in. long. Racemes narrow, 12 to 20 in. long, sometimes panicked. Flowers distant. Calyx 0'8 in. long, pubescent, teeth deltoid. Corolla pink, 2'5 in. long. Pod 1 to 3 in. long; stalks 3 in. long; joints few, 5 in. long; constrictions oblique, nearly to upper suture. Hab. Rare in forests. Perak, Ulu Batang Padang; Telom (Wray, Ridley). Distrib. Indo-Malaya.

(11) D. scalpe DC. Prodr. ii. 334; Baker, l.c. ii. 165.

A very slender shrublet 2 to 3 ft. tall, hairy. Leaves trifoliate; petioles 1'5 in. long, hairy; leaflets membranous, terminal one rhomboid, sub-acute, hairy on both sides, 2 in. long, 1'5 in. wide;
petiolule 1'2 in. long; laterals smaller ovate, base oblique, 1'7 in. long, '75 in. wide. Racemes terminal axillary, 8 to 12 in. long, hairy with flowers scattered in pairs on slender pedicels 5 in. long. Calyx 1 in. long, hairy, teeth setaceous. Corolla scarlet 3 to 5 in. long. Pod stipitate; joints 1 to 3 half-rhomboideal, '25 to '3 in. long and half as broad. Hab. Very local, in a damp spot in forest, with *Viola* and *Sanicula*. Pahang, Telom Valley, 4000 ft. altitude. **Distrib.** Indo-Malaya.

(12) **D. capitatum** DC. Prodr. ii. 336; Baker, l.c. ii. 170; Prain, l.c. 139.

Creeping shrublet. Branches 1 to 2 ft. long, white tomentose at tips. Leaves 2 to 2'5 in. long, trifoliolate; petioles 6 in. long; leaflets sub-coriaceous, glabrescent above, white-silky beneath; obovate-cuneate, tip rounded or ovate rounded, terminal one 1'25 in. long, 1 in. across, laterals smaller, '75 in. long; nerves 8 pairs. Stipules linear, '25 in. long. Racemes dense axillary and terminal, 1 to 2 in. long; pedicels 2 to 2'5 in. long, reflexed in fruit. Bracts small ovate cuspidate. Calyx 1 in. long, glabrescent, teeth setaceous. Corolla purplish red, 2 in. long. Pods 5 to '75 in. long, '15 in. wide puberulous, joints 6, lower suture indented. Hab. Open sandy country. Pahang, Pulau Tawar; Kwala Tembeling. Selangor, Batu Caves. Perak, Teluk Anson (Kunstler); Thaiiping (Scortechini). Perlis, Bukit Lagi, Kanga. **Distrib.** Ceylon, Burma, Malay islands.

(13) **D. polycarpum** DC. Prodr. ii. 334; Baker, l.c. ii. 171; Prain, l.c. 140, excluding var. ovalifolium.

Erect shrublet 2 to 3 ft. tall. Branchlets few tomentose. Leaves 2 to 4 in. long, 3-foliolate; petioles 6 to 1 in. long; leaflets coriaceous, glabrous, light green above, appressed-hairy beneath, oblong-obovalate obtuse 1'25 to 2 in. long, 1 to '1'5 in. wide, laterals smaller '75 to 1'25 in. long. Racemes dense, terminal sub-sessile, 1 to 4 in. long; bracts ovate-cuspidate. Calyx 1 in. long, glabrescent, teeth setaceous. Corolla deep mauve violet; standard pink, 2 in. long. Pod 5 to '75 in. long, '15 in. wide, joints 6 to 8, indented in lower suture, edges hairy. Hab. Common in open country in lalang fields, very showy. All over the whole peninsula. **Distrib.** Africa, Asia, Polynesia. **Native names:** Kachang Kaya Betina; Kalumbar; Rumput Kerbau D’rapah; Katumbar.


A strict woody plant about 3 ft. tall. Leaflets coriaceous, lanceolate base round, tip blunt, 3 in. long, '75 in. wide, glabrous shining above, with long white silky hair beneath. Racemes terminal 5 to 8 in. long. Pods 5 in. long, short hairy. Hab. In dry spots.
Pahang, Rumpin River (Evans); Penang, Ayer Hitam (Curtis). Lankawi (Curtis). Kedah, Alor Sta (Ridley).

sub. var. minor. A small form. Leaflets oblong-obtuse, '75 to 1 in. long, reticulate; branches silky. Racemes 1'75 in. long. 

Hab. Setul, Heaths (Ridley).

(14) D. ovalifolium Wall. Cat. 5730. D. polycarpum var. ovalifoillum Prain, l.c. 141.


This has been confused by most botanists with D. polycarpum, though in life the two could not be mistaken. It differs in its creeping habit, round silky leaves and pale lavender flowers.

(15) D. ormoecarpoides DC. Prodr. ii. 327.

Weak shrublet, 2 ft. tall, unbranched. Young parts shortly hairy. Leaves 1-foliolate; petioles '75 in. long, pubescent; leaflet sub-coriaceous, glabrous above, silky beneath, ovate acute, base round, 4 to 6 in. long, 1'5 to 2'5 in. wide. Stipules ovate acuminate. Raceme terminal 6 to 10 in. long; flowers 12 to 20, distant pale blue or white; bracts minute; rachis puberulous. Calyx '1 in. long, pubescent teeth deltoid. Corolla '2 in. long. Pod 3 to 4 in. long, '15 in. wide, pendulous, very adhesive, joints 6 to 8, flat thin green, constricted at both sutures. Hab. Dense forests. Pahang, Kwala Tembeling. Selangor, Ginting Bidai. Perak, Temengoh. Penang, Balik Pulau. Distri. India, Ceylon, Java.

Our form has more pubescent leaves than the Indian one and is the var. velutina Prain. It occurs also in the Andamans and Java.

(16) D. gangeticum DC. Prodr. ii. 327; Baker, l.c. ii. 168; Prain, l.c. 142.

A slender shrublet 1 to 4 ft. tall with few puberulous branches. Leaves 1-foliolate; petioles slender, '75 in. long; leaflets elliptic, blunt to ovate sub-acute, 3 to 5'5 in. long, 1'2 in. wide; nerves fine, 8 to 9 pairs. Stipules linear, '25 in. long. Racemes terminal, axillary slender, 8' to 14 in. long. Flowers in distant fascicles, bracts minute. Calyx pubescent, '08 in. long, teeth lanceolate. Corolla yellow, '15 in. long. Pod sub-falcate, '5 to '75 in. long,
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\[ \text{1 in. across, 6- to 8-jointed, indented on upper suture, puberulous with hooked hairs. } \]

(17) **D. virgatum** Zoll. Nat. en Geneesk. Arch. iii. 58; Prain, l.c. 143.

Slender shrublet, 1 to 4 ft. tall, pubescent. Leaves 1-foliate; petioles \( \frac{25}{2} \) in. long, tomentose; leaflet membranous, glabrous above, puberulous beneath, ovate acute, base round or truncate, 3 to 5 in. long, 1 to 2 in. wide; nerves 8 to 9 pairs. Stipules short, triangular, \( \frac{15}{2} \) in. long. Racemes slender erect, tomentose, 3 to 8 in. long; flowers in 20 to 30 fascicles. Calyx glabrous, \( \frac{08}{1} \) in. long. Corolla pink, \( \frac{2}{1} \) in. long. Pod sub-falcate, \( \frac{5}{2} \) to \( \frac{75}{2} \) in. long, \( \frac{1}{2} \) in. across, 6- to 8-jointed, indent on upper suture, densely hairy, hairs hooked. Hab. Forests, rare. Perak Batu Kurau (Scortechini). Distrib. Burma, Java.

Much resembles *D. gangeticum*, but is easily distinguished by its pink flowers.

(18) **D. triquetrum** DC. Prodr. ii. 326; Prain, l.c. 143.

Shrublet. Leaves 1-foliate; petioles winged, 1 in. long, \( \frac{3}{2} \) in. wide; leaflet oblong-lanceolate acute, base broad, truncate or rounded, coriaceous, glabrous; nerves 15 to 20 pairs, \( \frac{125}{2} \) to 5 in. long, \( \frac{75}{2} \) to 1 in. wide. Stipules \( \frac{5}{2} \) to \( \frac{75}{2} \) in. long, \( \frac{12}{2} \) in. wide, lanceolate- acuminate. Racemes axillary and terminal, strict 6 to 10 in. long. Flowers 20 to 40 in axils of scarious bracts. Calyx \( \frac{15}{2} \) in. long, hairy, teeth unequal, upper deltoid, lower linear. Corolla \( \frac{3}{2} \) in. long, purple. Pod 1 to 2 in. long, \( \frac{25}{2} \) in. wide, flat, joints 6 to 8, hairy. Hab. Woods. Pahang, Kwala Tahan (Seimund). Perak, Telor Pinang, Ipoh (Curtis); Sungei Rayah (Kunstler). Kedah, Alor Sta. Lankawi. Perlis, Kanga. Setul. Distrib. India and Cambodia.

(19) **D. gyroides** DC. Prodr. ii. 316.

Shrub 10 ft. tall. Branches pubescent. Leaves 2.5 to 3 in. long, 3- or 1-foliate; petioles \( \frac{75}{2} \) in. long; leaflets membranous, oblong or ovate-oblong blunt, glabrous above, thin pubescent beneath, \( \frac{175}{2} \) to 2 in. long, 1 to 1.25 in. wide; nerves 6 to 8 pairs (lateral leaflets when present \( \frac{5}{2} \) in. long, \( \frac{4}{2} \) in. wide). Racemes dense strobilate with large bracts \( \frac{25}{2} \) in. long. Calyx \( \frac{1}{2} \) in. long, teeth triangular. Corolla \( \frac{35}{2} \) in. long, \( \frac{2}{2} \) in. wide, purple. Pod 1 to 1.5 in. long, \( \frac{2}{2} \) in. wide, falcate, joints 6 to 10, not separating, dehiscing along the indented lower suture, tomentose. Hab. Perak, Kinta (Kunstler). Tomoh (Machado). Distrib. Indo-Malaya, Indo-China.
40. SOPHORA, Linn.

Shrubs (or trees). Leaves odd-pinnate. Flowers showy, yellow (white or purple), racemed (or panículed). Calyx oblique, campanulate, teeth short. Corolla much exsert; standard broad; petals equal clawed. Stamens free nearly to base. Ovary stalked. Pod moniliform, joints turgid. Species 25, whole world tropics.

(1) **S. tomentosa** Linn. *Sp. Pl. 373; Prain, l.c. 146.*

Seashore shrub, grey tomentose. Leaves 6 to 12 in. long; leaflets 11 to 17, elliptic-ovate obtuse, 1 to 1½ in. long, 5 to 7½ in. wide, glabrous above, tomentose beneath. Racemes 6 in. long. Calyx obliquely truncate. Corolla ½ in. long, bright yellow. Pod 6- to 8-seeded, 4 to 6 in. long, hoary, each joint separated by a stipe as long as itself. Seed black. **Hab.** Sandy sea-coasts; not common. Bindings, Lumut, Lankawi, Burau Bay. Adang islands, Pulau Butang. **Distrib.** Ceylon, Andamans, Burma, Malaya, Polynesia.

41. ORMOSIA, Jacks.


Seeds large, black and red, solitary.

Panicles large, dense; flowers pink; pod 3 in. across . . . . . (1) **O. scandens**

Panicle lax; flowers yellow; pod 1½ in. across . . . . . (2) **O. macrodisca**

Flowers racemed; ovary golden-silky; pod unknown . . . . . (3) **O. gracilis**

Seeds small, all red; pod 6 in. long.

Leaves glabrous beneath . . . . . (5) **O. nitida**

Leaves pubescent beneath.

Leaflets petiolulate; pod valves thin.

Leaflets 9 to 13 acuminate, 2½ in. long . . . . . (6) **O. parvifolia**

Leaflets 4 in. long, acute or blunt thinly pubescent beneath; panicles lax . . . . . (7) **O. sumatrana**

Leaflets pubescent beneath; panicles dense . . . . . (8) **O. microsperma**

Leaflets sessile; pod-valves woody . . . . . (9) **O. venosa**

(1) **O. scandens** Prain, l.c. 147.

Woody climber over 100 ft. long, 6 to 8 in. through, glabrous. Leaves 12 to 15 in. long; leaflets 5 to 7, ovate-oblong, acuminate coriaceous, base round 6 to 9 in. long, 2½ to 3 in. across; nerves 13 to 18, slightly elevate, reticulations small, distinct. Racemes panículed 12 in. long, 6 in. across, tawny-silky; pedicels 2 in. long.
Calyx silky, lower teeth as long as tube deltoid, uppers form a bifid lip. Corolla 35 in. long, white tinged reddish. Ovary ovate, hairy on upper edge; ovules 3. Hab. Perak, Larut 300 to 500 ft. altitude (Kunstler).

(2) O. macrodisca Baker, in Hook. fil. F.B.I. ii. 253; Prain, l.c. 148.

A big tree 80 ft. tall and 2 ft. through. Leaves 8 to 10 in. long; leaflets 7 to 9, dark green, coriaceous, glabrous above, pubescent beneath, oblong, base rounded, tip acute, 3 to 5 in. long, 1/25 in. wide; nerves faint 7 to 9 pairs. Racemes in crowded panicles 6 in. long, 3 to 4 in. wide, rachis brown-silky. Calyx 3 in. long, brown-silky, teeth oblong-obtuse. Corolla 5 in. long, rose pink, veined darker, base of standard green. Ovary glabrous; ovules 3. Pod sub-orbicular, 3 in. wide, 75 in. thick, rose pink. Seed 1, oblong, 7 in. wide, scarlet, aril black. Hab. Singapore. One tree in Dalvey road near the Gardens. Distrib. Sumatra.

(3) O. gracilis Prain, l.c. 148.

Slender tree, 30 to 40 ft. tall, 6 to 8 in. through. Leaves 5 to 8 in. long; leaflets 7 to 9, ovate-lanceolate, chartaceous, bright green, glabrous above, sparsely hairy beneath, cuneate-acuminatae, base cuneate 2.5 to 3 in. long, 1 in. across; nerves 8 to 9 pairs faint. Panicles lax, 2.5 to 3 in. long, grey-silky, slender. Calyx 25 in. long, silky green, teeth ovate-lanceolate. Corolla 35 in. long, pale yellow; standard 25 in. across. Ovary puberulous; ovules 2. Pod hard thick oblong-ovate, stalked, 1.5 in. long, 1/25 in. wide, green with bluish bloom. Seed 1, oblong, 75 in. long, 6 in. wide, scarlet, aril black. 15 in. long. Hab. Dense forest at 1800 ft. altitude. Perak, Thaiping Hills, Maxwell's Hill (Kunstler and Wray).


(5) O. nitida Prain, l.c. 149.

Tree 30 to 50 ft. tall, 5 to 8 in. through. Leaves 5 to 7 in. long; leaflets 7, rigidly coriaceous, glabrous, glossy dark green, obovate or elliptic, obtuse base rounded, 2.5 to 4 in. long, 1.3 to 2 in. wide; nerves 12 to 15 pairs, slender; lateral leaflets smaller. Panicles of fastigiate racemes, puberulous 6 to 8 in. long, 5 to 6 in. wide. Calyx 2 in. long, tawny-silky, teeth deltoid. Corolla unknown. Pod oblong, 1 in. long, 75 in. across, valves thinly woody, glabrous, black outside, stalk as long as calyx-tube. Seed
oval, red, '35 in. long, '3 in. wide, no aril.  

Hab. Dense hilly jungle. Perak, Goping (Kunstler).

(6) O. parvifolia Baker, in Hook. fil. F.B.I. ii. 253; Prain, l.c. 149.

A medium-sized tree. Branches brown-velvety. Leaves 6 to 8 in. long; leaflets 9 to 13, coriaceous, glossy green above, thinly hairy (except the densely tomentose nerves) beneath, oblong acuminate, base round 2 to 2'5 in. long, '6 to '7 in. wide; nerves fine 8 to 9 pairs. Racemes panicled, 3 to 4 in. long, 2'5 in. wide, densely brown-velvety. Calyx '2 in. long, brown-silky, teeth triangular. Corolla white '35 in. long; standard '25 in. across. Ovary ovate silky; ovules 3. Pod orbicular, '1-seeded (or oblong if 2-seeded), short stipitate; valves thin, at first silky, then glabrescent black outside. Seed ovoid '3 in. long, '25 in. wide, red, no aril.  

Hab. Open country generally near sea or rivers. Singapore, Pasir Panjang; Changi; Reservoir. Pahang, Pekan; Rumpin River (Evans). Malacca (Griffith). Panchur. Native name: Saga Hutan.

The Pahang tree differs from the Malacca one in having the leaves almost or quite glabrous beneath and very small reticulations.

(7) O. sumatrana Prain, l.c. 150.

A large tree. Branchlets tomentose. Leaves 8 to 10 in. long; leaflets 7 to 9, ovate or ovate-elliptic, obtusely apiculate, base rounded, coriaceous, glabrous shining above, hairy glabrescent below; nerves 8 to 10 pairs, 2 to 4 in. long, 1 to 1'75 in. wide. Racemes panicled, lax, 6 to 8 in. long and as wide, pubescent. Calyx '2 in. long, tawny-pubescent, 3 lower teeth ovate- lanceolate. 2 upper forming a bifid lip. Corolla pinkish white marked lilac purple, '35 in. long; standard orbicular, emarginate, '3 in. wide. Stamens exsert. Ovary puberulous, 3-ovuled. Pod orbicular (1-seeded), oblong (2-seeded) 1 to 1'75 in. long; valves thin woody black glabrescent. Seed ovoid red, no aril.  

Hab. Malacca, Brisu (Holmberg). Distrib. Sumatra.

(8) O. microsperma Baker, l.c. ii. 253; Prain, l.c. 151.

Tree 40 to 60 ft. tall. Branches velvety-brown. Leaves 8 to 10 in. long; leaflets 11 to 13, rigid, coriaceous, shining dark green, glabrous above, puberulous beneath, oblong or obovate acute or obtuse, base broad round, 2'5 to 4 in. long, 1'5 to 2 in. wide; nerves 7 to 9 pairs, elevate slightly beneath. Panicles of fastigiate racemes 8 in. long, 6 in. across, brown-velvety; pedicels very short. Calyx '25 in. long, velvety. Corolla white, '45 in. long; standard '35 in. wide. Ovary velvety, 3- to 4-ovuled. Pod 6 in. across, orbicular (1-seeded), oblong (2-seeded); valves thin, woody, glabrescent. Seed '3 in. long, '25 in. wide red, no aril.  


(9) O. venosa Baker, l.c. ii. 254; Prain, l.c. 152.
A big tree with densely velvety branches. Leaves 4 to 6 in. long; leaflets 7, obovate-oblong, blunt, base cuneate sub-sessile, densely tomentose beneath; nerves 10 to 12, strongly elevate, above glabrous, 3 to 4 in. long, 1.5 to 2 in. wide. Panicle 4 to 5 in. long, 3 in. wide, densely tomentose; pedicels as long as calyx. Calyx 25 in. long, velvety, teeth triangular. Corolla 35 in. long, white; standard 3 in. across. Ovary velvety. Pod oblong or obovoid, 1.5 in. long, 1.35 in. wide; valves woody thick, black and glabrous outside. Seeds 1 to 2, ovoid, 5 in. long, red. No aril. Hab. Malacca (Maingay).

Cultivated Papilionaceae

Cajanus indicus Spreng, Syst. Veg. iii. 248; Prain, l.c. 47. An erect shrub about 6 ft. tall. Leaves 2 to 5 in. long, appressed hoary silky; leaflets 3. Racemes axillary of few yellow flowers, veined red. Pod 2 to 3 in. long, downy with depressions between the 2 to 6 seeds. Native names: Dal; Kachang Kayu. Occasionally cultivated in gardens.

Dolichos Lablab Linn, Sp. Pl. 725; Prain, l.c. 54. A twining bean with trifoliate leaves and racemes 6 to 8 in. long on peduncles nearly as long. Flowers showy, purple or white. Native names: Kachang Karkaras or Kachang Jariji. Use: The pods form the local "French beans."

Psophocarpus tetragonolobus DC. Prodr. ii. 403; Prain, l.c. 55. Twiner, roots tuberous. Leaves trifoliate. Racemes lax, 4- to 6-flowered; peduncles long. Flowers large, showy, azure-blue. Pod 6 to 12 in. long, 4-winged; wings denticulate. Native names: Four-angled bean; Kachang Botol; Kachang Botor. Cultivated for its pods, eaten as a vegetable.


Arachis hypogaea Linn. Sp. Pl. 741. The ground nut, "Kachang Goring," an annual tufted herb with yellow flowers and well-known fruit, is cultivated in Singapore, Province Wellesley, the Dindings and Penang.

Lourea vespertilionis Desv. Prain, l.c. 132; "Malay Peninsula, Norris," is a rare plant even in gardens, and has no claim to be admitted to the flora.
(B) CAESALPINIEÆ (Genera 42–56).

42. CASSIA, Linn.

Shrubs, trees or herbs. Leaves simple, even pinnate. Flowers usually large showy yellow or pink in axillary racemes and terminal panicles. Calyx-tube very short; sepals imbricate. Petals 5, imbricate. Stamens 10, rarely all perfect, 3 to 5 reduced to staminodes or absent; anthers usually basifixed dehiscing by terminal pores. Ovary sessile or stalked, many-ovuled; style incurved. Pod terete or flat, usually septic. Seeds flat. Species 340, whole tropical world.

Stamens 10, fertile.
Pod terete; flowers pink; tree
Pods flat; flowers yellow; shrub
Stamens 7, fertile; pods dehiscent.
Trees; flowers in large panicles; yellow.

Stipules large; pod thin-valved; leaflets pubescent
Stipules small; pod thick, stiff
Coarse weedy shrubs.
Glabrous; pod 4-angled

Hairy; flowers in axillary pairs, yellow
Tall shrub; flowers with erect racemes with orange bracts
Slender under-shrubs with very small leaflets.
Leaflets linear; diffuse herb; pod 2 in. long; seeds 20 to 25
Leaflets oblong; erect; pod 1 to 1 ½ in. long; seeds 8 to 16

(1) C. nodosa Ham. in Roxb. Hort. Beng. 31; Baker, in Hook. fil. F.B.I. 261; Prain, l.c. 155.
A tree 40 to 80 ft. tall. Stem 10 to 15 in. through. Leaves 9 to 10 in. long; leaflets chartaceous, 6 to 12 pairs, oblong, shortly acuminate, base rounded 2 to 2 ½ in. long, 1 to 1 ½ in. wide, glabrous above, pubescent beneath. Flowers in corymbs, 2 to 3 in. long on the old nodes of the branches below the leaves. Sepals green, ovate obtuse, hairy. Corolla rose pink, ½ in. across; petals ovate, clawed. Pod terete, 1 ½ to 2 ft. long, ½ in. through, black with thin dissepiments between the 60 to 90 flat seeds. Hab. River-banks, forests, not rare. Pahang River, common. Malacca, Brisu; Sadanen; Selandor (Derry). Negri Sembilan, Temengah; Goping. Ulu Kerling (Kunstler). Penang, Waterfall (Curtis). Distrib. Burma, China, Sumatra, Borneo. Native names: Turukop Bumi; Sibusuk; Busuk-Busuk.

(2) C. glauca Lam. Encyc. Meth. i. 647; Baker, l.c. ii. 265; Prain, l.c. 157.
Shrub or treelet, 15 to 20 ft. tall, nearly glabrous. Leaves
6 to 9 in. long; leaflets 4 to 6 pairs, membranous, pale green above, glaucous beneath and slightly puberulous, ovate acute, base cuneate, 2 to 4 in. long, 1 to 2 in. wide; nerves 10 to 12 pairs; rachis puberulous with long conical glands between each of the lower pairs of leaflets. Flowers in axillary corymb, 4 in. long, 2 to 5 in. across. Calyx-segments orbicular, yellow unequal. Petals pale yellow, 1 in. long, 75 in. across. Pod flat straight linear, 6 to 8 in. long, 5 to 7 in. wide; stalk 5 to 6 in. long. Seeds 20 to 30, oval biseriate. Hab. In cultivated ground, doubtfully wild. Singapore, Sungei Morai. Malacca (Maingay). Perak, Simpang (Wray). Penang, Pulau Tikus. Distrib. Tropical Asia.

(3) C. timoriensis DC. Prodr. ii. 499; Baker, l.c. ii. 265; Prain, l.c. 162.

Small tree about 20 to 30 ft. tall, pubescent. Leaves 1 to 1½ ft. long; leaflets 16 to 24 pairs, membranous, glabrescent to densely pubescent above, sparsely pubescent to tomentose beneath, lanceolate-oblong, base round, 1 to 1½ in. long, 35 to 65 in. wide. Flowers in a large terminal panicle, 1 to 1½ ft. long, 6 in. across. Sepals unequal oblong-obtuse, pubescent, larger ones 3 in. long. Petals oblong, 6 in. long, 3 in. wide, orange yellow. Stamens 7; staminodes 3. Pod straight linear, flat thin, valves coriaceous, 5 to 6 in. long, 5 in. wide; stalk 3 in. long. Seeds biseriate, 16 to 20 oval obtuse, 25 in. long.

var. typica. Leaflets glabrescent above, sparsely pubescent beneath. Stipules narrow. Hab. Rare, Lankawi, Kwah (Curtis).


(4) C. siamea Lam. Encyc. Meth. i. 648; Prain, l.c. 163.

Tree 30 to 50 ft. tall, 12 in. or less through. Leaves 6 to 12 in. long; leaflets 4 to 16 pairs, sub-coriaceous, glabrous, dark green, paler beneath, oblong-obtuse, base round, 1½ to 2½ in. long, 5 to 9 in. wide. Flowers in large terminal panicles 8 to 16 in. long, 6 to 8 in. across, bright yellow. Sepals ovate-oblong unequal, puberulous. Petals sub-orbicular, 75 in. long. Stamens 7; staminodes 3. Pod straight, flat, sutures thickened; valves coriaceous, 6 to 9 in. long, 5 in. wide; stalk 5 in. long. Seeds 20 to 30, oval, 3 in. long. Hab. River-banks, open country, often planted as a roadside tree. Malacca, Chenana Putih (Cantley); Brisu (Derry). Pahang, along the Pahang River from the mouth to Kwala Tembeling. Selangor, Ulu Selangor (Kunstler). Penang (Curtis). Kedah, between Alor Sta and Perlis. Distrib. India, Indo-China, Malay islands. Native names: Guah hitam; Jual; Sibosuk; Busuk-Busuk (lit. foetid, on account of the foetid smell
of the leaves after rain); Johar; Jaha. Use: Flowers eaten in curry.

(5) C. Tora Linn. Sp. Pl. 376; Prain, l.c. 158.

A foetid herb or under-shrub, 2 to 3 ft. tall. Leaves 2 to 4 in. long; leaflets 3 pairs, membranous, glaucous, obovate-oblong; leaflets, uppermost 2 in. long, 1 in. wide, lower 1 to 1.75 in. long, 0.75 in. wide, tip acute, base obliquely rounded; nerves 8 to 10 pairs. Flowers in sub-sessile pairs, axillary crowded. Calyx 5-lobed to base, lobes ovate acute, green, 2 in. long. Petals oblong-obtuse pale yellow, 3 in. long, 2 in. wide; standard re-use. Stamens 7 with 3 staminodes; anthers brown. Pod 6 to 8 in. long, 15 in. wide, nearly 4-angled; valves puberulous not reticulated. Seeds 25 to 30, rhombohedral, brown, shining. Hab. Rare, in waste ground. Perak, KwaIa Dipang (Scortechini). Distrib. Tropical Asia.

(6) C. obtusifolia Linn. Sp. Pl. 377; Prain, l.c. 159.

Much resembling C. Tora Linn., but not foetid, the leaves not glaucous, deltoid at the tip. Flowers bright yellow. Petals 5 in. long, 35 in. wide. Pod 8 to 10 in. long, 2 in. wide, sub-terete. Seeds 30 to 35, brown, 2 in. long. Hab. Very common on waste ground. Singapore, Pulau Ubin, etc. Pahang, Pekan and far up the Pahang River. Malacca, Tanjong Kling. Selangor, KwaIa Lumpur; Raub Track (Machado). Distrib. S. America, now naturalised in Asia. Native names: Gelenggang Padang; Gelenggang kechil.


(8) C. hirsuta Linn. Sp. Pl. 378; Prain, l.c. 159.

Branched annual 2 to 5 ft. tall. Leaves 4 to 8 in. long; leaflets 3 to 6 pairs, membranous green hairy foetid, ovate acuminate, base cuneate 1.5 to 3.5 in. long, 1 to 1.5 in. wide; rachis with one large gland just above base. Flowers in sub-sessile axillary pairs. Sepals ovate sub-acute, pilose, 25 in. long. Petals bright yellow, 45 in. long, ovate-oblong blunt. Stamens 7 with 3

Large lax-branched shrub about 6 ft. tall. Leaves 1 to 2 ft. long; leaflets 8 to 14, stiff papery, light green, linear-oblong obtuse, base rounded, glabrous, 2 to 4 in. long, 1 to 1'5 in. wide. Flowers in erect spike-like racemes 6 to 18 in. long, at first covered with large ovate-rounded orange bracts, '75 in. long. Sepals spatulate, obtuse, '1 in. long, '6 in. wide, orange. Petals ovate-orbicular 1'25 in. long, yellow orange. Stamens 7; staminodes 3. Pod black, 6 to 8 in. long, '8 in. wide, winged. Seeds 50 to 60, triangular, '25 in. long. *Hab.* Damp spots near cultivation. An American plant now dispersed all over the tropics and valued for the use of its leaves in skin disease, popularly known as "seven golden candlesticks." *Native names*: Gelenggang; Daun Kurap.  


Slender shrubby plant pubescent, 6 in. to 1 ft. or more tall. Leaves 1 to 2 in. long; leaflets 16 to 24 pairs, narrow oblong, mucronate, glabrous or puberulous, '4 to '6 in. long, '1 to '15 in. across. Flowers axillary, 1 to 3 together. Sepals unequal linear-lanceolate, '35 in. long. Petals sub-equal, elliptic or orbicular, yellow, '4 to '6 in. long. Stamens 10 (or 9 or 7, the upper 1 or 2 reduced to staminodes). Pod 1 to 1'5 in. long, '2 in. across, linear, flat. Seeds 8 to 16, rhomboid. *Hab.* Grassy spots, roadsides. Singapore, formerly common in Tanglin; Bukit Mandai. Perak, Temengoh. Penang Hill, 2000 ft. altitude (Curtis). *Distrib.* India, Cochin-China.  

**EXCLUDED SPECIES**

*Cassia javanica* Linn. *Sp. Pl.* 379. A medium-sized tree with blunt leaflets and corymbs of pink flowers with blunt petals,
from amongst the leaves, 10 stamens and a long terete pod. Thaiping (Wray), Prain, l.c. 156. The only tree I know of in Thaiping is planted in the gardens. It seems to be quite absent from the peninsula as a wild plant. Native of Sumatra and Java. Native name: Dulang.

C. fistula Linn. Sp. Pl. 377. The Indian Laburnum. Native name: Bireksa. A low tree with long pendent spikes of large yellow flowers; pod long cylindric, is occasionally to be seen in gardens. It is recorded from Malacca under the old name of Cana fistula by Linschoten (Voyages to the East Indies) in 1583.

C. Sophera Linn. Sp. Pl. 379; Penang, fide Baker in F.B.I. l.c. 262. I have seen no specimens from Penang or anywhere else in the Malay Peninsula. It resembles C. occidentalis, but has 8 to 12 pairs of leaflets and turgid, not flat pods. A South American weed.

43. KOOMPASSIA, Maing.


Leaflets 7 to 9, 2 to 3 in. long . . . . (1) K. malaccensis
Leaflets 9 to 11, 1 to 1 25 in. long . . . . (2) K. excelsa

(1) K. malaccensis Benth. in Hook. fl. l.c. Pl. xii. 58, t. 1164; Prain, l.c. 166.

A tree 100 to 150 ft. tall, 3 to 8 ft. through buttressed at the base. Leaves 5 to 8 in. long; rachis pubescent; leaflets 7 to 9, ovate-lanceolate or oblong acuminate blunt, light shining green, 2 to 3 in. long, 8 to 1 25 in. wide; nerves 10 to 12 pairs. Panicles 3 to 4 in. long or more, pubescent. Sepals ovate acute, brown, 1 2 in. long, tomentose. Petals white, base green, oblong, obtuse, 1 5 in. long. Stamens very short, flesh-colour; anthers widely triangular. Ovary pubescent, violet. Pod 4 to 5 in. long, 1 25 to 1 5 in. wide, oblong, papery, light green, twisted at the base. Hab. Forests, often left in cultivated ground, being too hard to fell in clearing forest. Singapore, Tanglin; Selitar, etc. Malacca, Merlimau; Sungai Hudang; Selandor (Derry). Pahang, Pulau Tawar; Perak, Thaiping (Kunstler, Wray). Sindings, Lumut (Curtis). Province Wellesley, Tasek Gelugur (Fox). Penang, Penara Bukit (Curtis). Distrib. Sumatra. Native name: Kempas. Use: Timber, finely figured and hard, but not durable if exposed.


A gigantic tree over 150 ft. tall. Branchlets golden-hairy when
young. Leaves 3 to 4 in. long; leaflets 9 to 12, elliptic-lanceolate, obtuse often emarginate, base cuneate, glaucous silky beneath, 1 to 1.25 in. long, 25 to 35 in. wide; rachis and petioles silky when young. Panicles terminal at first silky, then glabrescent, 3 to 4 in. long; branches spreading 1.5 in. wide; flowers scattered 3 in. across. Calyx-tube short conic. Sepals ovate-lanceolate, pubescent in bud, nearly glabrous in flower. Petals elliptic white, nearly as long. Stamens with slender filaments as long as anthers. Ovary cylindric, glabrous. Pod 3 in. long, 1 in. wide oblong, apex broadly rounded, red. *Hab.* Forests; apparently very rarely flowering. Pahang, Raub (Burn-Murdoch); Perak, Goping (Kunstler); Grit; Gapis (Wray). *Distrib.* Borneo. *Native name:* Tualang (in Borneo, Tapan).

44. **DIALIUM,** Linn.

Medium to very tall trees, wood very hard. Leaves odd-pinnate; leaflets alternate 3 to 9, coriaceous. Flowers small white in large terminal panicles. Calyx-tube short; lobes lanceolate, deciduous. Petals o. Stamens 2, included; anthers attached near the base. Ovary sessile, 2-ovuled. Pod oblong or ovoid, globose, with black pericarp; endocarp pithy, sweet. Seed 1. Species 15, cosmopolitan. Malay name, Keranji; fruit of several species sold in the markets for eating. Timber very hard and compact, highly valued. The great size of these trees makes collecting specimens difficult, hence they are comparatively little known.

Leaves glabrous.

Pods 1.5 in. long, umbonate . . . . . . (1) **D. Kunstleri**

Pods 1 in. or less, blunt, not velvety.

Leaves thinly coriaceous.

Panicles lax, spreading; pedicels as long as calyx . . . . . . (2) **D. patens**

Panicles erect; pedicels shorter than the calyx.

Leaflets lanceolate, alternate; seed subquadrate . . . . . . (3) **D. indum**

Leaflets elliptic, opposite; seed orbicular . . . . . . (4) **D. laurinum**

Pods velvety; leaflets coriaceous . . . . . . (5) **D. Maingayi**

Leaflets pubescent beneath.

Leaflets large 5 to 7, golden-pubescent beneath . . . . . . (6) **D. platysepalum**

Leaflets small 9 to 12, alternate, golden-tomentose beneath . . . . . . (7) **D. Wallichii**

Leaflets small 13 to 15, opposite, rusty tomentose beneath . . . . . . (8) **D. Kingii**

(1) **D. Kunstleri** Prain, l.c. 168.

Tree 80 to 100 ft. tall, 2 to 3 ft. thick. Leaves 5 to 6 in. long; leaflets 5 (or 3), ovate-lanceolate narrow acuminate, base cuneate, 4 to 5 in. long, 1.25 to 1.5 in. wide, coriaceous, glabrous; nerves faint 5 to 6 pairs; petiolules 1 in. long. Panicles terminal and
axillary, 4 in. long, 3 in. wide. Flowers unknown. Pod sub-spherical, tip umbonate, 1'5 in. long, 1'35 in. wide, glabrous, black. Seed 1 sub-rotund, '6 in. long. Hab. Open hilly jungle. Perak, Goping (Kunstler).

(2) D. patens Baker, in Hook. fil. F.B.I. ii. 270; Prain, l.c. 169.

Tree 60 to 80 ft. tall, 10 to 20 in. through; branches slender. Leaves 5 to 6 in. long; leaflets 3 to 5, oblong or elliptic cuspidate or acute, base rounded, sub-coriaceous, glabrous; nerves 8 to 10 pairs, fine, 3 to 5 in. long, 1'5 to 2'25 in. wide; petiolules stout, 2'5 in. long. Panicles 6 to 8 in. long, 4 to 5 in. wide; branches slender, glabrous. Calyx '15 in. long, tube 0; lobes white, imbricate, ovate-oblong, obtuse, grey pubescent on both sides. Stamens, filaments short slender. Ovary silky, sessile. Pod ovoid, black, grey pubescent, '5 in. long, '35 in. across. Seed oblong, angles round, '3 in. long, dark maroon. Hab. Low wet jungle. Malacca (Griffith, Maingay). Pahang, Kwantan (Foxworthy). Perak, Larut (Kunstler). Distrib. Borneo. Native names: Keranji Umbut; Keranji Burong; Keranji Baledu.

(3) D. indum Linn. Mantiss. 24; Benn. Pl. Jav. Rar. 136, t. 30; Prain, l.c. 169.

Tree about 60 to 70 ft. tall. Branches grey puberulous. Leaves 6 to 8 in. long; leaflets 5 to 9, chartaceous, elliptic lanceolate-acuminate, base cuneate, 3 to 4 in. long, 1 to 1'5 in. wide, glabrous; nerves faint, 8 to 10 pairs; petiolules 2 in. long. Panicles terminal and axillary, 4 in. long, 3 in. wide; branches slender, silky. Calyx '15 in. long, white; tube 0; segments 5, imbricate, grey puberulous. Stamens 2; filaments short, slender. Pod sub-ovibcular, '9 in. wide, apiculate puberulous with minute silky hairs. Hab. Open country on river-banks. Pahang, Pijai, Pahang River (Ridley). Penang, Ayer Hitam (Curtis). Distrib. Java. Native names: Tulang Dayong.

(4) D. laurinum Baker, l.c. ii. 269; Prain, l.c. 170.

Big tree. Branchlets puberulous. Leaves 7 to 8 in. long; leaflets 7 (rarely 5) elliptic, tip cuspidate blunt retuse, base round coriaceous, glabrous, 4 to 5 in. long, 1'75 to 2 in. wide; nerves 8 to 9 pairs; petiolules thick '3 to '4 in. long. Panicles 4 in. long, 3 in. wide, pubescent; flowers in clusters of 3. Calyx '15 in. long, ovate-oblong, grey-velvety. Stamens short. Pod orbiculare, 1 in. across, not apiculate, black with grey pubescence. Seed orbicular, '5 in. across, reddish brown, reticulate. Hab. Dense forests. Singapore, Kranji. Malacca, Ayer Panas (Goodenough, Maingay). Pahang, Bentong (Foxworthy). Native name: Keranji papan.

(5) D. Maingayi Baker, l.c. ii. 269; Prain, l.c. 171.

Big tree. Branchlets glabrous. Leaves 4 to 5 in. long; leaflets 9 (or 7) elliptic-oblong, cuspidate or acuminate, base round, coriaceous, dark green above, pale beneath; nerves 4 to 5 pairs faint,

(6) D. platysepalum Baker, l.c. ii. 270; Prain, l.c. 172.
Tree 80 to 90 ft. tall. Branchlets puberulous. Leaves 5 to 9 in. long; rachis puberulous; leaflets 5 to 7, elliptic or oblong to ovate lanceolate, caudate-acuminate, blunt, base rounded or cuneate, coriaceous, dark green shining above, yellow silky beneath, keel very prominent; nerves distinct, fine 9 to 11 pairs, 3 to 5 in. long, 1 to 2 in. wide; petiolules '25 in. long. Panicles deltoid, lax, 5 to 8 in. long, 4 to 7 in. wide, brown-silky. Calyx '2 in. long, tube distinct, campanulate, lobes imbricate, triangular blunt, coriaceous, dense, brown-velvety on both sides. Filaments thick. Ovary black-velvety. Pod obovoid or round, 1 in. long, '6 to '8 in. across, dark brown-velvety. Seed orbicular, pale-brown striate. Hab. Forests, common. Malacca, Ayer Panas; Selandor (Derry). Negri Sembilan, Senawang Reserve (Burkill). Selangor, Kwala Lumpur (Foxworthy). Perak, Relau Tujor (Wray).

var. ambiguum. D. ambiguum Prain, l.c. Branches and leaves nearly glabrous. Ovary green-silky, sessile; style glabrous. Malacca, Bukit Sadanen (Derry). Perak, Goping (Kunstler). Prain, l.c. 173, distinguishes three forms, the typical one with ovate-lanceolate cuneate leaflets and orbicular pods, Perak and Malacca (Native name: Sepan), and two forms to which he gives respectively the names of papan and burong. These being Malay words cannot be used in place of Latin. The first form has elliptic leaflets round at base, the second oblong leaflets and clavate pods. The foliage varies considerably in these trees, and I think the varieties are hardly worth keeping up; Keranji papan is a name given to laurinum, as well as to platysepalum. The word means planks, this tree being specially valued for timber. Keranji burong, Bird Kranji, is also used for D. Maingayi. D. platysepalum is also known as Keranji Tembaga and Sakellet (said to be a perversion of scarlet) and refers to the coppery underside of the leaves.

Tree about 80 ft. tall. Leaves 7 to 8 in. long; leaflets 9 to 11, alternate, bright green above, golden yellow beneath coriaceous, oblong-lanceolate acuminate acute, base rounded, 2 to 2.25 in. long, '6 to '8 in. wide; nerves 15 pairs, very inconspicuous;
petiolules 1 in. long; rachis yellow, pubescent. Panicles terminal, 6 to 8 in. long, 3 to 4 in. wide, golden-pubescent. Calyx 2 in. long, ovoid; tube distinct, lobes imbricate, broad triangular, obtuse, coriaceous, green-velvety outside, within white, glabrous. Stamens, filaments thick, connective pubescent. Ovary brown-silky, stipitate. Pod obovoid, 1 in. long, 75 in. wide, black-velvety. Seed sub-quadrate, 4 in. long. Hab. Forests. Singapore (Wallich); Garden Jungle. Malacca (Maingay). Perak, Sungkai (Foxworthy).

(8) D. Kingii Prain, l.c. 175.

Big tree 100 to 150 ft. tall, 3 to 4 ft. through. Leaves 8 to 9 in. long; leaflets 13 to 15, opposite, coriaceous, glossy-green above, pubescent (not golden) beneath, oblong-lanceolate, blunt, base rounded; nerves conspicuous elevate, 2 to 2.5 in. long, 6 to 8 in. wide; petiolules 1 in. long. Panicle large, 12 in. long, 6 in. wide, dark brown-velvety. Calyx 2.5 in. long, no tube, lobes broad ovate-obtuse, dark brown outside, white glabrous inside. Ovary brown-velvety, sessile. Pod spherical, 9 in. long, 75 in. wide, velvety-black. Seed sub-quadrate striate, 4 in. long. Hab. Old Jungle. Perak, Goping (Kunstler).

45. BAUHINIA, Linn.

Unarmed shrubs, erect or climbers with circinate tendrils. Leaves simple usually ovate, deeply cleft into 2 lobes, rarely entire. Flowers usually showy and rather large in panicked or corymbose, rarely simple racemes. Calyx-tube with disc produced to top, short, campanulate or long cylindric, teeth 2 to 5. Petals clawed. Stamens 10 or reduced to 3 or 1, with sterile ones; filaments filiform; anthers versatile. Ovary stalked; stigma small or large, peltate. Pod linear or oblong, flat, dehiscent. Species 150, all tropics.

**Fertile stamens 10.** § Pauletia.
Shrub erect; flowers white . . . . (1) B. acuminata

**Fertile stamens 3.**
Calyx tube produced. § Phanera.
Erect shrub; leaves tomentose; flowers large red and yellow . . . . (2) B. mollissima

Climbers; flowers large white or pink in terminal racemes.
Buds club-shaped.
Petals glabrous except midrib and claw.
Calyx lobes 1.25 in. long . . . . (3) B. calycina
Calyx lobes 5 to 7 in. long . . . . (4) B. semibifida
Petals densely pubescent all over.
Petals longer than calyx lobes.
Leaves pubescent; flowers pink . . . . (5) B. Hulettii
Leaves glabrous.
Stipules large orbicular; flowers white . . . . (6) B. Griffithiana
Stipules small; flowers greenish yellow . . . . (7) B. ferruginea
Petals not longer than calyx lobes.
Leaves pubescent; pedicels very short.
Buds clove-shaped.
Leaves of 2 connate leaflets, tips round; flowers cream colour.
Flowers medium, red or orange in dense terminal corymbbs or racemes.
Calyx tube much longer than limb.
Leaves 5- to 7-nerved, pubescent beneath; pod velvety.
Leaves 7- to 9-nerved glabrous; pod glabrous.
Leaves 7-nerved, silky beneath; petals hairy outside.
Calyx tube twice as long as limb, or nearly so.
Calyx tube short, hardly or not exceeding limb.
Flowers in pubescent racemes.
Racemes many-flowered; leaves entire glabrous.
Racemes few-flowered; leaves bifid, pubescent beneath.
Racemes panicked densely hairy.
Leaves entire; racemes few 2 in. long.
Leaves bifid; racemes many 12 in. long.
Flowers corymbbose.
Leaves coriaceous small 3·5 in. long.
Calyx tube shorter than lobes. § LasioBema.
Flowers medium or small, green and pink or yellow, not red or orange.

Flowers over 1 in. across in racemes.
"Petals orbicular clawed. . . . (19) B. Finlaysoniana
Petals lancolate clawed. . . . (20) B. Wrayi
Flowers 5 in. across; petals spathulate. (21) B. Curtisi
Flowers 7 in. wide; very numerous; racemes 8 to 12 in. long. (22) B. strychnoidea
Flowers 1 in. wide; raceme 1 in. long. (23) B. micrantha
Flowers 6 in. wide; panicle 8 in. long. (24) B. glabrifolia
Flowers over 1 in. wide; panicle 9 in.

by 7 in. . . . . . (25) B. bracteata

(1) B. acuminata Linn. Sp. Pl. 376; Baker, in Hook. fil. F.B.I. ii. 276; Prain, l.c. 179.
A shrub about 5 to 10 ft. tall. Leaves slightly cordate cut down into acute or sub-obtuse lobes for a third of their length, glabrous above and hairy and glaucescent beneath, 4 to 5 in. long, 3·5 in. wide; petioles 1·25 in. long, puberulous. Flowers few corymbbose, pure white. Calyx 25 in. long, green. Petals oblong, 1·75 in. long. Stamens 10 fertile. Pod 4 to 5 in. long, 6 to 7 in. wide. Seeds 5 to 15. Hab. An occasional garden escape or remains of abandoned cultivation. I have never seen any which appeared to be really wild, but it is to be seen, in sandy places usually, in
Singapore and Malacca. Kunstler collected it in Larut, and on limestone rocks at Gunong Pondok, and perhaps it is really wild there. *Distrib.* India, Cambodia, Malaya.

(2) **B. mollissima** Wall. Cat. 5782; *Prain*, *l.c.* 180.

An erect shrub (or slender climber to 60 ft.). Branches tomentose, no tendrils. Leaves cordate round, lobes 75 to 1.5 in. long, quite round at tips; nerves 11, glabrous above, and prominent puberulous beneath, 3.5 to 4.5 in. long, 4 to 6 in. wide; petioles pubescent, 1.5 in. long. Flowers few, racemed; peduncles 5 to 2.25 in. long, tomentose. Calyx tomentose, lobes linear-lanceolate, 1 in. long, reflexed tube as long. Petals oblanceolate, lower four 2 in. long, red brown with central yellow streak, the upper one 2.25 in. long, 1.5 in. wide, red with a branched yellow line, all pubescent outside. Stamens 3 fertile, glabrous. Ovary tomentose. Pod pubescent, 4 in. long, 1 in. wide. Seeds 1 or 2 orbicular. *Hab.* Open country north of peninsula, usually a bush, slightly scandent or not. Perak, Larut, climber (Kunstler). Penang (Wallich). Kedah, Yan. Perlis, Kanga. *Distrib.* Tenasserim.


A climbing shrub covered with mealy red tomentum. Leaves ovate or nearly orbicular, lobes rounded one-third of length, base cordate, glabrous, 3 to 5 in. long and wide; petioles 1.5 to 2 in.

Baker identified two specimens of this in Griffith's collections as B. diphylla and B. ferruginea var. excelsa respectively.

(4) B. semibifida Roxb. Hort. Beng. 31; Wall. Pl. As. Rar. t. 253; Baker, l.c. ii. 280; Prain, l.c. 182.

A medium or gigantic climber, often slender, but sometimes with a stem 4 to 6 in. thick. Leaves rounded, oblong, base cordate; lobes ovate, blunt 5 in. long; nerves 11, elevate, pubescent beneath, 3 in. long and wide; petioles 1 in. long pubescent. Stipules ovate, falcate 15 in. long. Raceme lengthening to 6 in. or more, red-tomentose; buds club-shaped; pedicels 1.25 in. long, tomentose. Calyx densely pubescent, tube 1.4 to 1.5 in. long, dilate towards base, lobes narrowly lanceolate acute 5 to 7 in. long, 15 in. wide, green. Petals ob lanceolate obtuse, short clawed, 8 to 1 in. long, chalky white turning yellow green, glabrous except claw and on base of midrib. Stamens 3 fertile, white. Ovary stalked brown rusty-silky; style thick, silky. Stigma large, peltate. Pod oblong, thin; valves black, 4 in. long, 1.25 in. wide; stalk 35 in. long. Seeds 4 to 6 orbicular. Hab. Thick forest and edges of forest. Singapore, Garden Jungle; Bukit Timah. Malacca (Griffith). Tringganu, Bundi (Rostedo). Distrib. Sumatra.

Roxburgh's B. semibifida was based on a Sumatran plant cultivated in Calcutta Gardens. The pictures, Roxburgh's own and Wallich's, differ in the smaller flowers and distinctly hairy branches and leaves. The Singapore plant identified with this by Prain and the Malaccan plant identified by Baker are not hairy. I have seen no specimens from Sumatra. It was formerly at least common in Singapore, and our only wild Bauhinia there. I never met with it anywhere else. Baker's description appears to be based on the Malacca plant, and agrees with the Singapore plant.

(5) B. Hullectii Prain, l.c. 183.

Large climber 20 ft. or more tall, pubescent. Tendrils pubescent. Leaves rounded cordate, lobes rounded oblong, one-third length of leaf, sub-coriaceous, 2.5 to 4 in. long, 2.5 in. wide, sparsely pubescent above, appressed pubescent beneath or glabrous; petioles 1 in. long, pubescent. Stipules orbicular hairy. Raceme lax about 12-flowered, puberulous; pedicel 1.25 to 1.5 in. long. Buds club-shaped. Calyx rose pink, as are pedicels, tube dilate towards base, lobes lanceolate 4 to 5 in. long, 1 in. wide. Petals ob lanceolate obtuse, long-clawed, densely tomentose outside, 1.25 in. long,


A strong climber or big scandent shrub, glabrous. Tendrils glabrous. Leaves ovate-cordate or round, lobes ovate blunt 1 in. long, glabrous, coriaceous, 3 to 3.25 in. long, 3 in. across; petioles pubescent i in. long. Stipules long-persistent, orbicular, papery 75 in. across. Racemes 3.5 to 6 in. long, pubescent; pedicels 4 in. long. Bracts persistent ovate, 3 in. wide. Calyx puberulous, lobes lanceolate 6 in. long, 15 in. wide, tube 4 in. long. Petals white, silky ob lanceolate obtuse, short-clawed, 1.25 to 1.5 in. long, 4 to 5 in. wide, densely tomentose outside. Stamens 6; filaments red. Ovary stalked, silky; style stout, silky. Stigma peltate. Pod oblong black 5 in. long, 1.5 in. wide. Seeds 4 to 6 ovate, 5 in. long. Hab. Thickets, not very common. Pahang, Kwala Tembeling. Malacca, Gading (Hervey); Ayer Panas; Alor Gajah; Chabau (Hullett). Perak (Scortechini). Penang (Kunstler).

The name given by me really antedates Prain's name, but the genus Phanera was reduced to Bauhinia by Bentham in the "Genera Plantarum."

(7) B. ferruginea Roxb. Hort. Beng. 90; Baker, l.c. 283; Prain, l.c. 183.

Big climber. Tendrils glabrous. Leaves rounded cordate, lobes oblong rounded, sinus narrow, 1.75 in. long, glabrous; nerves elevate 11; whole leaf 2.5 to 3 in. long, 3.25 in. wide; petioles 75 in. long, hairy. Stipules ovate, falcate, 15 in. long, deciduous. Racemes pubescent, 3.5 to 6 in. long; pedicels club-shaped, 1 in. long. Calyx-tube 4 in. long slightly dilate towards base, lobes lanceolate, 6 in. long, 1.5 in. wide. Petals greenish yellow, ob lanceolate, blunt, short-clawed, 1 to 1.25 in. long, 3.5 in. wide, densely tomentose outside. Stamens 3; filaments pink. Ovary stalked, silky; style thick silky. Stigma oblique, peltate. Pod thin, oblong, black, glabrous, 8 in. long, 2 in. wide. Seeds 4 to 6, ovate, 5 in. long. Hab. Forests. Selangor, Petaling. Perak, Larut and Goping (Kunstler); Kamunting (Wray). Penang (Wallich 5776); Hill (Curtis). Native name: Lapang.

(8) B. Ridleyi Prain, l.c. 185.

Strong climber. Branches angled and tendrils long, silky. Leaves ovate blunt cordate; lobes to 1.5 in. long, above glabrous, beneath silky, 2.5 to 3 in. long, 2 to 2.5 in. wide; petioles 5 in. long, red-tomentose. Stipules ovate-lanceolate, caducous 15 in. long. Flowers densely corymbose; pedicels 2 in. long, tomentose. Calyx densely red-tomentose-hairy, tube 3 in. long dilate at base,
lobes lanceolate, 4 in. long, 1 in. wide. Petals oblong-obtuse, hardly clawed not exsert, densely tomentose outside, white, 4 to 5 in. long, 2 in. wide. Stamens 3; anthers crimson; filaments red. Ovary short-stalked, tomentose; style 5 in. long. Stigma large peltate. Hab. Forests, local. Johor (King and Hullett). Perak, Pengkalan Bharu (Kunstler); Padang Rengas (Curtis).

Easily recognised by its angled stem, the angles fringed with silk and dense corymb of short-pedicilled, short-petalled flowers.

(9) **B. glauca** Wall. Cat. 5785; Baker, in Hook. fil. F.B.I. ii. 282; Prain, l.c. 186.

Slender climber. Tendrils puberulous. Leaves membranous, ovate, deep cordate bilobed half-way; lobes round, 2 to 3 in. long, 2.75 in. wide, glabrous above, thin-pubescent beneath especially on nerves; petioles slender, 1.6 in. long. Stipules linear, subulate, 2 in. long. Corymb 1 in. long and as wide on peduncles slender as long or longer, red-pubescent. Buds clove-like. Calyx glabrous, tube cylindric, 4 in. long, lobes short, ovate 15 to 2 in. long. Petals cream colour, oblong, long-clawed, edges wavy, 75 in. long, pubescent outside. Stamens 3, white. Ovary glabrous, stalked. Stigma small. Pod thin glabrous, 6 to 8 in. long, 1.5 to 2.25 in. wide. Seeds 15 to 20, oval in a line down the pod. Hab. Perak, Kampong Kota (Wray, Scortechini). **Distrib.** Tenasserim.

(10) **B. cornifolia** Baker, in Hook. fil. F.B.I. ii. 278; Prain, l.c. 186.

A lofty climber 100 to 150 ft. tall, thinly downy. Tendrils downy, few. Leaves coriaceous entire ovate, tip blunt, acute or minutely bifid, base broad rounded; nerves 7 pairs, glabrous above, sparsely silky or glabrous beneath, 2.5 to 3.5 in. long, 1.5 to 2.25 in. wide; petioles 1 in. long, puberulous. Corymb 4 to 6 in. across; pedicels 2-2.5 in. long, pubescent. Buds clove-shaped. Calyx-tube slender, 1 in. long, lobes ovate, sub-acute, 25 in. long. Petals oblong-lanceolate, short-clawed, 8 in. long, 5 in. wide, orange yellow becoming red. Stamens 3; filaments short. Ovary downy, short-stalked. Stigma peltate. Pod oblong, woody, 4 in. long, 2 in. wide, red-pubescent. Seeds 4, 1 in. long. Hab. Hill forests, Pahang, Kluang Terbang (Barnes). Negri Sembilan, Seremban (Cantley). Selangor, Kerling; Semeniye; Bukit Hitam (Kelsall). Perak, Gunong Keledang; Larut (Kunstler). Penang, top of hill (Curtis); Kelantan, Chaning forests (flowers cherry red). **Native names**: Akar Tumbul Merah; Lapang.

(11) **B. bidentata** Jack, Mal. Misc. ii. (7), 76; Baker, in Hook. fil. F.B.I. ii. 279; Prain, l.c. 188.

A lofty climber. Tendrils glabrous. Leaves ovate, slightly cordate or truncate at base, tip round acute or bifid, coriaceous shining green, 2.5 to 5 in. long, 1.5 to 3.5 in. across, glabrous; nerves 7 to 9; petioles 1 in. long. Corymb very abundant, 3 in. long and broad; pedicels pubescent, lowest 1.5 in. long. Buds
clove-shaped. Calyx-tube cylindric, ribbed, puberulous, 1 in. long; lobes ovate acute, 3 in. long. Petals orange yellow then scarlet, oblong, short-clawed, 6 in. long, 35 in. wide, pubescent outside. Stamens 3; filaments hairy. Ovary pubescent, stalked. Stigma large peltate. Pod oblong, woody, 4·5 in. long, 1·5 in. wide, glabrous. Seeds 4 to 5. Hab. Common and most conspicuous all over the jungles of the centre of the peninsula. Johor River (Hullett). Pahang, Kualia Tahan. Negri Sembilan, Pantai Selangor, Semangkok; Rawang (Kloss); Batu Caves. Perak, Thaiping (Wray); Goping and Sugei Rayah (Kunstler); Penang Hill (Jack); Waterfall (Curtis); Province Wellesley, Tasek Gelugur (Fox). Distrib. Sumatra. Native names: Pride of Selangor; Katup-Katup; Akar Katup-Katup; Sekoyah; Dauh Nasi.


Climber. Branches red-tomentose. Leaves ovate entire or shortly bifid, lobes short blunt, glabrous above, red-silky beneath; nerves 7, elevate, 3 in. long, 2·5 to 3 in. wide; petioles 1 in. long, sub-glabrous. Panicle 2 in. long. Flowers red, few; pedicels 2 in. long, red-pubescent. Calyx-tube cylindric, 5 in. long, lobes pubescent, boat-shaped, 35 in. long. Petals ovate, clawed 1 in. long, 5 in. wide, densely red-hairy. Stamens 3, red-hairy. Pistil hairy. Hab. Open hill-top, rare. Perak, Gunong Keledang (Ridley).


Climber, glabrescent. Leaves ovate-deltoid, tip very shortly bifid or entire acuminate, base cordate, coriaceous, glabrous; nerves 7, 2 to 2·25 in. long, 1·5 to 2 in. wide; petioles 1 in. long. Racemes short, 1 to 2 in. long, glabrous or nearly so, lax; pedicels 1·5 in. long, slender, sparsely hairy; bracts minute caducous. Buds obovoid. Calyx-tube cylindric, 4 in. long, red, appressed hairy; lobes ovate, 3 in. long, hairy. Petals oblong obtuse, conspicuously veined, sparsely hairy on back, claw 1 in. long, blade 7 in. wide. Stamens very short, hairy at base. Pistil stalked, cylindric hairy on the suture, 2 in. long; style about half as long, hairy on the edge. Stigma large peltate. Hab. Hill forests, 4000 ft. altitude upwards. Selangor, Gunong Mengkuang Lebah 5000 ft. altitude (Robinson). Perak, Gunong Kerbau 4500 to 5500 ft. altitude (Robinson).

(14) B. lucida Wall. Cat. 5779A; Prain, l.c. 188. B. emarginata Baker, in Hook. fil. F.B.I. ii. 278, not of Miller.

Big climber 100 ft. long, glabrous. Leaves ovate-cordate entire acuminate, coriaceous, glabrous, 3·5 in. long, 2 to 2·5 in. wide, 5- (rarely 7-)nerved; petioles 3 to 4 in. long. Panicles of racemes lax, long peduncled, 4 to 6 in. long, 2 in. across, rusty-puberulous; pedicels 7·5 in. long or less. Buds clove-shaped. Calyx tomentose, tube cylindric, 2·5 in. long, 2 in. across. Petals ovate-oblong bright yellow, claw long, 8 in. across, pubescent outside. Stamens

(15) B. Scortechinii Prain, l.c. 188.

Large climber, glabrous except at tip of branches. Leaves shallow cordate ovate bifid, lobes narrow, sub-triangular, sinus wide, coriaceous, glabrous above, appressed-hairy beneath; nerves 9 (rarely 7) elevate beneath, 3'5 to 4 in. long, 2 to 2'25 in. wide; petioles 1'5 in. long, glabrous. Racemes few-flowered, rusty-pubescent; pedicels 5 in. long or less. Bud 5 in. long, clove-shaped. Calyx-tube cylindric 25 in. long, lobes ovate nearly as long. Petals ovate tomentose outside. Stamens 3 (or 4) fertile, hirsute. Ovary pubescent; style glabrous. Stigma peltate. Hab. Perak, Gunong Haram (Arang) Para (Scortechini).


Big climber. Branches, petioles, inflorescence red-velvety, Leaves coriaceous orbicular cordate, entire or retuse at tip; nerves 7 or 9 elevated beneath, glabrous above, red-velvety beneath, densely on nerves and reticulations, 2 to 2'5 in. long, 2'4 to 3 in. wide; petioles 1'25 in. long. Panicles of a few stout racemes axillary and terminal, 2'5 to 5 in. long; branches with prominent flower-scars, very numerous. Bracts lanceolate-acuminate, 1 in. long; pedicels slender 6 in. long. Buds ovate, sub-acute, the tube shorter. Calyx-tube cylindric, dilate at base, 2 in. long, lobes oblong, 2 in. long, all hairy. Petals oblong, rather short-clawed, very red-hairy outside, 35 in. long, 2 in. wide. Stamens fertile, 3, slender glabrous. Ovary hairy all over; style about as long, slender, glabrous; stigma peltate. Pod woody, firm. 8 in. long, 2'5 in. wide, oblong, blunt, slightly narrowed at tip, brown, scurfy. Seeds flat orbicular, 11 in. long. Hab. Northern forests. Pahang, Sungei Jelai (Machado). Perak, Temengoh; Kinta (Murton). Province Wellesley (Kunstler). Penang (Roxburgh, Wallich). Kelantan, Sungei Lebeh (Yapp).


A lofty climber. Branches and tendrils puberulous. Leaves usually deep cordate, ovate, rounded with short wide sinus at top or quite entire (seedling leaves 8 in. across, thin, sinus broad, points acute). Adult leaves 4 to 6 in. long and about as wide; leaves near the inflorescence small 1 in. long, coriaceous, glabrous except nerves beneath, sometimes pubescent; nerves 11; petioles glabrous, 175 to 2'25 in. or more long. Flowers in leafy panicles, 12 in. long of dense, many-flowered racemes, 3 to 6 in. long; pedicels slender 1 in. long, puberulous. Calyx-tube 15 in. long,

Baker and other botanists mistook this plant for Roxburgh's *B. integrifolia*, but it is clear that Roxburgh intended by his species collected in Penang the entirely northern plant, and not this species.

(18) **B. Kingii** Prain, *l.c.* 189.

Small glabrous climber. Branches zigzag. Leaves deeply cordate ovate acuminate, bifid or entire, lobes very short, coriaceous, glabrous above and beneath, 5-nerved, 3:5 in. long, 2:5 to 3 in. wide; petioles 1 in. long. Corymbs axillary and terminal lax, 3 in. long, 2:5 in. wide to 6 in. across and 1 to 1:5 ft. long; pedicels slender, 1:25 in. long, puberulous. Bud clove-shaped. Calyx-tube narrow infundibuliform, '25 in. long, lobes ovate acute as long. Petals bright red oblong-lanceolate obtuse, long-clawed, '8 in. long, '25 in. wide, pubescent outside. Stamens 3, hirsute. Ovary pubescent along edges, stalk long; style large, peltate. Pod glabrous, woody, narrowly ovate, narrowed both ends, 2 in. long, '8 in. wide; stipe '2 in. long, pubescent. Seeds 1 to 2, ovate. *Hab.* Hill forests. Selangor, Bukit Hitam (Kelsall). Perak, Gunong Batu Putih (Wray). *Native name:* Akar Suloh.


(20) **B. Wrayi** Prain, *l.c.* 191.

Shrubby creeper 15 to 30 ft. long, glabrous. Leaves ovate truncate (rarely cordate) acuminate acute (rarely obtusely emar-
ginate), 2 to 3 in. long, 1·25 to 1·75 in. wide, glabrous above, glaucous beneath; nerves 5; petioles slender '5 to '6 in. long. Racemes lengthening as the flowers fall, from 1 to 4 in.; rachis with raised scars, glabrous; buds clove-shaped, '2 in. long; pedicels very slender, 1 in. long. Calyx glabrous, tube '15 in. long, lobes spathulate as long. Petals broad oblanceolate, long-clawed, edge wavy, sparsely pubescent outside, greenish yellow to pink. Stamens 3. Ovary glabrous. Stigma small. Pod obovate or oblong, thin, woody, 2 to 3 in. long, 1 in. across, glabrous. Seeds 1 to 2, ovate. Hab. On rocks usually at about 1000 ft. altitude. Johor, Gunong Pulai 1000 ft. altitude. Selangor, Ulu Selangor 1000 to 1200 ft. altitude (Kunstler). Perak, Larut (Kunstler).

(21) B. Curtisii Prain, l.c. 195.

Slender woody climber, nearly glabrous. Leaves obovate-oblong, base round, tip entire or shortly blunt, bilobed, membranous, glabrous; nerves 5 to 7, 2·5 to 4 in. long, 2 to 2·5 in. wide; petioles '5 in. long. Racemes or few-branched panicles, 4 to 6 in. long; pedicels spreading, slender, '6 in. long; buds ovate, very small. Calyx-tube campanulate, very small, lobes ovate, '15 in. long, puberulous. Petals '25 in. long, spathulate, glabrous, white. Stamens 3, longer. Ovary glabrous. Pod linear-oblong, flat, thin, sub-glabrous, 2·5 in. long, '75 in. wide. Seeds 3 to 5. Hab. Lankawi, near the lake and on Terutau (Curtis).

(22) B. strychnoidea Prain, l.c. 195.

Creeper about 30 ft. long. Stems 1 in. through, glabrous. Leaves obovate acute, base cuneate, coriaceous, glabrous; 3 to 4 strong raised nerves, dark shining green, 3 to 3·5 in. long, 1·5 to 2 in. wide; petioles '75 in. long. Racemes paniced or simple, 8 to 12 in. long; pedicels spreading '75 in. long. Flowers very numerous, small. Calyx-tube campanulate, limb with 5 short teeth, glabrous. Petals spathulate, slightly puberulous inside. '35 in. long, yellow or light red. Stamens 3. Ovary pubescent, Stigma large, peltate. Pod oblong woody, brown-velvety, 3 to 5 in. long, 2 in. wide. Seeds 3 to 5 ovate, 1 in. long. Hab. Hills usually limestone. Pahang, Gunong Senyum (Evans). Selangor, Batu Caves on the top of the hill (Kelsall); Negri Sembilan, Tampin Hill (Burkill). Perak, Goping and Chanderiang (Kunstler); Tambun, Ipoh (Ridley).


A long climber over rocks. Leaves (red and silky when young), bright green ovate, tip shortly bilobed, base broad entire, glabrous except a little red hair at base; nerves 10; 2 in. long, 2·5 in. wide; petioles '5 to '75 in. long. Peduncles 2 in. long; raceme corymbose 1 in. long, red-hairy; flowers white; pedicels '5 in. long, pubescent. Calyx-tube cylindric, lobes ovate. Petals '5 in. long, oblong rounded, crisped; stem pubescent. Stamens longer, glabrous. Ovary glabrous. Pod oblong, beaked at tip, 3 in. long,


Slender climber 50 to 80 ft. long. Stem 1 to 5 in. through; branchlets and tendrils silky. Leaves membranous, glabrous, ovate-acuminate, base truncate, entire or bifid, with narrow acute, overlapping lobes; nerves 9 elevate, 4 to 6 in. long, 3 to 4.5 in. wide; petioles 1.25 to 2 in. long. Panicles 8 in. long, 4 in. wide, of dense small corymbs of small white flowers, grey-silky; buds clove-shaped. Calyx-tube 1.5 in. long, lobes ovate 2.5 in. long, grey-silky. Petals obovate, clawed 3 in. long, grey-silky outside. Stamens 3 glabrous. Ovary silky; style glabrous. Stigma small. Hab. Forests to 1000 ft. altitude. Perak, Goping (Kunstler); Blanda Mabok (Wray). Penang, Ayer Hitam and West Hill (Curtis). Distrib. Burma, Borneo.

The young leaves are split into two large ovate acuminate lobes down to the petiole.


Climber. Branches tomentose, reddish. Leaves coriaceous, glabrous, sub-cordate, lobes 2.5 in. long; nerves 10, 3.5 in. long and as wide; petioles 2 in. long. Panicle 9 in. long, 7 in. across, much-branched, tomentose; pedicels 1.5 to 2 in. long, pubescent. Calyx-tube very short, silky, lobes 2 ovate-oblong, pubescent, 3 in. long. Petals claw slender, pubescent, 6 in. long; blade cordate, rounded, crisped, greenish white, veins conspicuous, silky-hairy on both surfaces, 4 in. long and as wide. Stamens 3, hairy; staminodes 6 glabrous. Ovary hairy at base. Hab. Kedah, Gerun, base of Kedah Peak (Robinson, Haniff). Distrib. Siam and Tenasserim.

**Excluded Species.**

**B. purpurea** Linn. *Sp. Pl.* 375. A shrub or tree with large purple (or white) flowers 3 in. across. Planted in gardens and occasionally as an escape into hedges at Tanglin, Singapore.

**B. diphylla** Ham, *Syme, Embassy*, p. 476. An Indian plant. The plants referred to it by Baker belonged to two other species.


46. CYNOMETRA, Linn.


C. Cauliflora Linn. Sp. Pl. 382; Prain, l.c. 197. The Nam-Nam; Puki anjing, is occasionally cultivated in the Malay Peninsula. It has a short trunk and pink flowers with brown reniform acid fruits about 2 to 3 in. long, borne on the trunk.

Stamens 10.

Cymes umbelliform; bracts small; leaves 1 to 2 jugate.

Racemes sub-spicate, dense; bracts large; leaves 3 jugate.

Stamens 40 to 60.

Flowers in axillary corymbs.

(1) C. ramiflora


var. minosoides Baker, in Hook. fil. F.B.I. ii. 269; Prain, l.c. 198.

Leaflets smaller, terminal pair obtuse emarginate, hardly larger than the basal pair. Rare; open swampy country. Setul. Distrib. India, Burma, Ceylon.


A big tree 80 ft. or more tall with very stout stem. Leaf shoots covered with large white, imbricating bracts. Leaves 2 to 3 in. long; leaflets 2 to 3 pairs, coriaceous oblong, base oblique cuneate, sub-acuminate dark green glabrous sessile 2 to 3 in. long, 1 to 1-25 in. wide. Racemes axillary congested, 1 to 1-5 in. long, 1 in. wide. Bracts close imbricating, hard, 1-25 in. across. Sepals 5, narrow obovate imbricate; tube short, white, 1-2 in. long. Petals white, 1-2 in. long. Stamens 10, 1-4 in. long, slender. Ovary pubes-

I have seen a spray from Pahang, Bukit Lentong, Rumpin, collected by Mr. Yeop of the Forest Department, Selangor, with unifoliate leaves in the axils of which are small tufts of flowers quite similar to typical C. inaequalifolia. Possibly only an abnormality. The collector gives the name Kong Katong for it.

(3) C. polyandra Roxb. Hort. Beng. 32; Prain, l.c. 200 var. Kurzii.

Large tree. Shoots enveloped in imbricating bracts, lower ones 3 in. across, inner ones 2 in. long, 1 in. across. Leaves, 3 pairs of leaflets; rachis puberulous elliptic obovate or oblong, base oblique cuneate, sub-acuminate coriaceous, dark green, paler beneath, 2.5 to 5.5 in. long, 1 to 2.5 in. across. Corymb axillary sessile, 2 in. long, 1.5 in. across; pedicels pubescent, 6 to 1 in. long. Calyx-tube short, lobes obovate, imbricate, white. Petals 5 lanceolate as long and narrower, white. Stamens 40 to 60; anthers versatile. Ovary pubescent. Pod oblique oblong, woody, wrinkled 2 to 2.5 in. long, 1.5 in. wide. Hab. Forests. Malacca, Batu Tiga (Holmberg). Penang Hill (Jack, Curtis); Kelantan, Kwala Lebir (Gimlette). The typical form is Indian, it has smooth pods. Native names: Malangkan; Bulangkan; Katang.

47. TAMARINDUS, Linn.


(1) T. indica Linn. Sp. Pl. 34; Prain, l.c. 201. T. officinalis Bot. Mag. 4563.

Leaves 2 to 6 in. long. Leaflets 0.35 to 1.25 in. long, 0.2 to 0.3 in. across; racemes 2 to 4 in. long. Flowers about 0.5 in. across. Petals yellowish with pink stripes. Pod 3 to 8 in. long, scurfy-brown outside, pithy green inside, 1 in. through. Cultivated chiefly in the north at Penang and Province Wellesley, and has occurred as an escape in Singapore on a rocky island in the Johor Strait (as a shrub), and in Selangor and Kedah. Probably a native of Africa. Native names: Asam Jawa; the Tamarind.

Big trees. Leaves even-pinnate; leaflets few, stiff, coriaceous. Flowers panicled. Calyx with short tube, basal disc; 4 segments. Petal 1. Stamens 10, upper ones free, sterile, others monadelphous, hairy, unequal, 2 upper ones fertile, the rest alternately short and long, antherless or sterile; anthers obovate, versatile. Ovary pubescent, 2 to 5 ovules, stalked; style long circinate. Pod round or oblong; valves thin, woody, usually covered with prickles. Seed 1 to 2; testa hard, black; funiculus large thick arillate. Species 9, Indo-China, Malaya. *Native names*: Saputi or Sepetir.

**Fig. 56.—Sindora Wallichii.**

Pods spiny.
- Leaflets 3 pairs; panicle pubescent; leaflets pubescent beneath
- Leaflets 3 pairs; panicle tomentose; spines fewer and thicker on calyx
- Leaflets 3 pairs; panicle pubescent, hairy; leaflets large, quite glabrous
- Leaflets 5 to 6 pairs, densely pubescent beneath
- Pod unarmed; leaves glabrous beneath

(1) **S. Wallichii**
(2) **S. intermedia**
(3) **S. siamensis**
(4) **S. velutina**
(5) **S. coriacea**

(1) **S. Wallichii** Benth. *Ic. Pl.* 1017 and 1018; *Prain, l.c.* 203. *S. echinocalyx* *Prain, l.c.* 204.

Very big tree. Leaves 4 to 6 in. long; rachis puberulous; leaflets 3 pairs, oblong, acute or round at both ends, 1·5 to 3·25 in.

I fail to see any difference between S. Wallichii and S. echinocalyx Prain.

(2) **S. intermedia** Baker, in Hook. fil. F.B.I. ii. 268; Prain, l.c. 204.


Near S. Wallichii, but more tomentose, with stouter panicle and fewer and thicker spines on calyx.


Stipules in seedlings very large, oblique ovate-lanceolate acute.

(4) **S. velutina** Baker, in Hook. fil. F.B.I. ii. 269; Prain, l.c. 205.

Big tree. Branchlets, panicle and underside of leaves densely red-tomentose. Leaves 5 to 7 in. long; leaflets 5 to 6 pairs, oblong-elliptic blunt, base rounded, glabrous above, 3‘5 in. long, 1‘6 in. wide; petiolules tomentose ‘05 in. long. Panicles 6 in. long; branches thick, 1‘5 in. long. Sepals oblong, ‘25 in. long, densely hairy tomentose, as is the petal. Stamens hairy. Ovary hairy. Hab. Malacca (Maingay), very rare. Native name: Saputi Jantan.
(5) S. coriacea Prain, l.c. 206.


49. AFZELIA, Smith.

Trees, sometimes vast. Leaves even-pinnate; leaflets opposite, few, coriaceous. Flowers in large terminal panicles. Calyx disc produced to top of elongated tube; lobes 4, imbricate unequal. Petal 1, orbicular, clawed. Stamens 3, perfect; filaments long, pilose. Pod large, oblong, flattened, woody. Seeds several not arillate. Species 10 to 12, Old World tropics.

Leaflets 4, rarely 2; small trees.

Inflorescence glabrous
Inflorescence puberulous
Leaflets 8 to 10; large tree

(1) A. retusa Kurz, Journ. As. Soc. Beng. xliii. (2), 73; Baker, in Hook. fil. F.B.I. ii. 274; Prain, l.c. 207.

Tree 15 to 20 ft. tall. Stem 6 to 8 in. through. Leaves 3 to 6 in. long; leaflets 2 pairs glabrous, sub-coriaceous, oblong, base rounded, blunt retuse, 2 to 4 in. long, 1.2 to 2 in. wide; petiolules 1.5 in. long. Panicle or simple raceme 2-5 in. long, terminal, glabrous; pedicels 5 in. long, thick. Calyx glabrous, tube slightly dilated upwards, 5 in. long, lobes 4, oblong, 3.5 in. long. Petal 7 in. long; limb 6 in. wide, claw slender, pubescent, pink or white. Stamens pink, 1.25 in. long. Pod 5 to 6 in. long, 2 in. wide, oblong, coriaceous. Seeds orbicular 1 in. across. Hab. Common in tidal rivers. Singapore, Toas. Malacca, Sungei Doon (Griffith). Negri Sembilan, Pengkalan Kempas (Foxworthy). Dindings, Pangkor (Scortechini). Perak, Matang (Wray). Distrib. Ganges delta, Andamans. Native name: Merabau Ayer.


Tree 50 ft. or less. Leaves as in A. retusa, but thinner and longer, more acuminate; panicles more branched with more flowers, pubescent, 6 in. long, 4 in. wide. Pod longer, 6 to 8 in. long, 2.5 in. wide. Hab. Sea coasts, apparently rare, Singapore (Wallich).
Dindings, Pangkor (Curtis). *Distrib.* Mascarene islands to Polynesia. Possibly only a variety of *retusa.*

(3) **A. palebanica** Baker, in Hook. *fil.* F.B.I. ii. 275; Prain, l.c. 209.

A gigantic buttressed tree over 100 ft. tall, 2 to 4 ft. through. Leaves 6 to 8 in. long; leaflets 4 pairs (rarely 3 or 5), sub-coriaceous, glabrous oblong, base slightly oblique, round or cordate, tip rounded blunt, 2 to 4 in. long, 1 1/2 to 2 in. wide; petiolules 15 in. long. Panicles corymbose, terminal, 3-1/2 in. long, 2-1/2 in. across, pubescent. Calyx-tube cylindric, 2 in. long, lobes 4, oblong, 25 in. long, downy. Petal 35 in. long, limb oblong, white. Stamens pubescent, clarlet-colour. Pod 10 to 12 in. long, 3 to 5 in. wide, oblong, woody. Seeds oblong, 1-25 in. long. *Hab.* Forests of the whole peninsula. Pahang, Rumpin (Foxworthy). Malacca (Maingay, Griffith). Negri Sembilan. Selangor, abundant. Perak, Gopeng and Gunong Bubu (Kunstler). *Distrib.* Sumatra. *Native name:* Merabau. *Use:* A very valuable timber for building, furniture, sleepers, etc.

**50. SARACA,** Linn.

Shrubs or medium trees. Leaves even-pinnate; leaflets glabrous, coriaceous. Stipules large. Flowers in dense corymbs on old nodes with coloured bracts, red or yellow. Calyx petaloid, limb 4-cleft, tube cylindric, crowned with a lobed disc. Petals 0. Stamens 2 to 8 exsert; filaments filiform, long; anthers versatile. Ovary stalked, often rudimentary; style long, filiform. Stigma minute. Pod flat, coriaceous often very large, oblong pink. Seeds several ellipsoid flat. Species 16, Indo-Malayan.

Leaves 7-foliate; corymbs large; flowers yellow; trees.

Bracts large, coloured.

Corymbs very large, often 9 in. through; leaflets oblong-lanceolate, acute.

Corymbs smaller, peduncled.

Leaves oblong-acute; calyx-lobes one-third length of tube.

Leaves elliptic blunt, short, strong-nerved.

Leaves 2- to 3-jugulate; calyx lobes as long as tube.

Bracts large; petiololes 25 in. long.

Bracts small; petiololes 2 in. long.

Leaflets 1 to 2 pairs; stamens 7 to 8.

Leaflets 4 to 7; stamens 3 to 4.

Pedicels and ovary glabrous.

Pedicels and ovary puberulous.

Leaves 2- to 4-jugulate; corymbs lax, red; bush sub-scandent to a small tree.

**S. thaipingensis** Cantley, in Prain, l.c. 211.

A low-branched tree about 20 to 30 ft. tall. Stem thick. Leaves and rachis 12 to 16 in. long; leaflets sub-coriaceous, dark green, 5 to 8 pairs, oblong-lanceolate acuminate, 12 to 16 in. long, 4 to

(2) **S. declinata** Miq. Fl. Ind. Bat. i. 84.


I am not clear which of this set of Java species Miquel intended by his *declinata*, as there are more than one in Java, but this species is identical with the plant so named by Koorders. Prain's *S. declinata*, l.c. 211, is a mixture.

(3) **S. cauliflora** Baker, in Hook. fil. F.B.I. ii. 272.

Tree. Leaflets 5 pairs, rather stiff, elliptic, blunt 5 in. long, 3 in. wide; nerves about 8 pairs, rather strongly elevate; petioles 2 in. long. Corymbs on branches 6 in. wide; peduncles 1 to 5 in. long or quite short. Bracts lanceolate-acuminate. Sepals 3 in. long yellow; pedicels and tube 5 in. long. Stamens 4 to 7. Pod "red brown," 12 in. long, 2.5 in. wide, beaked. Seed 1.75 in. long. Hab. Malacca (Griffith). Perak, Ulu Kenering (Wray).

Baker's type (in part) the Malacca plant has four stamens, Wray's (apparently identical) seven, but I believe the number of stamens varies in some species. The small corymb and short, blunt, strongly-nerved leaflets distinguish it.

(4) **S. Kunstleri** Prain, l.c. 213.

Tree 20 to 40 ft. tall. Stem 3 to 5 in. through. Leaves, rachis 5 to 10 in. long; leaflets 2 to 3 pairs, ovate acuminate, base cuneate, upper ones 8 to 10 in. long, 3.5 to 4 in. wide, lower ones 3.5 to 4 in. long, 2 to 2.25 in. wide, chartaceous, glabrous; nerves 6 to 9 pairs, prominent beneath; petiolules 2.5 in. long. Corymbs panicked on terminal peduncles, 8 to 12 in. long, glabrous. Calyx tube and pedicel very short, 4 to 5 in. long. Sepals ovate-oblong, 2 in. long; filaments 7. Pod falcate, 4 to 6 in. long, 1.5 in. wide. Seeds 5 to 6, ovate, 5 in. long, 7 in. wide. Hab. Rare in rocky jungle. Perak, Gunong Batu Putih, 1500 ft. altitude (Kunstler).

(5) **S. bijuga** Prain, l.c. 214.

Small tree 20 to 30 ft. tall. Stem 6 in. to 2 ft. thick, glabrous. Leaves, rachis 1 in. long; leaflets sub-coriaceous one or two pairs oblong-lanceolate acute, base of terminal pair oblique, upper margin rounded, base cuneate, lower pair round or sub-cordate,
4 to 10 in. long, 1 to 2'75 in. wide; petiolules under '1 in. long. Corymbs dense 4 to 5 in. across, axillary. Calyx orange at length light red, tube '25 in. long, lobes 4 or 5, blunt, nearly as long. Stamens 7 or 8, dark pink. Ovary stalked, puberulous along sutures (in most flowers rudimentary). Pod reddish yellow, 6 to 8 in. long, 2'35 in. wide; stalk '2 in. long. Seeds 4 to 6. Hab. Forests by stream edges. Perak, Batu Togoh (Wray), Kota (Wray); Kinta and Larut (Kunstler); Temengoh (Ridley).

6) S. macroptera Mig. Fl. Ind. Bat. i. 1080; Prain, l.c. 215.

Tree 30 to 40 ft. tall. Stem 4 to 6 in. through. Leaves, rachis 4 to 15 in. long; leaflets rigidly coriaceous 4- to 7-paired, oblong-lanceolate cuspidate, base unequally rounded; nerves 12 pairs prominent beneath, 5 to 12 in. long, 1'5 to 3'5 in. wide; petiolules '15 in. long. Flowers in dense corymbs, fascicled in leaf axils and on old nodes, 1 in. long, 1'5 in. across. Calyx bright yellow, tube slender, 2'25 in. long, lobes 4, oblong, shorter. Stamens 3 to 4 twice as long. Disc crenately lobed. Hab. Low wet ground in dense jungle. Perak, Larut (Kunstler). Distrib. Sumatra, Borneo.

7) S. palembanica (Mig.) Baker, in Hook. fil. F.B.I. ii. 272; Prain, l.c. 216.

Tree 30 to 40 ft. tall. Stem 8 to 10 in. through. Leaves, rachis 8 in. long; leaflets coriaceous, 4 to 7 pairs, oblong, shortly abruptly acuminate, base unequally rounded; nerves about 12 pairs, 5 to 14 in. long, 2'5 to 4'5 in. wide; petiolules '15 in. long. Corymbs fascicled on old nodes 2 in. long and nearly as wide; bracts and bracteoles '2 in. long. Peduncles and pedicels pubescent. Calyx orange yellow, tube slender '35 in. long, puberulous, lobes oblong '25 in. long. Stamens 4 (or 3) much longer. Ovary stalked, hairy. Hab. Dense low wet forest. Dindings, Pangkor (Curtis). Perak, Larut (Kunstler). Province Wellesley, Kubang Ulu (Curtis).

8) S. triandra Baker, in Hook. fil. F.B.I. ii. 272; Prain, l.c. 216.

Slender tree, or often a sermentose shrub about 15 to 20 ft. tall. Leaves, rachis 1'5 to 3 in. long. leaflets sub-coriaceous 2 to 3 (rarely 4) pairs, oblongate-oblong, blunt or short acuminate, base cuneate, 5 to 12 in. long, 2 to 6 in. wide; nerves prominent beneath; petiolule '15 in. long. Corymbs lax, panicled usually in axils 5 to 8 in. long and as wide. Bracteoles persistent '25 in. long, red. Calyx salmon red, tube slender, '25 in. long, as long as the four oblong lobes. Stamens 3 to 4, nearly three times as long; filaments purplish. Ovary long-stalked, pubescent. Pod oblong, obliquely rounded at base and blunt at tip, lower suture forming beak, '25 in. long, 4 to 6 in. long, 1'5 to 1'75 in. wide, brown, puberulous. Hab. Common in forests. Malacca, Kesang Road (Hervey); Panchur (Derry); Sungei Hudang; Jus (Goodenough).

51. LEUCOSTEGANE, Prain.


Small tree. Branches pubescent. Leaves, rachis 7 to 8 in. long; leaflets coriaceous, oblong cuspitate, base rounded slightly oblique, 2 to 5 in. long, '75 to 1'5 in. wide; petioles '1 in. long, thick. Stipules '75 to 1 in. long, ovate-acuminate. Flowers from nodes on old wood below the leaves, white; pedicels '1 in. long. Calyx-tube '15 in. long, lobes longer narrow oblong. Stamens pink. Pod oblong, apex truncate with a prominent beak, base narrowed 2 in. long, '75 in. wide, pink. Hab. Very local in thick hill-forest. Dindings, in forest at Lumut (Ridley).

52. CRUDIA, Schreb.

Trees, sometimes very large or shrubs. Leaves odd-pinnate; leaf-rachis sometimes prolonged beyond the last leaflet; leaflets distinctly alternate, rarely sub-opposed. Stipels o. Flowers small in racemes, terminating, or in clusters at the bases of, the new leafy shoots. Calyx-tube very short with a short disc; lobes 4, oblong or ovate imbricate, persistent reflexed in flower. Petals o. Stamens 10 (or 8 to 9) exsert; filaments free, filiform; anthers versatile. Ovary hairy few-ovuled, stalked; style filiform, incurved. Stigma small capitate. Pod-valves rounded, coriaceous, compressed. Seeds 1 or few. Species about 12, Malayan; 9 to 10 American and 2 Indian and African.

Leaflets 11 to 13 oblong lanceolate . . . . (1) C. Scortechinii
Leaflets 7 to 9.

Leaflets, back and pod velvety; rachis prolonged beyond the last leaflet . . . . . . (2) C. caudata
Rachis not prolonged.

Leaflets glabrous; raceme glabrous . . . . (3) C. glauca
Leaflets puberulous beneath; raceme pubescent . . . (4) C. Curtisii
Leaflets 4, alternate; raceme 12 in. long, glabrous . . (5) C. penduliflora
Leaflets 3 or 4, sub-opposite; raceme dense, 2 in. long, velvety . . . . . . . . . . (6) C. Evansi
Leaflets 3.
Leaflets elliptic-lanceolate, glaucous beneath; flowers subsessile.
Leaflets lanceolate acuminate; flowers pedicelled. (7) C. brevipes
Leaflets oblanceolate, 2 in. long; flowers pedicelled. (8) C. lanceolata
Leaflets ovate-oblong, 6 by 3 in. coriaceous. (9) C. Wrayi
Leaflets ovate-oblong, 6 by 3 in. coriaceous. (10) C. gracilis

(1) C. Scortechinii Prain, l.c. 220.
Tree 80 to 90 ft. tall. Branchlets pubescent. Leaves odd-pinnate, 6 to 8 in. long; leaflets 11 to 13 with petiolules 2 in. long and rachis tawny-pubescent, alternate lanceolate acuminate, base obliquely rounded, glabrous above, glaucous beneath, 2 in. long, 1/4 in. wide. Racemes at the end and bases of new leafy shoots pubescent, 3 to 6 in. long. Flowers 2 in. long. Calyx-tube very short lined by a disc; lobes 4, pubescent on both sides. Stamens 9; filaments glabrous, free, alternating short and long. Ovary densely hairy; stalk as long as calyx-tube. Pod oblong, obliquely rounded at both ends, villous-brown wrinkled 2 1/2 in. long, 1 1/2 in. wide. Seed 1. Hab. Perak, Goping (Scortechini).

(2) C. caudata Prain, l.c. 219.
A small tree. Branches densely red-tomentose. Leaves, rachis tomentose, 1 1/2 to 2 in. long; leaflets 5 to 7 on tomentose petiolules 1 in. long, coriaceous, glabrous above; nerves 6 to 7 pairs, elevate, tomentose beneath, oblanceolate, base narrowed blunt, tip long caudate (tail 7 1/2 in. long), 2 1/2 to 4 in. long, 1 in. across. Racemes narrow; rachis tomentose; pedicels stout, 1 1/2 in. long. Calyx-tube very short; lobes rusty-tomentose outside, glabrous inside. Ovary rusty-velvety; stalk as long as calyx-tube. Pod linear-oblong, short-stalked, tip obtuse apiculate, 2 in. long, 1 1/2 in. across, red-pubescent. Hab. Johor, Tanjong Kupang (Ridley).

(3) C. glauca Prain, l.c. 221.
Tree 50 to 70 ft. tall, 1 1/2 to 2 1/2 ft. through. Leaves 4 to 4 1/2 in. long, glabrous; leaflets 7 to 8, alternate or sub-opposite, oblanceolate-oblong, base obliquely rounded, obtusely cuspidate, 2 1/2 to 4 in. long, 1 1/4 to 1 1/2 in. wide, papery, glaucous beneath. Racemes dense, narrow glabrous, 3 to 5 in. long. Flowers unknown. Pod oblong tapering at both ends to a stalk 1 1/4 in. long, beaked, puberulous, reticulate 4 in. long, 2 in. wide, firmly coriaceous. Seed 1, oblong. Hab. Dense forest on limestone hills. Perak, Goping (Kunstler).

Tree 80 to 150 ft. tall, 2 to 3 ft. through, with spreading top. Leaves 3 to 4 in. long; rachis and petiolules puberulous; leaflets 7 to 9, alternate oblong, short, blunt acuminate, base rounded or oblique, membranous to sub-coriaceous, green, glabrous above, glaucous puberulous beneath, 2 to 3 1/2 in. long, 1 to 1 1/2 in. wide. Racemes 4 to 6 in. long, lax, many-flowered; rachis grey-pubescent; pedicels slender '6 in. long. Calyx-tube short; lobes 4, pubescent

The var. *Wallichii* Prain, is based on specimens collected by Wallich 5983 and 8089. They are leaf-specimens only, very hairy and quite indeterminable.


Tree. Leaves with 4 alternate leaflets, distant elliptic, cuspidate, rounded at both ends, thin, coriaceous; nerves 6 pairs, 1 to 4 in. long, 1.5 in. wide; cusp 5 in. long; petiolules thick, 12 in. long. Racemes simple pendulous, 12 in. long; flowers 12 in. long, nearly sessile. Buds ovoid. Calyx-tube short; lobes 4, ovate, glabrous. Stamens 5; filaments slender. Ovary red-haired, conic. *Hab.* Malacca, base of Mt. Ophir on Gunong Mering (Ridley).

(6) **C. Evansi** Ridl. *Journ. F.M.S. Mus.* x. 133.

"Climbing plant," glabrous. Leaves 6 in. long; leaflets 3 or 4, thinly coriaceous, broad elliptic, shortly blunt acuminate, base very shortly narrowed, 6-nerved with nervules and reticulations nearly as conspicuous, 4 in. long, 2 in. wide; petiolules 2 in. long. Raceme dense; rachis thick scurfy-velvety, 2 in. long, brownish. Stamens 10, glabrous. Ovary densely hairy. *Hab.* Pahang, Gunong Senyum (Evans).

Mr. Evans says this is a climbing plant; all the rest of the species are trees.


Tree 16 ft. tall. Branchlets slender, white. Leaves rather thin; leaflets 3, elliptic-lanceolate, cuspidate, base shortly narrowed glaucous beneath; nerves 5 to 6 pairs, 2.5 in. long, 1 to 1.75 in. wide; petiolules 25 in. long. Racemes 5 in. long, slender dense; flowers numerous; pedicels under 0.5 in. long. Sepals 4, oblong, blunt, 0.8 in. long. Stamens 6; filaments long; anthers cordate. Ovary woolly hairy; style glabrous, filiform. Stigma small. *Hab.* Province Wellesley, Tasek Gelugur (Ridley). Native name: Poko Bebaru.


Glabrous tree? Leaves, rachis 1.5 in. long; leaflets 3, subcoriaceous, lanceolate or ovate acuminate obtuse, base rounded, quite glabrous; nerves fine, 7 pairs with reticulations conspicuous beneath, 3.5 to 5.75 in. long; petiolules 1 in. long, thick. Raceme about 6 in. long, puberulous. Flowers distant, 3 in. across, on puberulous pedicels 3 in. long. Calyx-tube short, puberulous,

(9) **C. Wrayi** Prain, l.c. 222.

Small tree, glabrous. Leaves, rachis slender 1 in. long; leaflets 3, alternate, oblanceolate, base cuneate, apex acute or acuminate, 1.5 to 2.5 in. long, 5 to 1 in. wide; nerves fine. Racemes dense 2 to 8 in. long. Flowers numerous; rachis puberulous; pedicels 2 in. long. Calyx-tube very short; lobes 4 faintly puberulous outside, glabrous within. Stamens 8 to 9. Ovary densely pubescent; stalk as long as tube. Hab. Perak, Sungei Larut (Wray).

(10) **C. gracilis** Prain, l.c. 223.

A shrub 6 to 8 ft. tall, glabrous. Leaves, rachis 75 to 1 in. long; leaflets 3 (rarely 2), with stout petiolules 2 in. long, ovate-oblong-lanceolate, base cuneate, tip caudate, stiffly papery 4.5 to 6 in. long, 2 to 3 in. wide. Flowers pale yellow in narrow sparse spikes, 10 to 12 in. long; rachis glabrous. Stamens 8 to 9. Ovary shortly stipitate densely pubescent; stalk shorter than calyx-tube. Hab. Dense forest. Perak, Thaiping (Kunstler).

**Excluded Species**

**C. speciosa** Prain, l.c. 222, is from Pungah, outside our boundary.

**53. PELTOPHORUM**, Vogel.

Medium-sized trees. Leaves even-pinnate with numerous narrow oblong leaflets. Flowers usually bright yellow in axillary or panicked terminal racemes. Calyx with a disc at the base, teeth sub-equal, deep cut. Petals oblong or rounded imbricate. Stamens 10, free, declinate, a dense tuft of hairs at the base; anthers linear-oblong. Ovary sessile; ovules free; style long. Stigma peltate. Pod oblong, flat indehiscent, thin, winged broadly on each suture. Species 7 or 8, cosmopolitan in the tropics.

Pedicels short not longer than calyx; indumentum pubescent ... (1) **P. ferrugineum**

Pedicels 3 to 4 times as long as calyx; indumentum red-tomentose ... (2) **P. dasyrachis**

(1) **P. ferrugineum** Benth. Fl. Austral. ii. 279; Baker, in Hook. fil. F.B.I. ii. 257; Prain, l.c. 224.

Tree about 60 to 80 ft. tall, low-spreading. Branchlets thinly tomentose. Leaves 6 to 12 in. long; petioles 1 to 1.5 in. long, sparsely tomentose, pinnae 16 to 20, 4 to 6 in. long; leaflets ligulate-oblong, sessile, 5 to 75 in. long, 35 in. wide. Racemes in a large terminal panicle 12 in. long, 8 to 9 in. across, rusty pubescent; pedicels 15 to 25 in. long. Calyx-lobes ovate-lanceolate, 25 in. long, rusty-pubescent outside. Corolla 1.25 in. across. Petals 8 in. long, orange yellow, base densely hairy, edges ciliate. Pod

(2) **P. dasy rhachis** Kurz; Baker, in Hook. fil. F.B.I. ii. 257.
A tree resembling the last, but branches, petioles, rachis, inflorescence thickly red-tomentose. Leaves rather longer. Racemes 6 to 9 in. long; pedicels 1 to 1.5 in. long. Calyx densely velvety outside. Corolla large, 1.5 in. across, base hairy, edges glabrous. Pod 4 to 5 in. long, 1.25 to 1.4 in. wide, puberulous not veined outside. Hab. Sea-coasts and open forests. Malacca, common. Bukit Bruang (Griffith); Batu Berendam (Maingay); Selandor and Sungei Hudang (Cantley). Perak, Goping (Kunstler). Distrib. Siam, Sumatra. **Native name:** Batai. **Use:** Wood used for dyeing red.

### 54. MEZONEURON, Desf.


- Calyx deep-cleft; tube short; anterior lobe deep-hooded
- Calyx shallow-cleft; tube long; anterior lobe short-hooded

(1) **M. Kunstleri**

(2) **M. sumatranum**

(1) **M. Kunstleri** Prain, l.c. 233.
A big climber with a few prickles. Leaves 6 to 8 in. long, pinnae 4 to 6, 4 to 5 in. long; leaflets 6 to 8, alternate, sub-coriaceous, ovate, base and tip cuneate, 5 to 1.25 in. long, 35 to 75 in. wide; petiolules 15 in. long. Panicles of racemes large 1.5 to 2 ft. long; racemes 8 to 10 in. long puberulous; pedicels slender, 35 to 45 in. long. Calyx leathery, anterior sepal hooded, the rest orbicular, tube very short. Corolla expanded, yellow. Petals ovate-orbicular. Stamens far exsert. Hab. Perak at Sungei Rayah (Kunstler).

(2) **M. sumatranum** W. and A. Prodr. i. 1081; Prain, l.c. 235.
A robust, very prickly climber, glabrous. Leaves 1 to 1.5 ft. long; pinnae 6 to 10, 8 to 12 in. long; leaflets 6 to 8, alternate, coriaceous, obovate-oblong emarginate apiculate, 1.5 to 2 in. long, 1.25 to 1.75 in. wide; petiolules 2 in. long. Panicles of erect racemes terminal or axillary, many-flowered very showy. Racemes 5 to 6 in. long; rachis thick. Calyx leathery, anterior sepal orbicular 25 in. long, others half as large, tube 5 in. long. Corolla

55. PTEROLOBIUM, R. Br.

Stout prickly woody climbers. Leaves even-bipinnate. Flowers in panicled racemes. Calyx deep cleft, disc near the base; lobes imbricate, lowest one longer and hooded. Petals spreading, oblong, clawed, as long as calyx. Stamens 10, free, hardly exsert. Ovary sessile, 1-ovuled; style filiform. Fruit a samara with a large oblique terminal wing. Species 7, Africa, Indo-Malaya, China, Australia.

(i) P. densiflorum Prain, l.c. 236.
A large pubescent climber armed with hooks and prickles. Leaves 4 to 8 in. long; pinnae 8 to 16, 3 in. long; leaflets 14 to 16, narrow-oblong, blunt unequally rounded on both sides, 6 in. long, 25 in. wide, sub-coriaceous. Racemes dense in panicles; 100- to 200-flowered; rachis puberulous, 1.5 ft. long. Calyx puberulous, lowest sepal 3 in. long. Corolla yellow. Pod 2 in. long, base turgid, wing 5 to 7 in. wide. Hab. Forests, very local. Penang, base of hill Waterfall, to the altitude of 2500 ft. (Maingay and Curtis); Ayer Hitam (Fox).

56. CAESALPINIA, Linn.

Trees, shrubs or woody thorny climbers. Leaves large, bipinnate. Flowers yellow (rarely red) in axillary racemes. Calyx deep cleft, disc at the base; lobes imbricate, lowest the largest, hooded. Petals spreading, orbicular, clawed, upper one smaller. Stamens 10, free; anthers versatile. Ovary few-ovuled; style filiform. Pod oblong or ligulate, flat or turgid, smooth or spiny. Species about 40, tropics.

C. pulcherrima Sw. Obs. 166. A well-known garden shrub with yellow or red flowers, probably a native of S. America, is common in cultivation.

i. GUILANDINA. Very thorny shrubs; pod prickly; seeds grey globose.
Leaves stipulate; leaflets small, .5 in. long . . (1) C. Bonducella
Leaves not stipulate; leaflets larger, 1.5 to 2 in. long . . . (2) C. Bonduc

ii. EU-CAESALPINIA. Pods unarmed, thin-valved.

Trees.
Stipules 0; flowers .75 in. across . . . (3) C. Sappan
Stipules lanceolate; flowers .3 in. across . . . (4) C. parviflora
Climbers thorny.

Leaflets few, large, coriaceous . . . . . (5) C. Nuga

Leaflets many small.

Flowers '75 in. across; pod winged on upper edge . . . . . . . (6) C. sepiaria

Flowers '3 in. across . . . . . . . . . . . (7) C. stipularis

iii. Cinclidocarpus. Pod fleshy, thick-valved.

Leaflets oblong; racemes lax; pedicels longer than calyx . . . . . . . (8) C. digyna

Leaflets linear; racemes dense; pedicels shorter . . . . . . . (9) C. tortuosa


A thorny climber. Branches armed with hooked yellow prickles. Leaves 1 to 2 ft. long with a pair of reduced pinnae (compound stipules) at base; pinnae 12 to 16, 2 to 3 in. long; leaflets 12 to 18, ovate or elliptic, base round, tip cuneate, '5 to 1 in. long, '3 to '6 in. wide. Racemes simple or panicked, 6 to 10 in. long. Bracts squarrose, reflexed, '25 in. long, downy. Calyx '25 to 3 in. long, downy. Petals oblong, yellow. Stamens silky. Pod stalked, short, oblong 2 to 3 in. long, 1'75 in. wide, brown, densely aculeate. Seeds 2, oblong globose, lead colour. Hab. Sea-coasts, not very common. Penang, Tanjong (Curtis); Patani, hedges in rice-fields (Gwynne Vaughan). Distrib. All tropics.


(3) C. Sappan Linn. Sp. Pl. 381; Roxb. Cor. Pl. i. 17, t. 16; Prain, l.c. 228.

Shrubby tree about 20 ft. tall, thorny. Stem 6 to 10 in. through. Leaves 8 to 15 in. long; pinnae 16 to 24, 4 to 6 in. long; leaflets 20 to 36, chartaceous, oblong oblique, sessile blunt, '5 to '75 in. long, '35 in. wide, glabrous except slight pubescence beneath. Racemes panicked, 12 to 16 in. long, separate racemes, 4 to 6 in. long. Calyx '4 in. long. Corolla '75 in. across, yellow, base of upper petal pink, orbicular. Stamens white, bases woolly. Ovary grey-velluzy. Pod woody oblong flattened, 3 to 4 in. long, 1'5 to 2 in. wide, polished brown beaked. Hab. Wild on river-banks in sandy spots and often in gardens. Pahang River, Pulau Chengei; Pulau
Aor (Feilding). Malacca (Maingay); Chabau (Cantley). Perak, Ulu Bubong (Kunstler). **Distrib.** India, Cambodia, Malay isles. Native name: Seppang. Use: A red dye obtained from the wood. Sappan-wood.

(4) **C. parviflora** Prain, l.c. 330.

A small tree 30 to 40 ft. tall and 8 to 12 in. through, sparsely pricky (a large climber according to Kunstler). Leaves 8 to 10 in. long; pinnae 18 to 24, 2 to 3 in. long; leaflets 30 to 36, subcoriaceous, sessile, oblong with lower corner produced, '35 to '5 in. long, '2 to '25 in. wide, glabrous. Stipules lanceolate, '45 in. long, entire. Racemes in a branched panicle, 2 to 3 ft. long; pedicels '25 in. long, all puberulous. Bracts linear, '2 in. long. Calyx '25 in. long, puberulous. Corolla 3 in. across, greenish yellow, hardly exert. Stamens green, base woolly. Pod 1 in. long, '5 in. wide, with recurved beak. Seeds 4. Hab. Lowland forest, Perak, Larut (Kunstler); Relau Tujor (Wray); Gunong Bubu, a large climber (Kunstler).

(5) **C. Nuga** Ait. Hort. Kew, iii, 32; Prain, l.c. 227.

A stiff wiry thorny black-stemmed climber. Leaves 6 to 12 in. long; pinnae 6 to 8; leaflets 4 to 6, light, shining green, coriaceous, glabrous, ovate acute, 1 to 2.5 in. long, '5 to 1 in. wide. Panicle of racemes 10 to 15 in. long, 6 to 8 in. across; racemes 2 to 3 in. long; pedicels '3 in. long. Calyx '25 to '3 in. long, glabrous. Corolla '5 in. across, bright yellow, fragrant. Petals orbicular, upper ovate acute, blotted red. Stamens woolly at base. Pod 2 in. long, '35 in. wide, turgid, beaked, indehiscent. Seed 1, black, 1 in. long. Hab. Tidal swamps. Common. Singapore, Kranji; Jurong; Selitar. Johor, Tebrau River, Malacca (Griffith), Pahang, Pekan, Sungei Segal (Fox). Selangor, Port Swettenham (Burkill). Perak River (Kunstler); Dindings, Lumut. Lankawi (Curtis). Perlis, Kanga. **Distrib.** S.E. Asia, Australia and Polynesia.

(6) **C. sepiaria** Roxb. Hort. Beng. 32; Baker, l.c. ii, 256; Prain, l.c. 229.

Prickly woody climber. Branches pubescent. Leaves 9 to 15 in. long; pinnae 12 to 20, 2 to 3 in. long; leaflets 16 to 24, oblong blunt, base round, slightly oblique; petiolulate pale green above, glaucous beneath, '5 to '8 in. long, '2 in. wide. Stipules obliquely ovate, long-acuminate, base with lower angle auricled, '5 in. long, '3 in. wide. Racemes simple, drooping, 6 to 12 in. long, 2 to 2.5 in. wide; pedicels '75 in. long. Bracts ovate-lanceolate, '4 in. long pubescent. Calyx '5 in. long, pubescent. Corolla '75 in. across, yellow; petals orbicular. Stamens little exert white, woolly below. Pod linear-oblong, 3 to 5 in. long, 1.2 in. wide, curved, turgid. Seeds 6 to 8, mottled, '4 in. long. Hab. Hill forests, Penang Hill at 2500 ft. altitude (Curtis). **Distrib.** India, China, Japan, Malay isles.

Climber, thorny. Leaves 12 in. long; pinnæ 6 in. long, distant; leaflets oblong, tip broad, round, base truncate, oblique; midrib puberulous, '75 in. long, '4 in. wide. Stipules broad, ovate-oblong '75 in. long, '35 in. wide, edges often incised. Panicle over 12 in. long, pubescent with short thorns below the branches. Bracts lanceolate, linear, '25 in. long, very narrow; pedicels slender, longer. Flowers very similar to those of *C. parviflora*, but more pubescent. *Hab.* Open country. Malacca, Batu Tiga (Holmberg). Perak, Kurau (Wray). *Native name:* Akar Kuku Tupai.


Woody climber, sparsely thorny. Leaves 6 to 9 in. long; pinnæ 8 to 9, '15 to 2'5 in. long; leaflets 16 to 20, oblong blunt, base rounded sessile, membranous, glabrous above, glaucous-pubescent beneath, '35 to '45 in. long, '25 in. wide. Stipules subulate. Racemes simple, axillary, 8 to 12 in. long, lax; pedicels spreading 1 in. long. Calyx '3 in. long, glabrous. Corolla '75 in. across; petals orbicular, yellow, upper ones streaked with red. Stamens little exsert white-woolly below. Pod fleshy, indehiscent, oblong, turgid torulose, sutures thickened, '15 to 2 in. long, 1 in. wide. Seeds 2 to 4, ovoid, '5 in. long. *Hab.* Dry country in the North. Penang (Phillips); between the Waterfall and Tanjong Bunga (Curtis). Lankawi (Curtis). Perlis, Kanga, abundant. *Distrib.* India, Cambodia, Malaya.

Prain gives "Malacca, Griffith." I have seen no specimen from further south than Penang, and its occurrence in Malacca is highly improbable.

(9) **C. tortuosa** Roxb. *Hort. Beng.* 32; *Baker, l.c.* ii. 257; *Prain, l.c.* 231.

Glabrous climbing prickly shrub. Leaves 12 to 18 in. long; pinnæ 30 to 40, 2'5 to 4 in. long; leaflets 40 to 60, sessile subcoriaceous, ligulate blunt, base obliquely cuneate, '25 to 3 in. long, '1 in. wide. Racemes axillary simple erect, 15 to 18 in. long; pedicels '5 in. long, slender. Calyx '5 in. long, glabrous, lower segment deeply hooded. Corolla '75 in. across; petals yellow, base streaked red, orbicular clawed. Stamens little exsert, green, woolly below. Pod oblong, twisted, sutures thickened, torulose 2 to 3 in. long, 1 in. wide. Seeds 2 to 5, dark brown. *Hab.* Thickets and woods near the sea. Singapore, Changi near Loyang. Penang, Penara Bukit (Curtis). *Distrib.* Tenasserim, Sumatra.

(C) MIMOSEÆ (Genera 57–66).

57. **PARKIA**, R. Br.

Big trees unarmed. Leaves bipinnate; leaflets linear or oblong, very numerous and small. Flowers in dense solitary obovoid heads
on long pendulous peduncles. Calyx tubular, 5-lobed; lobes imbricate. Corolla tubular, split half-way. Stamens 10, exsert; filaments below connate, and adnate to corolla; anthers gland-tipped. Ovary stalked; style filiform. Stigma minute. Pod strap-shaped or thick, dehiscent. Species 10, all tropics.

Leaflets sub-falcate, acute, 40 to 80 pairs; pod thick
suberete
Leaflets straight, blunt, 20 to 25 pairs; pod thin, flat

(1) P. Roxburghii

(2) P. speciosa

A big tree 80 ft. tall. Bark pale. Branches spreading, pubescent. Leaves bipinnate, 12 to 24 in. long; pinnae 20 to 30 pairs, opposite; leaflets falcate linear-lanceolate, 40 to 80 pairs, tip acute, base truncate, edges puberulous, 3 in. long, 1 in. wide; petioles 2 to 3 in. long with one gland below the pinnae and 3 to 5 solitary on upper pinnae. Capitula pyriform, 1'5 in. long, 1 in. wide, pendulous on peduncles, 10 to 16 in. long. Calyx tubular, 25 in. long. Corolla yellowish white. Pod flattened oblong black woody 15 to 20 in. long (stalk 3 to 7 in. long), 1'5 in. wide, 25 in. thick. Hab. Villages, probably not wild, but often planted. Malacca, Panchur (Goodenough). Distrib. Java. Native name: Kedawong. Use: Seeds as a remedy for colic.

Prain notes that the P. intermedia Hassk. of Java is somewhat different from the true P. Roxburghii Don, of Cachar and Chittagong, and that the Malacca plant is P. intermedia; indeed it is probably introduced here from Java. It is doubtful if the two plants are specifically identical.

(2) P. speciosa Hassk. Fl. xxv. Beibl. 55; Prain, l.c. 240.

Tall, smooth-barked tree 60 to 80 ft. high, 2 to 3 ft. through. Branchlets glabrescent. Leaves bipinnate, pubescent, 8 to 10 in. long; pinnae 10 to 16 pairs; leaflets linear, 20 to 35 pairs, base truncate, tip blunt, 25 in. long, 1 in. wide, nearly glabrous; petioles 1 to 1'5 in. long with 1 gland between base and lowest pair of leaflets and 2 to 6 solitary between the bases of upper pinnae. Capitula club-shaped, 2 in. long, 75 in. through; peduncles 16 to 20 in. long. Calyx 25 in. long. Corolla white. Pod (stalk 2 to 5 in. long) 18 to 20 in. long, 2 to 2'5 in. wide, very thin, green drying black. Seeds 12 to 18. Hab. In woods and cultivated ground. Singapore, Bukit Timah; Blakang Mati. Malacca, Bukit Sabukor (Derry). Pahang River. Perak, Changkat Serdang (Wray). Province Wellesley (Kunstler). Distrib. Malay isles. Native name: Petai. Use: The pods are eaten cooked by Malays, but they cause the eaters to exhale a peculiar horrible odour.

Excluded Species

P. biglandulosa W. and A. Malay Peninsula, Baker, l.c. 289.
No specimens known.
58. NEPTUNIA, Lour.


59. ADENANTHERA, Linn.


Leaves blunt glabrous beneath; pinnæ 8 to 12.

- Seed all red
- Leaves acute, puberulous beneath; pinnæ 6 to 8.
- Seed black and red

(1) **A. pavonina**

(1) **A. pavonina** Linn. *Sp. Pl.* 384; *Prain, l.c.* 243.

Tree 20 to 30 ft. tall or more; petioles 2 to 4 in. long; rachis 6 to 10 in. long; pinnæ 8 to 12, opposite, 3 to 6 in. long; leaflets alternate 10 to 16, ovate or oblong, base cuneate, tip blunt, membranous, dark green above, glaucous beneath, glabrous. Racemes 2 to 6 in. long, panicked on ends of branches. Flowers '15 in. long on slender pedicels as long. Calyx green. Corolla pale yellow; petals narrow, lanceolate. Stamens hardly exerted, pink. Pod 6 to 9 in. long, '6 in. wide, '3 in. thick contort in dehiscence. Seeds 10 to 15, lenticular, '35 in. across, shining red. *Hab.* Dubiously wild here and often planted. Singapore, Pasir Panjang; Lavender Road, Malacca (Griffith). Negri Sembilan, Tampin Hill. Jalor, Biserat (Gwynne Vaughan). Lankawi (Curtis). *Distrib.* S.E. Asia. *Native names:* Saga; Kanduri Batang.
(2) **A. bicolor** Moon Cat. Pl. Ceyl. 34; Baker, in Hook. fl. F.B.I. ii. 287; Prain, l.c. 243; Trimen Fl. Ceyl. ii. 120, pl. xxxiv. Tree 20 to 80 ft. tall. Leaf 6 in. long; petioles 1'5 to 2'5 in. long; rachis 3 to 5 in. long; pinnæ 6 to 8 opposite, 2'5 to 4 in. long; leaflets alternate 8 to 10, ovate or elliptic, base round, tip acute, sub-coriaceous, glabrous above, puberulous beneath, '75 to 1'5 in. long, '5 to '75 in. wide. Racemes axillary or panicled 3 to 5 in. long. Flowers '15 in. long on pedicels as long. Calyx green. Corolla white; petals elliptic-lanceolate. Stamens exert. Pod 4 to 6 in. long, '6 in. wide, '3 in. thick contort when ripe. Seeds 8 to 10, lenticular, '35 in. wide, black and red (nearly all red). Hab. Lowland woods. Singapore, Bukit Mandai; Bukit Timah. Malacca, Sungei Hudang. Selangor, Ulu Sapetang. Perak, Larut (Kunstler); Asam Kumbang (Wray). Penang, Waterfall (Curtis). **Distrib. Ceylon.**

60. **ENTADA**, Adans.

Woody climbers with tendrils. Leaves bipinnate. Flowers in narrow dense racemes, minute, shortly pedicelled. Calyx campaneulate 5-toothed. Petals narrow, falcate, linear. Stamens 8 to 10, free shortly exert; filaments filiform; anthers crowned with a gland. Ovary many-ovuled; style filiform; stigma concave. Pod woody or coriaceous of many discoid or oblong one-seeded joints. Seeds orbicular or sub-triangular.

Leaves all green; pod straight, woody, indehiscent. (1) **E. Schefferi**

Leaves glaucous beneath; pod spiral, coriaceous dehiscing into joints. (2) **E. spiralis**


A large woody climber often 6 in. through at base. Branches slender, quite glabrous. Leaves with petioles 2 in. long; rachis ending in a tendril; pinnæ 4; leaflets green on both sides, sub-coriaceous, blunt usually obovate, base narrowed, tip broadest 1 to 2 in. long, '6 to '8 in. wide, quite glabrous. Spike 6 to 8 in. long, simple, densely-flowered. Flowers '1 in. or less; rachis puberulous. Bracts minute acuminate persistent. Calyx small cup-shaped, 5-toothed. Petals yellow, narrow-lanceolate, acute. Pod straight not breaking into lobes, 2'7 ft. long, 3 in. wide, with a very thick woody suture, edge slightly indented between the seeds. Seeds 13 to 15, flat ellipsoid, 1'25 in. long, 1'15 in. wide, '25 in. thick, dark brown. Hab. River-banks covering the trees and bushes, local but abundant where it occurs. Muar, Sungei Pauh (Fox). Pahang, Pekan. Perak, Temengoh River; Haram (Scortechini); Telok Anson (Kunstler). Tringganu, Bundi (Rostado). Kelantan, Kota Bharu in a village. Penang (Wallich), Ayer Hitam (Curtis). **Distrib. Java. Native name:** Akar Beluru or Blu. **Use:** The bark used for soap.
Entada scandens Benth., Mimosa scandens Linn. is a mixture of several very distinct species from India and Ceylon, Eastern Malaya, Polynesia and South America. Distributed with Wallich Penang, 5293, are some scraps of foliage of apparently E. spiralis.


Stem flattened spiral 3 in. wide, 1 to 2 in. thick. Leaves alternate, 3 in. long; pinnæ 4; leaflets alternate elliptic to oblong retuse, 2 to 3 in. long, 1 in. wide, dark green above, glaucous beneath, coriaceous. Racemes axillary 6 in. long; peduncle 2 in. long; rachis hairy. Calyx hairy, green. Petals 4 to 5, green. Stamens 8 to 10, white turning yellow, 125 in. long. Pod spiral green, thick, lobed, breaking into joints, and then dehiscing. Seeds 5 to 11, rounded triangular or heart-shaped, 2 in. long, 1 in. thick, testa brown, coriaceous. Hab. Common in secondary growth and woods in the south. Singapore, Tanglin; Chan Chu Kang, etc. Malacca, Ayer Panas (Goodenough), (Maingay). Dindings, Bruas. Perak, Larut (Kunstler).

61. LEUCÆNA, Benth.


Shrub about 6 ft. tall, unarmed. Leaves 4 to 6 in. long; petioles 2 to 3 in. long; pinnæ 4 to 8 pairs, 2 to 3 in. long; leaflets 10 to 15 pairs, linear-oblong acute, base oblique cuneate, glaucous downy, 14 to 15 in. long, 11 to 15 in. wide. Raceme of dense globose heads, 15 to 175 in. through; peduncles 1 to 1 25 in. long, slender. Corolla white 175 in. long. Stamens 25 in. long. Ovary pubescent. Pod 5 to 6 in. long, 14 to 15 in. wide. Seeds 15 to 20, narrow-ovate, base acute, 3 in. long. Hab. Open country and waste ground, introduced, but scattered over the peninsula. Pahang, Pulau Tawar,Selangor. Perak, Gapis (Scortechini). Penang Waterfall (Curtis), Kedah. Distrib. Whole tropics, doubtless of South American origin. Native name: Petai Jawa.

62. MIMOSA, Linn.


Low wiry herb; leaves sensitive; flowers pink . . . . (1) M. pudica
Shrub; leaves not sensitive; flowers white . . . . . . (2) M. sepiaria
(1) **M. pudica** Linn. Sp. Pl. 518; Prain, l.c. 247.

Low under-shrub up to 2 ft. tall, prickly and bristly. Leaves very sensitive of 4 digitate pinnae, sessile on a 2-in. petiole; pinnae 2 to 3 in. long; leaflets 12 to 20 pairs bristly beneath. Heads in pairs, axillary, rose pink, '35 in. long; peduncles 1 in. long. Stamens 4. Pods '6 to 1 in. long, '2 in. across, of 3 to 5 joints, sutures persistent, bristly. The sensitive plant. Native name: Samalu. Hab. Abundant all over the peninsula. Introduced from America in the 16th century.


A thorny shrub. Stem about 4 ft. tall and 6 in. through; branches long, erect. Leaves, rachis downy, 2 in. long; pinnae 6- to 8-paired, not sensitive, '1-5 in. long, pubescent above; leaflets 12 to 20 pairs, coriaceous, ligulate, '2 to '3 in. long, '1 to '15 in. wide, tip sub-acute, base oblique, truncate, sessile. Panicles 6 to 8 in. long, of heads '25 in. through; rachis puberulous; peduncles '5 to '75 in. long. Corolla '05 in. long, white. Stamens 8 to 10. Pod black, straight, '1-5 to 2 in. long, '25 in. wide, joints 6 to 8, sutures unarmed. Hab. Damp ground. Singapore, chiefly at Tanglin. An escape from cultivation. Distrib. Also an escape in China and Borneo. Use: As a hedge plant and firewood.

63. **ACACIA,** Willd.

Spiny or thorny trees or shrubs, erect or climbing. Leaves bipinnate; leaflets narrow, very small. Flowers in globose heads or spikes. Calyx campanulate or funnel-shaped, short-toothed. Petals exsert, united in lower half. Stamens free, exsert; anthers not gland-crested. Ovary stalked or not; style filiform; stigma minute. Pod ligulate or oblong, not jointed, dehiscent or not, rarely sub-cylindric. Species 430, cosmopolitan, mostly Australian.

Erect shrubs, thorny.
- Pods cylindric, fleshy; flowers orange . . . (1) **A. Farnesiana**
- Climbing shrubs, thorny.
- Pods flat; flowers white.
- Flower-heads '4 in. long; leaves narrow oblong (2) **A. pseudo-intsia**
- Flower-heads '2 in. across; leaflets linear. . . (3) **A. pennata**

(1) **A. Farnesiana** Willd. Sp. Pl. iv. 1083; Prain, l.c. 248.

A thorny shrub. Leaves bipinnate; rachis downy, 1 to '1-5 in. long; pinnae 6 to 16, from 1 to '1-5 in. long; leaflets 10 to 20 pairs, green coriaceous, linear-oblong, '25 in. long, '05 in. wide. Stipules forming white thorns 1 in. long. Capitula '35 in. through, orange yellow, fragrant. Pod thick, cylindric, 2 to 3 in. long, '5 in. thick, pulpy, dark brown or black. Seeds 12 to 18, ovate. Hab. Sandy open places, probably introduced. Pahang near Pekan. Selangor, Kwala Selangor near the fort. Penang (Porter, Wall. Cat. 5264f).
Distrib. All tropics. Native name: Lasana. Use: Pods for making ink.

(2) A. pseudo-intsia Miq. Fl. Ind. Bat. i. 12; Prain, l.c. 249.
A lofty climber over 100 ft. long and about 3 ft. through, armed with hooked prickles. Leaves bipinnate; rachis 8 in. long, prickly; petioles 2.5 in. long, with large gland at base; pinnae 8 to 12 pairs, 2.5 to 3.5 in. long; leaflets 30 to 35 pairs, linear-oblong, blunt, 4 in. long, 15 in. wide, sub-coriaceous. Capitula 4 in. across, white on peduncles 5 to 75 in. long, 2 to 4 together on a 10 to 12 in. long panicle. Pod linear-oblong, 4.5 in. long, 1 in. wide, sutures thickened. Seeds 6. Hab. Common in forests in south. Singapore, Garden Jungle; Bukit Timah; Changi. Malacca, Tebong. Negri Sembilan near Tampin. Penang Hill (Haniff). Distrib. Sumatra, Java. Native names: Akar Kapok; Kayap.

(3) A. pennata Willd. Sp. Pl. iv. 1090; Baker, l.c. ii. 297; Prain, l.c. 250, var. pluricapitata Baker, l.c.
Climber about 80 ft. long. Branches prickly with curved thorns. Leaves bipinnate; rachis 6 in. long; petioles 75 to 1 in. long, with a gland above the base; pinnae 20 to 40 pairs, 25 to 2 in. long; leaflets 30 to 40 pairs, linear, 2 to 35 in. long, under 0.5 in. wide. Capitula 2 in. through, white; peduncles 5 to 7 in. long, in clusters of 4 to 8 on a 12 to 15 in. panicle. Pod linear-oblong, acute at both ends, thin, 4 to 6 in. long, 75 to 1 in. wide. Seeds flat, ovate, 4 in. long. Hab. Open country, common in the north. Pahang River. Malacca, Batu Tiga (Holmberg); Ayer Panas and Selandor (Cantley). Negri Sembilan, Bukit Sulu (Cantley). Perak, Larut; Goping and Ulu Bubong (Kunstler). Selangor, near Batu Caves. Penang (Porter, Wall. Cat. 5255). Kedah, Yan. Perlis, Chupeng; Kanga. Distrib. Malay isles. Native name: Akar Kayu Manis.

64. SERIANTHES, Benth.

Big tree unarmed. Branches and panicle rusty, puberulous. Leaves bipinnate. Flowers panicled, large, 5-merous. Calyx deep campanulate, toothed, woolly-silky. Petals adnate to staminal column at base. Stamens monadelphous, very numerous. Ovary sessile, many-ovuled. Pod large oblong nearly woody turgid, septate between the 6 to 8 seeds. Species 2, the other Polynesian.

Leaves, rachis puberulous, 7 to 9 in. long, a large gland at base and small ones between pinnae; pinnae 3-8-jugate, 3 to 4 in. long; leaflets 6 to 12 pairs, oblong-obtuse, base truncate oblique, coriaceous, pale beneath, glabrous, 5 to 1 in. long, 3 to 6 in. wide. Flowers few in panicles 4 to 6 in. long, branches 1.5 in. long. Calyx 5 in. long, teeth triangular. Petals yellowish white, 1.5 in. long, dense-woolly outside. Stamens over 500,
2'5 in. long. Pod 6 in. long, 2'25 wide, '75 in. thick, woody, oblong or obovoid, narrowed at tip. *Hab.* Forests, south of peninsula, Singapore (Wallich 5285); Bukit Timah. Malacca, Pulau Besar (Griffith). *Distrib.* Malay isles.

65. ALBIZZIA, Durazz.

Trees, often large or (in *A. myriophylla*) climbing shrubs unarm. Leaves bipinnate. Flowers in globose sessile or pedicelled heads. Calyx campanulate, toothed. Corolla funnel-shaped; petals united below the middle. Stamens indefinite, monadelphous at base, much longer than corolla; anthers not gland-crested. Ovary stalked or sessile; style filiform. Stigma capitate. Pod large thin, flat, strap-shaped, indehiscent, not septate. Species 20 to 30, Old World tropics.

Climbing shrubs with pulvinus of leaf base forming a hook.
Leaflets narrow, linear; flowers sessile
(1) *A. myriophylla*
Trees; flowers pedicelled; stamens white or yellowish white; umbels large.
Leaflets 5 to 9 pairs; sutures straight, thickened
Leaflets 12 to 16 pairs; sutures sinnate not thickened
Flowers pink; umbels small, few-flowered
(2) *A. Lebbek*
(3) *A. pedicellata*
(4) *A. littoralis*


Tree 40 to 70 ft. tall. Bark pale. Leaves, rachis 3 to 9 in. long, gland large at base; pinnae 2 to 3 pairs, 4 in. long; leaflets 5 to 9 pairs, elliptic-oblong or obovate-oblong, blunt or retuse, base obliquely rounded, usually quite glabrous, bright green, 1 to 2 in. long, '5 to '75 in. wide. Umbels sub-capititate, pale green, 1'25 in. across; peduncles 2 to 4 in. long, axillary or corymbose
at the branch ends; pedicels 1 to 15 in. long. Calyx 15 to 2 in. long, teeth deltoid. Corolla 3 in. long, puberulous; filaments connate, shorter than corolla. Pod 4 to 12 in. long, 1 to 2 in. wide, linear-oblong, thin papery, yellowish. Seeds 4 to 12, 6 in. long. 

_Hab._ Open lowland rather dry country, but probably planted wherever it occurs here. Penang, Quarry; Telok Bahang (Curtis). Perlis, Kanga, open fields. _Distrib._ Asia and Africa.

(3) **A. pedicellata** Baker, in _Benth. Trans. Linn. Soc._ xx. 563; and in _Hook. fil. F.B.I._ ii. 299; _Prain_, l.c. 258.

A tall tree 40 to nearly 100 ft. high. Stem 3 ft. through. Leaves, rachis 5 to 8 in. long, gland large, 5 in. above base; pinnae 6 to 12 pairs, 4 to 6 in. long; rachis puberulous; leaflets 12 to 16 pairs, oblong-obtuse, sessile, base round, coriaceous, pale beneath, 5 to 75 in. long, 3 to 4 in. wide, glabrous. Umbels 75 to 1 in. wide, many-flowered, yellowish white; peduncles pubescent, 1 to 1.25 in. long; panicle 6 to 8 in. long. Calyx 15 in. long, pubescent. Corolla 3 in. long, pubescent. Stamens connate at base in a white tube, free part green, over 1 in. long. Pod indehiscent, 12 to 18 in. long, 2.5 in. wide, thin and brittle, yellowish, sinuate-oblong. Seeds 6 to 9, ovate, 25 in. long. _Hab._ Forests. Singapore, Kranji Road. Malacca (Maingay); Ayer Keroh (Goodenough); Perak, Goping; Ulu Uubong (Kunstler). Province Wellesley, Tasek Gelugur. Penang, Waterfall (Curtis).


Tree 40 to 50 ft. tall. Leaves, rachis 4 to 8 in. long, glabrous; pinnae 2 to 4 pairs, the upper ones 4 to 5 in. long; leaflets 5 to 6 pairs; lower pinnae 3 to 4 in. long; leaflets 3 to 4 pairs, elliptic-oblong or obovate blunt or retuse, base oblique round, sub-sessile, membranous, glabrous glaucescent beneath, 75 to 1 in. long, 4 to 75 in. wide. Panicles about 4 in. long; branches 2 to 3 in. long; peduncles at the extremities slender 1 in. long. Capitula 4 in. across; pedicels 25 in. long. Calyx 1 in. long, pubescent. Corolla 2 in. long, silky. Filaments rose pink at the ends, tube white. Pod 6 to 7 in. long, 1 in. wide, linear, narrowed to both ends, greenish brown. Seeds 12 to 16, oval, 4 in. long. _Hab._ On banks and cliffs by the sea. Singapore, Pulau Ubin. Penang, Pulau Jerajah (Curtis). _Distrib._ Malay isles.

**Excluded Species**

A. **ODORATISSIMA** _Benth._ Malacca (fide Baker). Occasionally planted in gardens.

A. **LUCIDA** _Benth._ Singapore (fide Baker). Not seen anywhere here.

A. **MOLUCCANA** _Miq. Fl. Ind. Bat._ i. 26. A very big tree 100 ft. tall, white bark and extensive spreading crown. Leaves narrow; leaflets numerous, oblong, 25 in. long and 1 in.
wide. Flower-heads numerous in panicles, white. Pods linear, 4 in. long, 5 in. wide, sutures thickened. Formerly much planted as a shade for coffee, and sometimes persisting long after the disappearance of the cultivation, occasionally reproducing itself. Native of Malay islands.

66. PITHECOLOBIUM, Mart.

Trees medium-sized, usually unarmed. Leaves bipinnate; leaflets even pinnate in few or many pairs. Flowers small, white or yellowish in gloseb heads or small clusters, in short panicles, pentamorous. Calyx campanulate or funnel-shaped, short-toothed. Corolla funnel-shaped; petals connate in a tube for half or two-thirds of their length. Stamens monadelphous, exsert; anthers glandless. Ovary often stalked; style filiform. Stigma minute capitate. Pod strap-shaped, curved to a circle or twisted, dehiscent along the lower edge, very much twisted during dehiscence. Seeds several, black, exallate. Species about 100. Mostly American, 1 or 2 African, rest Asiatic.


Pods not twisted.
Pod indehiscent; leaves bipinnate; pinnae with
2 pairs of leaflets . . . . .   (1) P. confertum
Pod splitting in 2, valves velvety . . . . .   (2) P. bubalinum
Pods twisted.
Pinnae 1 to 4 pairs of leaflets.
Pods large, deeply lobed, brown . . . . .   (3) P. lobatum
Pods not lobed, red.
Pods large, 5 in. across; leaflets large.
Panicles large, lax glabrous; flowers small, cymose . . . . .   (4) P. ellipticum
Panicles little-branched, hairy; flowers in heads . . . . .   (5) P. affine
Pods under 1 in. across.
Leaflets 3 pairs 4 in. long or less; flowers over 5 in. long, few in head . . . . .   (6) P. Kunstleri
Leaflets 3 to 4 pairs, 4 to 6 in. long; flowers 15 in. long; fruit 2 by 4 in.
Pinnae with 3 to 10 pairs of leaflets; flowers pedicelled.
Branches strongly angled; leaflets 1 in. wide . . . . .   (8) P. angulatum
Branches hardly angular; leaflets 75 in. wide . . . . .   (9) P. Clypearia
Pinnae with 15 to 20 pairs leaflets; flowers sessile in pairs . . . . .   (10) P. contortum

Small tree. Leaves glabrous, rachis '75 in. long; pinnæ i pair, rachis 2 in. long; leaflets 2 pairs, sub-coriaceous, green, shining above, pale beneath, oblong blunt acuminate, base cuneate, distal pair 3'25 in. long, 1'75 to 2 in. wide, lower pair 2'5 in. long, 1'25 in. wide; nerves 3 to 4 pairs. Panicles axillary and terminal, 2 in. long of small 5- to 10-flowered heads, '75 in. across on pubescent peduncles, '75 in. long. Calyx sessile, '05 in. long, puberulous. Corolla '25 in. long, puberulous. Stamen-tube longer than corolla. Pod horseshoe-shaped, indehiscent (?), not indented between the seeds, 10 to 12 in. long. Seeds 11 to 13, ovate flattened, '75 in long. *Hab. Open country, not common. Singapore, Bedoh; Selitar; Bukit Timah. Pahang, Kwantan (Foxworthy). Malacca, Jelutong (Goodenough). Penang, Penara Bukit (Curtis). Distrib. Sumatra. Native name: Kongkor.

I am not sure if the pod ever splits, as fruiting specimens are rare.

(2) **P. bubalinum** Benth. *Trans. Linn. Soc.** xxx. 576; Prain, l.c. 264.


Tree 60 to 80 ft. tall, crown spreading. Stem 15 to 20 in. through, grey. Leaves glabrous, '6 to 1 in. long; pinnæ 1 pair; leaflets 2 to 3 pairs, oblong to oblong-lanceolate acute, base cuneate, stiff papery, distal pair 5 to 8 in. long, 2 to 3 in. wide, basal pair 3 in. long. Panicles 3 in. long, much branched, heads 3- to 5-flowered, '25 in. across on short peduncles. Calyx sessile, '05 in. long. Corolla glabrous, '15 in. long, white; filament-tube shorter than corolla. Ovary glabrous. Pod 9 to 10 in. long, horseshoe-shaped or twisted, deep purple, glabrous, deeply lobed along the lower suture, 2 in. wide, '1 in. thick. Seeds 3 to 6, orbicular, flat 2 in. across, brown, foetid. *Hab. Campings and waste ground, very common. Singapore to Penang. Distrib. Tenasserim, S. Siam,
Sumatra, Java. Native name: Bua Jering. Use: The seeds cooked and eaten by Malays.


Tree nearly 30 ft. tall. Branchlets puberulous. Leaves, rachis glabrous, 3 to 4 in. long; pinnæ 2 pairs; leaflets 2- to 4-paired, elliptic-oblong acuminate dark shining green, glabrous, base round, rather stiff, 6 to 8 in. long, 2·5 to 3 in. wide, lower ones smaller. Panicle a foot long, rather stout, lax, long-branched. Flowers 2 to 5 together on the ends of the puberulous branchlets. Calyx '05 in. long, puberulous. Corolla yellowish, silky, '15 in. long; filaments united at base only, yellow, '2 in. long. Pod twisted into a circle or spirally, 3 to 7 in. long, 1·25 in. wide, dull red. Seeds 3 to 7, oblong, black with a pale blue bloom, hanging from the pod-edge when ripe, '8 in. long, '6 in. through. *Hab.* Common in lowland country, woods and open land. Singapore, Selitar; Pulau Ubin. Johor, Kwala Sembrong (Kelsall). Pahang, Pulau Chengei. Malacca, Ayer Panas (Derry); Chenana Putih (Cantley). Negrî Sembilan, Tampin Hill. Perak, Goping and Chanderiang (Kunstler); Ulu Selama (Wray). Kedah, Pulau Song-Song. *Distrib.* Java, Sumatra. Native names: Jering Bali; Kachang Tupai; Saga Gajah.


Tree 15 to 25 ft. tall, 6 to 8 in. through. Branchlets pubescent. Leaves, rachis 4 to 6 in. long; pinnæ 1 to 2 pairs; leaflets 4 pairs, papery glabrous, lanceolate oblong or ovate-acuminate, base cuneate, terminal ones largest, 6 to 7 in. long, 3 in. wide, lowest 3 in. long, 1·5 in. wide; nerves 4 to 6 pairs. Panicles 6 to 8 in. lax, puberulous, heads dense, '75 in. across. Calyx sessile, '15 in. long, funnel-shaped, silky. Corolla '25 in. long, white silky; filament-tube as long as corolla, white. Ovary puberulous, stalked. Pod spiral curved into a circle 8 in. long, 1·25 in. wide, dull red or yellow. Seeds oblong, pendent from pod, 6 to 8, black with a blue bloom, 1 in. long. *Hab.* Open country, woods. Singapore, Tanjong Bunga. Malacca (Griffith). Selangor, Semangkok Pass. Perak, Chanderiang (Kunstler). *Distrib.* Burma. Use: Fruit used in curries.

(6) *P. Kunstleri* *Prain*, l.c. 271.

A low tree about 20 ft. tall with slender stems, bushy. Leaves, rachis puberulous, 1 to 4 in. long; pinnæ 2, rachis 4 in. long; leaflets 3 pairs, terminal elliptic acuminate, base cuneate, 4·25 in. long, 1·75 in. wide, lowest 1·75 in. long, '75 in. wide or larger, papery glabrous above; nerves 7 pairs and midrib hairy beneath. Panicles 6 in. long, puberulous. Flowers (largest in genus) up to 12, sessile in a head. Calyx funnel-shaped, '2 in. long, silky. Corolla
Pithecolobium.

**LEGUMINOSÆ.**

5 in. long, tube funnel-shaped, lobes oblong-acute; filaments 1.5 in. long, yellow; tube as long as corolla. Ovary very long, stipitate, pubescent. Pod twisted, 5 to 6 in. long, 1 in. wide, puberulous outside, red inside. Seeds 8 to 10, oblong, pendulous, black. *Hab.* Low swampy woods. Johor, Kota Tinggi; Castlewood; Kwala Sembrong (Kelsall); Sungei Biku (Down). Pahang, Pianggu, Endau (Evans); Perak, Batang Padang district (Kunstler); Bernam River (Kunstler). *Distrib.* Borneo. *Use*: Fruit used for soap.

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Fig. 57.—Pithecolobium Kunstleri.


Tree about 20 to 30 ft. tall. Branches pubescent. Leaves, rachis pubescent, 5 to 1.5 in. long; pinnæ 1 pair; leaflets 3 to 4 pairs, stiffly papery, dark shining green, ovate obtusely caduate, distal leaflets, base cuneate, 4 to 6 in. long; lower ones, base round 3 in. long. Panicles 4 to 6 in. long, lax puberulous, heads 5- to 8-flowered, 1 in. across, sub-umbellate on short peduncles. Calyx sessile, glabrescent, '05 in. long. Corolla white, '15 in. long; filament tube shorter. Ovary glabrous. Pods spirally twisted, 1.75 to 2 in. long, '3 to '4 in. wide, indented between the seeds, orange red. Seeds 8 to 10, pea-shaped, '2 in. through, black.
Hab. Common all over the peninsula in open country and thin woods, very beautiful in fruit, with its brilliant pods and deep green leaves. Singapore, Changi; Bukit Mandai; Bukit Timah. Malacca, Chabau (Cantley); Bukit Bruang (Holmberg). Penang, Batu Hitam (Curtis, Wallich). Distrib. Sumatra, Borneo. Native names: Jering Tupai; Petai Belalang; Kurudas; Kerudas; Kayam and Kayam Api.


Tree about 20 ft. tall. Branches angled. Leaves 12 in. or more long; rachis angled puberulous; pinnae 2 to 4 pairs, lowest 3 in. long terminal, 6 to 7 in. long; leaflets 3 to 8 pairs, ovate-oblong or lanceolate-acuminate, oblique, base very oblique cuneate, 1 to 3 in. long (terminal largest), 1 to 1 75 in. wide, stiffly papery, glabrous above and beneath except midrib on both sides. Panicles axillary and terminal about 6 in. long, with few short branches puberulous. Flowers in small terminal corymbs, about 5 in. across. Calyx 0 5 in. long, puberulous. Corolla 2 in. long, white or pale yellow, silky. Stamen-tube nearly as long as corolla; filaments pale pink. Pod 7 to 8 in. long, 7 in. wide, spirally twisted, puberulous, red, sinuate between the seeds. Seeds 8 to 10, black, 5 in. long. Hab. Secondary forest, common. Singapore, Changi (Hullett); Bukit Timah; Chanchu Kang. Malacca, Sungei Hudang and Bukit Bruang (Derry). Selangor, Rawang (Kloss). Perak, Gunong Batu Putih (Wray). Province Wellesley, Krian. Penang, Moniot’s Road (Curtis). Distrib. Indo-Malaya.


(10) P. contortum Mart. Flora xx. (2), Beibl. 115; Baker, l.c. ii. 305; Prain, l.c. 272.

Tree 15 to 30 ft. tall, grey-pubescent. Leaves 4 to 8 in. long;
rachis slender pubescent; pinnae 5 to 6 pairs, about 4 in. long; leaflets 15 to 20 pairs, oblong or trapezoid, obtuse or sub-acute, base obliquely truncate, papery, pubescent all over, '5 to '7 in. long, '25 to '35 in. wide, sessile. Panicles lax with very slender branches terminal puberulous, 8 to 12 in. long and as wide. Flowers sessile in pairs or single on the tips of the branches. Calyx '05 in. long, puberulous. Corolla greenish white, glabrous, '15 in. long; filament-tube as long as corolla, above cream colour, '35 in. long. Pod long, '4 to '8 in. wide, spirally twisted, puberulous, orange colour, red inside, margin sinuate. Seeds 8 to 10, oblong, black.


Excluded Species (Mimoseæ).

**Xylica dolabriformis** Benth. Baker, l.c. ii. 286; Prain, l.c. 245.
 Singapore, Wallich No. 5278. Though thus in Wallich’s catalogue, the ticket on the specimen in the type-set of Wallich’s plants gives Prome Hill (in Burma) as its locality.

**Enterolobium Saman** Prain, l.c. 251; Inga Saman, Willd. The rain tree, often planted for shade, but not spontaneous anywhere. Native of Guiana.

**Calliandra umbrosa** Benth. Prain, l.c. 253; Penang (fide Baker). No specimen from the Malay Peninsula seen.

**Order XLVIII. ROSACEÆ**

Herbs, shrubs or trees. Leaves stipulate, usually alternate. Flowers bisexual and usually regular. Calyx-tube free or adnate to ovary, usually 5-lobed. Petals 5 or 0, inserted under the margin of the disc. Disc lining the calyx-tube or forming a ring at base. Stamens perigynous usually numerous (rarely 1, 5 or 10) often connate; filaments filiform, anthers small. Ovary 1 or more, free or connate. Carpels with free or connate basal lateral or sub-terminal styles; ovules 1 or more in each carpel. Stigmas simple or penicillate. Fruit various, achenes, berries or drupes. About 1200 species, whole world. (King, Journ. As. Soc. Beng. lxvi. ii. 275.)

**Carpel 1.**

Style basal; trees or shrubs; leaves simple, entire.
Stamens 6 to 30; drupe hard, hardly or not pulpy; calyx-tube long . . . . . . . . . . . . . . 1. Parinarium
Stamens 8 to 10; drupe red, pulpy; calyx-tube short . . . . . . . . . . . . . . . . . . . 2. Coccomelia
Stamens 2; drupe small, coriaceous; calyx-tube short
Style terminal; trees or shrubs; leaves simple.
    Petals large; calyx 5-toothed; drupe pulpy
    Petals minute or 0; calyx 5- to 10-toothed; drupe fleshy
Carpels many, fleshy or pulpy, not included in calyx-tube.
Climbing thorny shrubs; leaves lobed serrate
Calyx-tube becoming fleshy and enclosing the carpels;
    fruit a pome, with 3 to 5 bony or coriaceous stones.
Flowers corymbose or fascicled
Flowers panicled

1. PARINARIUM, Juss.

Trees. Leaves entire, alternate. Flowers bisexual in panicled corymbose racemes, bibracteolate, usually white. Calyx-tube funnel-shaped or campanulate, lobes 5. Petals 5, sometimes clawed. Stamens 6 to 30; filaments united in an incomplete ring or in an unilateral bundle, all perfect or some antherous. Carpels 1, adnate to one side of the calyx-tube, 2-celled; ovules 2 or 1. Drupe round, globose or ovoid, woody, 2-celled not pulpy. Species about 50, tropics of both worlds.

Leaves whitish beneath, woolly pubescent.
Leaves thin, 1½ to 3 in. long, thinly whitish, pubescent; panicles lax
Leaves stiffly coriaceous, 3 to 4 in. long, thick, yellow woolly; panicles very short
Leaves 5 in. long, elliptic, wide
Leaves oblong 8 in. long; panicle large many-nerved
Leaves glabrous.
Flowers in sessile, solitary spikes.
Stamens 10; fruit 1 in. through; flowers small
Stamens 12 to 16; fruit much thicker; flowers large
Flowers racemose or panicled; fruit woody; flowers straight.
Leaves large, sub-sessile, base broad, 3 in. wide
Leaves smaller, base narrowed; petioles 2 in. long; stamens 12 to 16
Leaves oblong-lanceolate, stiff; stamens 10
Leaves broad, lanceolate; stamens 20 to 30
Leaves lanceolate acuminate.
Panicles short; flowers curved; petals unequal
Panicle corymboid; petals equal

(1) P. costatum
(2) P. rubiginosum
(3) P. polyneurum
(4) P. oblongifolium
(5) P. spicatum
(6) P. Maingayi
(7) P. elatum
(8) P. scabrum
(9) P. asperulum
(10) P. Kunstleri
(11) P. heteropetalum
(12) P. Griffithianum
lanceolate acuminate, base cuneate, glabrous, dark green, shining above, pale brown tomentose beneath; nerves 10 to 12 pairs, 1.5 to 3 in. long, .75 to 1.25 in. wide; petioles .25 in. long pubescent. Panicles terminal and axillary 4 to 8 in. long, lax, yellowish tomen-

tose. Flowers .25 in. long, solitary or in cymes of 4. Calyx puberulous outside with a line of subulate processes in the throat and a band of silky hair; lobes ovate shorter than tube. Petals obovate, clawed, pubescent. Stamens 8, villous. Fruit hard, oblong compressed, brown with pale spots, 1 in. long, .65 in. wide.


Tree about 20 ft. tall. Branchlets densely yellowish tomentose. Leaves stiff coriaceous, ovate-lanceolate acuminate, base round, glabrous above, reddish woolly pale beneath; nerves strongly elevate, 3.5 to 4 in. long, 1.25 to 1.75 in. wide; petals 2 in. long, red-woolly. Panicles 5 in. long, red-woolly. Flowers 2 in. long. Calyx-tube funnel-shaped, red-woolly outside, villous inside, teeth ovate acute. Petals small, oblanceolate, pubescent on edge. Stamens shorter than sepals, glabrous. Style very short, villous, as is the ovary. Hab. Mountain woods. Pahang, in woods above the Teku on Gunong Tahan, at 5000 ft. altitude (Ridley).

(3) P. polyneurum Miq. Fl. Ind. Bat. Supp. 306; King, l.c. 278.

Tree 60 to 100 ft. tall, 2 to 3 ft. through. Branchlets puberulous. Leaves oblong blunt acuminate, base round, above glabrous, beneath areolate whitish; nerves elevate, 15 to 18 pairs, 3 to 5 in. long, 1.35 to 2 in. wide; petals 2 in. long. Panicles terminal, 4 in. long, many-flowered, grey-tomentose. Flowers yellowish white 2 in. long; pedicels very short. Calyx funnel-shaped, tomentose outside, villous inside, lobes lanceolate-acuminate, pubescent inside. Petals oblong, blunt not clawed, glabrous. Stamens 10 all fertile. Ovary silky. Drupe compressed, woody, scurfy, 2 in. long, 1 to 2 in. across, 2-celled. Hab. Dense jungle, near limestone. Malacca (Griffith, Maingay). Perak, Goping (Kunstler). Distrib. Sumatra.

(4) P. oblongifolium Hook. fil. F.B.I. ii. 309; Prain, l.c. 279. P. Wallichianum Wall. Cat. 7520.

Tree up to 100 ft. tall, 3 ft. through. Leaves oblong or elliptic, sub-acute, base rounded, dark shining above, white beneath; nerves elevate, 20 to 30 pairs, puberulous, 5.5 to 8.8 in. long, 1.85 to 3 in. wide, petals 35 to 65 in. long. Panicles large, terminal, 6 in. long and wide, white tomentose. Flowers 25 in. long; pedicels very short. Calyx funnel-shaped, tomentose outside, villous inside, lobes ovate acute. Petals as long, spatulate. Stamens as long, 8. Ovary villous. Drupe woody 2 to 3 in. long, elliptic ovoid, scurfy white. Hab. Dense forests, low country. Singapore, near Bukit Mandai. Johor, Scudai River. Pahang, Rumpin River; Sungei Chenei (Fox); Kwala Lipis (Foxworthy). Malacca, Sungei Hudang (Derry). Perak, Ulu Bubong (Kunstler). Native names: Balau; Bidara hutan. Use: One of the most valuable timbers in the peninsula and nearly exterminated on account of this.
(5) P. spicatum King, l.c. 279.

Tree 60 to 80 ft. tall. Leaves elliptic-ovate, blunt or acuminate, base round slightly decurrent, glabrous; nerves 12 pairs, slender, reticulations small, distinct, 2 to 3 in. long, '85 to '16 in. wide; petioles '1 in. long. Panicles spike-like with 1 or 2 branches axillary and terminal, about 2 in. long, brown-pubescent. Flowers '5 in. long, sessile; bracts oblong 2 at base shorter. Calyx-tube funnel-shaped, tomentose, villous inside, lobes oblong obtuse. Petals longer, elliptic obtuse, glabrous, white tinted pink. Stamens 10, dark pink, glabrous. Ovary and style-base silky. Drupe sub-globose, 1 in. long, scurfy, grey. Hab. Dense mixed jungle, 300 to 800 ft. altitude. Perak, Goping (Kunstler); Ulu Bubong (Kunstler).


(7) P. elatum King, l.c. 280.

Tree 100 to 130 ft. tall, 2 to 3 ft. through. Leaves sub-sessile elliptic to ovate-elliptic acute or shortly acuminate, base rounded, cordate, glabrous except a few hairs on the base of midrib beneath; nerves 12 to 14 pairs very prominent, 4'5 to 7'5 in. long, 1'5 to 3'25 in. wide; petioles '15 in. long, thick, strigose. Panicles axillary or terminal 1 to 2 in. long, dense, stout, tomentose. Bracts ovate. Flowers '3 in. long. Calyx-tube short, funnel-shaped, tomentose, mouth villous, lobes nearly as long, ovate sub-acute, tomentose both sides. Petals longer and narrower. Stamens longer, glabrous. Ovary silky. Drupe ovoid rounded, light brown, scurfy, 2-celled, 1'15 in. long, '8 in. through; pericarp 2 in. thick, hairy inside. Rare. Dense rocky jungle, 500 to 800 ft. altitude. Perak, Larut (Kunstler).


Tall tree. Leaves coriaceous, elliptic-oblong, short acuminate, base rounded unequal, one side shortly decurrent, glabrous; nerves 13 to 15 pairs, 4 to 6 in. long, 1'75 to 2'75 in. wide; petioles '2 in. long. Racemes solitary or panicled, pubescent. Flowers '2 in. long. Bracts 2 lanceolate. Calyx-tube cylindric, dilate upwards, lobes oblong half as long. Petals longer, obovate, clawed. Stamens 12 to 16; filaments united at base. Ovary woolly. Fruit ovoid.
obtuse compressed grooved, scurfy, 1 in. long, .6 in. wide. *Hab.*
Perak (Scortechini). *Distrib.* Java.

Perhaps only a form of *P. asperulum*, but the leaves are broader.

(9) **P. asperulum** *Miq. Fl. Ind. Bat. Supp. 307; King, l.c. 281.*
Tree 50 to 80 ft. tall. Leaves thinly coriaceous, lanceolate or oblong-lanceolate acuminate acute, base rounded, shortly cuneate, glabrous; nerves 10 to 16 pairs, 3 to 5.5 in. long, 1 to 1.6 in. wide; petioles .25 in. long. Racemes solitary or panicled, sub-terminal deflexed, 1.5 in. long, tomentose. Flowers .3 in. long; pedicels .1 in. long. Bracts 2, lanceolate. Calyx-tube cylindric, lobes oblong acuminate, half as long. Petals longer, obovate, white. Stamens 10, glabrous, blue. Ovary villous. Fruit sub-ovoid, compressed, rounded, grooved on both sides, rough and scurfy 1 in. long, .6 in. wide. *Hab.* Forests up to 2000 ft. altitude. Singapore, Chan Chu Kang. Pahang, Tahan River; Kwantan, Tanjong Pasir (Foxworthy). Penang Hill at 2000 ft. altitude (Curtis); Moniot’s Road; Batu Feringhi. *Distrib.* Sumatra.

(10) **P. Kunstleri** *King, l.c. 202.*
Tree 50 to 80 ft. tall. Leaves thinly coriaceous, oblong-lanceolate, acuminate, base rounded unequal or shortly cuneate, glabrous; nerves 6 to 7 pairs, slender, hardly elevate, reticulations very inconspicuous, 3.25 to 4.5 in. long, 1.15 to 1.65 in. wide; petioles .25 to .3 in. long. Calyx-lobes oblong, tomentose. Petals longer. Stamens 20 to 30, glabrous. Fruit globose-ovoid, very slightly compressed, 1.25 in. long, .9 in. wide, chocolate brown, scurfy. *Hab.* Dense jungle 300 to 500 ft. altitude. Perak, Larut (Kunstler).

Very like *P. scabrurn*, but the leaves differ in texture and number of nerves.

(11) **P. heteropetalum** *Scort. King, l.c. 283.*
Tree 60 to 80 ft. tall. Leaves coriaceous, oblong-lanceolate acuminate both ends, base often unequal, glabrous; nerves obscure 5 to 6 pairs, 2 to 4.5 in. long, 1 to 1.16 in. wide; petioles .35 in. long. Panicles in upper axils 1 in. long, dense tomentose. Bract 1 lanceolate. Flowers .5 in. long, sessile. Calyx-tube, base cylindric above, campanulate bent at juncture of the two parts, green tomentose, lobes unequal, oblong to obovate. Petals 5, pink, very unequal, 2 upper erect, elliptic, clawed; 3 others narrow, flat, oblong. Stamens 20 to 30 in a semi-tubular phalange, glabrous. Ovary villous. *Hab.* Perak at 1000 to 1500 ft. altitude (Kunstler) in dense jungle. Probably from the Larut hills.

A big tree. Leaves coriaceous, oblong-lanceolate caudate-acuminate, base narrowed, glabrous, dark shining green; nerves 7
to 10 pairs, faint, 3'5 to 6 in. long, 1 to 2'25 in. wide; petioles '25 to '35 in. long. Panicles terminal, pyramidal, 5 to 6 in. long with peduncle, often 3 in. across, dense-flowered, glabrous. Bracts 0. Flowers '5 in. long; pedicels short. Calyx-tube campanulate, lobes broad round, as long, grey puberulous. Petals white, oblong, as long. Stamens 20 to 30 little longer. Ovary tomentose. Fruit ellipsoid obtuse, 1'5 in. long, '75 in. wide, narrowed at base, woody eventually glabrous, yellow, densely woolly inside. Hab. Usually near the sea. Singapore, Changi; Fort Canning. Malacca, Pringitt (Griffith); Bukit Bruang (Derry); Brisu (Derry). Pahang, Pekan. Negri Sembilan, Tampin (Burkill); Pasir Panjang (Foxworthy). Penang, Muka Head (Curtis). Lankawi, Gunong Raya (Haniff). Kedah, Pulau Song-Song (Curtis). Perlis, Kanga: Dis-trib. Java, Borneo, Philippines. Native names: Merbatu Loyang; Chana; Mujagon; Sauh Hutan; Sunko Rimau.

2. COCCOMELIA, Ridl.


Tree 15 to 40 ft. tall. Stem 6 in. through. Branches slender. Leaves elliptic-lanceolate acuminate both ends, glabrous, bright green, lower side paler; nerves faint, 7 to 9 pairs, 2'25 to 3 in. long, '8 to '75 in. wide; petioles '2 in. long. Panicles 3 to 3'5 in. long, hoary, with distant branches, '5 in. long. Flowers '15 in. long. Calyx sub-sessile, funnel-shaped, tomentose within, lobes triangular acute, tomentose. Petals oblong obtuse. Stamens con-nate, glabrous, 7 to 10. Fruit ellipsoid, pulpy red; stone woody, 1-celled, '25 in. long, '2 in. wide. Hab. Open country in woods and thickets. Singapore, Reservoir; Bukit Mandai, etc. Malacca, Bukit Sabukor; Bukit Sadanen (Derry). Sungai Ujong, Rembau (Cantley). Pahang, Kwala Pahang. Selangor, Ulu Selangor; Kwala Lumpur (Foxworthy). Perak near Ulu Kerling (Kunstler). Hindings, Simpit.

var. latifolia. Leaves broad elliptic ovate, stiffly coriaceous, pale 3'5 in. long, 2 in. wide. Fruit globose, '3 in. long, '25 in. wide. Penang Hill (Curtis); Setul Heath. Distrib. Borneo. Native names: Merbatu Merah; Merbatu putih and Merbatu Kechnil; Mumbatu; Tumbatu; Marabatu; Mumpadang; Bangas Putih; Kelat Laya Hutan; Medang Kawan.
3. PARASTEMON, DC.

Big tree. Leaves alternate, coriaceous. Flowers very small, racemose or spicate, glabrous. Calyx-tube short, campanulate, 5-lobed. Petals 5 or 6, oblong. Stamens 2, unilateral, several imperfect. Carpel 1, adnate to one side of the tube, 1-celled. Style basal; ovules 2. Fruit oblong, coriaceous, 1-celled, 1-seeded. Seed testa hairy. Species 2, 1 Malay Peninsula, 1 Borneo.

King, l.c. 285.

Big tree up to 100 ft. high, and 3 to 4 ft. through with drooping branches, glabrous. Leaves ovate-lanceolate or lanceolate caudate acuminate acuminate obtuse, bright green; nerves 4 to 6 pairs faint, 2.5 to 3 in. long, .85 to .15 in. wide; petioles .25 in. long. Racemes slender, 3 to 3.5 in. long. Flowers numerous .05 in. long; pedicels very short. Fruit yellowish, oblong, .45 in. long, .25 in. through. Hab. Common in open country, often near the sea. Singapore (Wallich); Jurong; Changi; Chan Chu Kang. Malacca, Ayer Panas (Hervey); Panchur (Goodenough). Negri Sembilan, Kopis Residency (Foxworthy). Bindings, Bruas; Lumut, Perak, Kol (Kunstler). Penang, Penara Bukit; Batu Feringhi (Curtis). Distrib. Labuan. Native names: Siagnos betina; Malas; Kelat Pasir.

4. PRUNUS, Linn.

Shrubs or trees. Leaves alternate. Flowers white or pink, solitary, panicked or racemed. Calyx deciduous in fruit, lobes 5, imbricate. Petals 5. Stamens 16 to 80 inserted in mouth of corolla tube; filaments free. Carpel 1. Style terminal; ovules 2. Drupe indehiscent or 2-valved, 1-seeded. Species about 80, chiefly north temperate zone.

(i) Prunus martabanica Kurz var. Scortechini King, l.c. 286.

Tree 40 to 80 ft. tall, 2 to 3 ft. through. Leaves lanceolate long acuminate, narrowed or round at base, glabrous membranous, 2.75 to 5 in. long, 1 to 1.75 in. wide; petioles .3 to .6 in. long. Racemes usually solitary, 2 in. long, many-flowered, pubescent. Flowers .35 in. across, greenish white. Calyx-tube campanulate, tomentose, lobes ovate. Petals orbicular, 1 in. long. Stamens 60 to 80. Ovary ovoid, glabrous; style long. Drupe ovoid acuminate beaked, 1 in. long, .4 in. through; pericarp thin, woody. Hab. Forests, not common. Perak, Chanderiang (Kunstler). Penang Hill at 1000 ft. altitude (Curtis). Distrib. Burma, Andamans.

5. PYGEUM, Gaertn.

Trees or shrubs. Leaves alternate; stipules minute (except one species). Flowers small, racemmed or panicked, tomentose. Calyx-tube obconic, campanulate, 5- to 15-toothed. Petals very
small, 5 to 6 in a 5- to 6-toothed calyx, none in some species, villous, tomentose. Stamens 10 to 50 at the mouth of the calyx-tube; filaments slender, incurved. Carpels 1, basal in calyx-tube, ovoid hairy. Ovules 2; style terminal, slender, exsert in bud. Fruit globose or transversely oblong, grooved in centre on both sides, fleshy, green or black. Species about 30, tropical Asia, 1 in Africa.

Stipules large.
Leaves large, ovate, strongly nerved, hairy beneath.

Stipules small and caducous.
Flowers 5 in. wide; leaves glabrous large.

Ovary glabrous; racemes 2 to 3 in. long.
Flowers 25 in. long, 5-merous; leaves 7 by 4 in. with 2 large glands at base.
Racemes little longer than petiole; leaves narrow.

Ovary hairy.

Racemes longer than petioles, over 1 in. long.
Leaves glabrous.

Racemes slender, lax; leaves elliptic 2 to 3 by 8 to 13 in.

Leaves hairy on midrib beneath.

Racemes shorter than petioles.
Petals 6; leaves thin, ovate cuspitate.

Petals 0; leaves stiff, coriaceous; mountain plants.
Leaves 5 to 7 by 2 to 3 in.; stamens 12.

Leaves 6 by 3 in.; stamens 15.

Leaves 2 to 2.5 by 1 to 1.3 in., glabrous.

Leaves 1.5 to 2.15 in. long; branches and midrib dense-velvety.

Leaves 1.5 in. long; branches glabrous; midrib and edge hairy.

(1) P. stipulaceum
(2) P. grandiflorum
(3) P. polystachyum
(4) P. lanceolatum
(5) P. Scortechinii
(6) P. coriiformum
(7) P. persimile
(8) P. parviforum
(9) P. Hookerianum
(10) P. Griffithii
(11) P. patens
(12) P. brevifolium
(13) P. ovalifolium
(14) P. rubiginosum

(1) P. stipulaceum King, l.c. 287.
Tomentose tree. Leaves very coriaceous, entire, elliptic acute, base broad cordate, edges revolute, above glabrous except midrib with nerves deeply depressed, below red-pubescent especially on nerves, 5 to 7 in. long, 2.5 to 3.75 in. wide; nerves 10 to 12 pairs, elevate; petioles tomentose, 5 in. long. Stipules ovate caudate acute persistent. Racemes below the leaves, 1.25 to 2 in. long, rusty-pubescent. Flowers 15 in. long; pedicels as long. Calyx-tube campanulate, teeth short blunt 10, tomentose. Petals 0. Stamens 15, glabrous. Hab. At 500 to 700 ft. altitude. Perak, Ulu Bubong (Kunstler).

(2) P. grandiflorum King, l.c. 288.
Tree 50 to 70 ft. tall, glabrous. Leaves thinly coriaceous,
elliptic to oblong-elliptic, short acuminate, base cuneate, no glands at base: nerves 8 to 9 pairs, prominent beneath, 5 to 8 in. long, 2.75 to 3.5 in. wide; petioles '75 in. long. Panicles axillary, few lax branches, 3 to 5 in. long, rusty-tomentose at tips. Flowers '5 in. long; pedicels '15 in. long. Calyx-tube campanulate, lobes 5, tomentose reniform blunt. Petals 5, larger, round or oblong blunt, white. Stamens numerous. Pistil longer; ovary pubescent. Hab. Open rocky jungle, 500 to 800 ft. altitude. Perak near Gunong Bubu (Kunstler).

This is very like *P. polystachyum*, but the leaves are thinner and have no glands at the base.

(3) *P. polystachyum* Hook. fil. F.B.I. ii. 320; King, l.c. 290.
A stout tree about 80 ft. tall or less. Leaves coriaceous, thick, dark shining green above, paler beneath, elliptic-oblong, short, blunt, acuminate, base broad or very shortly cuneate with 2 large glands; nerves elevate, 7 to 10 pairs, depressed above, 4.5 to 7 in. long, 2.5 to 4 in. wide; petioles '5 in. long. Racemes axillary, 2 to 3.5 in. long, sparsely pubescent. Flowers '3 in. long; pedicels nearly as long. Calyx-tube campanulate tomentose, lobes 5 oblong. Petals 5. Stamens 40 to 50. Ovary glabrous. Drupe globular or transversely oblong shining light green, '6 in. long. Hab. Common in forests. Singapore, Garden Jungle; Changi; Bidadari. Malacca (Maingay). Selangor, Gardens, Kwala Lumpur (Foxworthy). Perak, Chanderiang and Ulu Bubong (Kunstler).

(4) *P. lanceolatum* Hook. fil. F.B.I. ii. 319; King, l.c. 289.

Leaves always glabrous, thicker with less conspicuous nerves and slightly smaller. This seems to me to be a higher level or drier locality form of *lanceolatum*. Hab. Malacca, Selandor (Cantley); Bukit Sadanen (Derry). Perak (Scortechini). Penang, West Hill at 2500 ft. and at 1100 ft. altitudes (Curtis).

(5) *P. Scortechinii* King, l.c. 290.
Slender tree 40 to 50 ft. tall. Leaves coriaceous elliptic to oblong-lanceolate, acute or acuminate, base cuneate, glands 0, glabrous, paler beneath; nerves 6 to 7 pairs, 2 to 3 in. long, '8 to
1'35 in. wide; petioles '25 to '35 in. long. Racemes solitary axillary 1'5 in. long, pubescent, hairy. Flowers '15 in. long; pedicels '1 in. long. Calyx narrow, campanulate, lobes oblong sub-acute, hairy. Petals 0. Stamens 12, exsert. Pistil shorter. Ovary hairy. Fruit transversely oblong, glabrous or minutely pubescent, '3 in. long, '4 in. wide. Hab. Perak (Scortechini).

A small tree. Leaves coriaceous elliptic, shortly blunt acuminate, base broad shortly narrowed, glabrous; nerves invisible above, prominent beneath, 5 pairs, reticulations invisible, 6 in. long, 3'5 in. wide; petioles 5 in. long. Racemes solitary axillary '5 in. long, dense. Flowers very shortly pedicelled, puberulous. Calyx-tube campanulate, pubescent, lobes 6, unequal ovate acute, inside of tube glabrous. Petals 0. Stamens long, rather thick, about 20. Style stout, glabrous; ovary hairy. Hab. Perak, woods at Temengoh, on the Kertai River (Ridley).

A small slender tree about 30 ft. tall. Leaves thin coriaceous, elliptic to elliptic-lanceolate, short blunt acuminate, base shortly cuneate glabrous; midrib, nerves and petiole pubescent on both sides; nerves 7 to 8 pairs, very prominent beneath, 2'5 to 4 in. long, 1'3 to 1'6 in. wide; petioles '3 in. long. Racemes 3- to 4-fascicled, 1'5 in. long, supra-axillary below leaves, tomentose; pedicels '1 in. long. Calyx campanulate, tomentose, teeth 6. Petals 0. Stamens 12 to 18. Pistil, ovary and base of style silky. Stigma discoid. Fruit transversely oblong deeply grooved, glabrous, '25 in. long, '35 in. wide. Hab. Woods. Singapore, Tanglin; Kranji. Malacca (Griffith); Ayer Panas; Brisu and Batang Malacca (Derry). Negri Sembilan, Tanglin Hill (Goodenough). Selangor, Ginting Bidai. Distrib. Tenasserim. Native name: Medang Changnau.

Tree about 60 ft. tall. Leaves coriaceous elliptic to oblong or ovate-acuminate, base rounded or shortly cuneate, glabrous above, sparsely pubescent on nerves beneath; nerves 5 to 6 pairs elevate beneath, 2 to 4 in. long, 1'5 to 2 in. wide. Racemes fascicled, 1 to 1'5 in. long, dense on old wood, densely tomentose. Bracts ovate, tomentose outside. Flowers '2 in. long, sessile. Calyx campanulate, tomentose, teeth 10. Petals 0. Stamens 30 to 40, glabrous, exsert. Pistil shorter. Ovary hairy. Fruit sub-globose, apiculate pubescent when young, then glabrous green, grooved down both sides. Hab. Common in woods. Singapore, Kranji. Malacca, Sungei Hudang (Goodenough). Selangor, Bangi (Fox-worthy). Perak, Larut and Ulu Bubong (Kunstler); Temengoh. Distrib. Java, Borneo.
I fail to see any difference between King's *intermedium* and *parviflorum*, Teysm.

(9) **P. Hookerianum** King, *l.c.* 293.


(10) **P. Griffithii** Hook. fil. *F.B.I.* ii. 293; *King, l.c.* 293.

Treelet. Branches stout, tomentose. Leaves coriaceous, oblong to oblong-lanceolate acuminate acute, base rounded slightly narrowed, edge sinuate above, glabrous beneath, minutely puberulous or glabrous; nerves 8 to 10 pairs, 5 to 7 in. long, 2 to 3 in. wide; petioles 4 in. long tomentose. Racemes axillary, solitary, 5 in. long, densely red-tomentose. Flowers 5 or 6. Calyx red-woolly, obconic, teeth 6. Petals 0. Stamens 12. Ovary hairy. *Hab.* Local at 1000 ft. altitude and upwards. Johor, Gunong Pantai. Malacca, Mt. Ophir at 4000 ft. altitude (Griffith). Selangor, Gunong Mengkuang Lebah (Robinson).


Small slender tree 20 ft. tall. Branches red-scurfy. Leaves ovate coriaceous, base rounded, edge entire, glabrous above; nerves sunk elevate beneath, 9 to 11 pairs, red-scurfy, reticulations conspicuous, 6 in. long, 3 in. wide; petioles 25 in. long, red-scurfy. Flowers in small fascicles, less than 25 in. long. Bracts small, ovate. Calyx cupular, hairy, lobes short. Petals 0. Stamens 15, short, glabrous; anthers as long, elliptic; style thick, hairy. Drupe transverse oblong, 2-seeded, 25 in. long, sparsely hairy. *Hab.* Woods on high mountains, local. Pahang, woods on Gunong Tahan at about 4000 ft. altitude (Ridley).

(12) **P. brevifolium** Hook. fil. *F.B.I.* ii. 321; *King, l.c.* 293.

Shrub 3 to 4 ft. tall. Leaves coriaceous, ovate or elliptic, blunt acuminate, base very shortly narrowed, glabrous when adult; midrib depressed above, elevate beneath, as are 4 to 5 pairs fine nerves, 2 to 2.5 in. long, 1 to 1.3 in. wide; petioles 25 to 3 in. long. Racemes axillary, 3 in. long, red-tomentose, 6- to 10-flowered. Calyx-tube urceolate, teeth 5 to 6. Petals 0. Stamens 10 to 16, short. Ovary villous. Fruit globose, apiculate, 5 in.
through, black. *Hab.* Local, on high mountains. Malacca, Mt. Ophir at 4000 ft. altitude (Griffith, Hullett, Ridley).

(13) **P. ovalifolium** King, *l.c.* 292.

Small tree 15 to 20 ft. tall. Leaves stiffly coriaceous, oval blunt emarginate, base round, above glabrous, midrib rusty-tomentose on both sides; nerves 7 to 8 pairs, fine, red-hairy, 1·75 to 2·15 in. long, 1 to 1·15 in. wide; petals 3 to 4 in. long. Racemes stout, axillary, 3 to 5 in. long, few-flowered, tomentose. Flowers 2 in. long, sessile, brown-tomentose. Calyx-tube campanulate, teeth oblong, blunt 10. Petals o. Stamens 30 to 40, glabrous, exsert. Pistil shorter. Ovary silky. Fruit sub-globose, apiculate, grooved, '35 in. through. *Hab.* Mountains 4800 to 5300 ft. altitude. Perak, Gunong Bubu (Kunstler).


6. **RUBUS**, Linn.


Leaves simple.

Flowers '5 in. wide; calyx woolly; leaves large . . . . . (1) **R. alceæfolius**
Flowers 4 in. or less wide; calyx tomentose; leaves buff tomentose beneath . . . . . (2) **R. angulosus**
Flowers about 4 in., lax panicle; calyx silky; leaves ovate hardly lobed . . . . . (3) **R. glomeratus**
Flowers a little smaller; panicle more lax; leaves hardly tomentose beneath . . . . . (4) **R. Hasskarli**
Flowers small; calyx pale velvety; leaves as in *glomeratus*, but white-scurfy beneath . . . . . (5) **R. elongatus**
Leaves pinnate . . . . . . . . . . . . . . . (6) **R. roseæfolius**


A robust bramble. Stem velvety, thorns large, dark. Leaves 5-lobed, corotate denticulate bullate with strigose hairs above, yellowish tomentose, back of leaf whitish, velvety; midrib thorny, 6 in. long and wide, or less; petals 1·5 to 2·5 in. long, velvety

The broad leaves and large flowers distinguish this bramble from the others.

**Fig. 59.—Rubus angulosus.**


Big sarmentose shrub armed with short hooked thorns, buff tomentose. Leaves ovate or rounded, cordate, 3- to 8-lobed, lobes acute, denticulate, sparsely hairy above; midrib, back of leaf and petioles buff-tomentose, thorny, blade 3:5 to 8 in. long, 3 to 7 in. wide; petioles 1 to 3 in. long. Stipules pinnatifid, fimbriate. Flowers crowded in short axillary racemes to the branch ends. Bracts oblong, palmatifid hairy outside. Calyx yellow, silky; sepals triangular, lanceolate. Petals ovate erose-dentate nearly as long. Drupes small few, orange. *Hab.* Com-
mon in the lowlands. Singapore, Tanglin; Jurong. Malacca, Mt. Ophir; Selandor (Cantley). Pahang, Pekan; Kwala Tembeling; Temerloh. Selangor, Batu Tiga; Semangkok Pass. Perak, Relau Tujor (Wray). Penang. Tringganu, Bundi (Rostado). Kelantan, Kwala Lebir. **Distrib.** Mergui. **Native names:** Papa Runga; Duri Berumbet; Tempo Ranak; Tempo Ragat; Tempo Ranang; Tapa ringu (Tringganu); Akar Kupor. **Use:** Roots, decoction for dysentery.

(3) **R. glomeratus** Bli. Bijdr. III; Focke, l.c. 90; King, l.c. 295.


Nearly always a mountain plant, and common above 2000 ft. altitude, but I once found it at sea level in Singapore. **Native names:** Akar Balik Adap; Akar Bulan Mudik; Akar Kupor.

(4) **R. Hasskarli** Miq. Fl. Ind. Bat. 381. **R. glomeratus** var. gracilis, King, l.c. 295.

Slender purplish bramble with few thorns. Leaves deltoid, thin, 3- to 5-lobed wide, cordate acuminate denticulate above, glabrous except midrib and nerves, beneath concolorous, nearly glabrous, 4-25 in. long, 3 in. wide; petioles slender, 1-25 in. long appressed, hairy and thorny. Stipules oblong-lanceolate pinnatifid about half-way. Panicles long, 8 in. or more lax, lowest branch 3-5 in. long, yellowish tomentose. Buds ovoid, acute. Pedicels '5 in. long. Sepals ovate acuminate, '2 in. long, yellowish silky tomentose outside. Petals shorter, white. Fruit raspberry colour. **Hab.** Mountain forests, not common. Perak, Batang Padang valley (Wray). Penang (Schomburgk). **Distrib.** Java, Sumatra.

This differs from **R. glomeratus** in its straggling inflorescence and the leaves not yellowish white beneath.

(5) **R. elongatus** Smith, Icon. iii. 6, 62; Focke, l.c. 60, pl. 22. **R. Lobbianus** Hook. l.c. Pl. 741-742.

A slender climber 30 to 40 ft. tall. Branches hardly puberulous, covered with many short curved thorns. Leaves thin ovate acuminate, edges at base sinuate but not lobed, margins denticulate, base widely cordate, glabrous above, pale grey puberulous beneath, 3-5 in. long, 2-4 in. wide; petioles slender, very thorny, 1.5 in.
long. Stipules pectinate. Inflorescence slender zigzag puberulous, lax, 6 in. long; branches short, 1 to 1.5 in. long. Flowers 1.3 in. across. Sepals rounded. Petals white. Fruit red, glossy black when quite ripe. Hab. Dense open jungle, 300 to 800 ft. altitude. Perak, Larut (Kunstler); Thaiping Hills, Waterfall (Wfay). Distrib. Malay isles.

(6) R. rosæfolius Sm. Ic. iii. 60; Focke, l.c. 153; King, l.c. 296.

A slender scrambling bramble, with slender stems sub-glaborous with long straight thorns. Leaves pinnate; leaflets 7 to 9, ovate or lanceolate acuminate, toothed, glabrous or hairy beneath, 1.5 to 3 in. long, 7 in. wide. Stipules subulate. Flowers 1 to 2 axillary and terminal on peduncles 5 in. long, glabrous or pubescent, 5 in. across. Calyx-lobes setaceous, glabrous. Petals large, white. Fruit a blunt cone of many crimson drupes, about 5 in. tall, sweet and juicy. Hab. Mountain thickets, Pahang, Telom. Selangor, Semangkok Pass. Perak, Thaiping Hills near the Cottage, 3500 to 5000 ft. altitude (Wray). Distrib. India, Malay islands to Papua.

7. PYRUS, Linn.

Trees or shrubs. Leaves simple. Flowers in terminal cymes or corymbs. Bracts subulate or linear. Calyx-tube urceolate or obconic, lobes 5. Petals 5. Stamens 20 or more; filaments connate at base. Disc annular or lining the tube. Carpels 2 to 5 connate and adnate to tube. Styles 2 to 5; ovules 2 in each cell. Fruit fleshy, 2- to 5-celled, cells with a membranous cartilaginous endocarp. Species 100, North Temperate zone, rare in tropics.


Tree 80 to 100 ft. tall. Stem 2 to 3 ft. through. Leaves coriaceous ovate, acuminate, base cuneate or round, edges serrate, glabrous; nerves 7 to 9 pairs, prominent below, 4 in. long, 2.5 in. wide. Corymbs lax, terminal. Fruit globose pear-shaped rugulose, 1.75 in. long, 6 in. through, 4-celled; endocarp of large granules. Hab. Rocky spots in woods by streams, 2000 to 5000 ft. altitude. Pahang, open woods and stream borders on Gunong Tahan. Perak, Thaiping Hills at 2000 to 2500 ft. altitude (Kunstler); Box Hill (Fox). Distrib. India, Burma, Sumatra.

8. ERIOBOTRYA, Lindl.

Trees or shrubs. Leaves alternate petioled, coriaceous. Flowers white in corymbs and panicles. Calyx-tube turbinate, lobes ovate, 5. Petals 5. Stamens 30, insert in calyx-mouth. Ovary inferior, 2- to 5-celled; ovules 2 in a cell. Styles 2 to 5, free or more or
less connate at base, apices dilate. Drupe or berry ovoid, 1- to 5-locular, cells 1- to 2-seeded.


A shrub or tree. Leaves elliptic or oblong acuminate, narrowed to base, crenate, glabrous; nerves 8 to 12 pairs, 4 to 5 in. long, 1.75 in. wide; petioles 1.75 to 1 in. long. Panicles 2 to 3 in. long, usually dense woolly, rather stout. Flowers 3 in. across, white, fragrant. Calyx-tube obconic. Petals orbicular, claw woolly. Styles 2, base woolly. Fruit 75 in. long, ellipsoid-ovoid, crowned with the sepals, 1- to 2-seeded, green. *Hab.* Rocky spots. Pahang, Gunong Tahan (Robinson). Malacca at Bukit China (Griffith). Dindings at Segari (Ridley). *Distrib.* Himalayas, Burma.

**ORDER XLIX. SAXIFRAGACEÆ.**

Trees, shrubs or herbs. Leaves alternate or opposite; stipulate or not. Flowers bisexual, regular. Calyx more or less adnate to ovary, sometimes free, sometimes inferior. Petals 5 or 4, perigynous or epigynous. Stamens as many or double, rarely numerous. Ovary of 2 to 3 or 5 united carpels, 2- to 3- or 5-celled with axile placentas or 1-celled with parietal placentas. Styles as many as carpels, free or combined nearly to top. Ovules numerous. Fruit capsular or berried. Seeds numerous (one in *Polyosma*). Species 600 in cold or temperate regions and mountains of tropics, with a few tropical trees or shrubs.

1. **Dichroa**, Lour.


(i) **D. febrifuga** Lour. *Fl. Cochinchine*, 301; *Wall. Pl. As. Rar. t. 213; Bot. Mag. t. 3046; King, i.c. 298.

Shrubby at base, 3 to 6 ft. tall, nearly glabrous. Leaves caudate-acuminate, 4 to 5 in. long, 1.4 to 1.8 in. wide; petioles 6 to 1.75 in. long. Panicles large, lax, about 6 in. or more long and wide.

2. **WEINMANNIA**, Linn.

Trees or shrubs. Leaves stipulate odd-pinnate (or trifoliate or simple) glandular serrate. Flowers small racemose. Calyx-tube short, lobes 4 to 5. Petals 4 to 5, imbricate, spathulate or obovate inserted under the margin of a perigynous disc. Stamens 8 to 10, insert with the petals; filaments exsert. Ovary free, conic 2-celled. 2-beaked. Styles 2. Capsule coriaceous, 2-celled, 2-valved. Seeds elongate. Species 80, Mascarene, Malaya, Australia, America.


A small much-branched tree. Leaves bright red when young, pinnate 2 to 3'5 in. long; leaflets 9 to 11, sessile, oblong lanceolate acute, glabrous except for a few black hairs beneath; nerves 6 to 7 pairs, 75 to 1 in. long (terminal one longer), 2 to 3 in. wide. Stipules obovate, round, 2 in. across, pubescent. Racemes clustered about 3 in. long, terminal. Flowers pinkish white. Capsules elliptic with the two divergent styles at tip red. Hab. Mountains, not rare, 4000 to 6000 ft. altitude. Malacca, Mt. Ophir. Pahang, Gunong Tahan (Robinson); K'luang Terbang (Barnes). Perak, Gunong Bubu (Wray); Gunong Hijau, Thaiping Hills. Distrib. Java, Philippines.

3. **POLYOSMA**, Bl.

Trees of medium or small size or shrubs. Leaves coriaceous or membranous, opposite petioled. Flowers in terminal racemes, short pedicelled with 3 bracts, white, fragrant. Calyx-tube short, adnate to ovary; lobes 4, small. Petals 4, epigynous, linear, valvate, pubescent outside, villous inside, recurved in flowering. Stamens 4; filaments hairy. Ovary inferior, 1-celled; style columnar, long; ovules numerous, parietal. Stigma simple. Fruit baccate, 1-seeded. Species 20, Indo-Malaya, Australia.

Leaves membranous drying black.

- Leaves sinuate-dentate, 2'5 in. long, 1 in. wide; flowers 1 in. long, few (1) **P. ilicifolia**
- Leaves sinuate-dentate, 6 to 7 by 3'5 in.; flowers '5 in. many (2) **P. grandis**
- Leaves entire; leaves 4 to 6 in. long. Fruit elliptic, narrow both flowers '3 in. appressed, hairy
- Flowers conoid; flowers sparsely puberulous (3) **P. integrifolia**
- Leaves 3'5 by 1'5 in.; flowers small, 2 in. long (4) **P. conocarpa**
- (5) **P. fragrans**
Leaves coriaceous, glabrous, drying black.
Leaves glaucescent beneath.
Leaves not glaucescent beneath.
Leaves short cuneate at base.
Leaves long, acuminate at base.
Leaves sparsely denticulate; buds fascicled.
Leaves bright yellow green, velvety beneath.
Leaves 3 to 4 in. long; flowers 12 in. long.
Leaves 6'5 by 2'5 in.; flowers 4 in. long.
Leaves fuscous tomentose beneath; with nerves prominent, sunk above, 6 to 8 in. long.

(6) **P. glaucescens**

(7) **P. coriacea**

(8) **P. Scortechnii**

(9) **P. fasciculata**

(10) **P. laete-virens**

(11) **P. Ridleyi**

(12) **P. flavo-virens**


Shrub. Leaves membranous, elliptic or obovate narrowed at both ends, edges dentate sinuate, glabrous; nerves 10 pairs, 2'5 in. long, 1 in. wide; petioles 1 to 2'5 in. long. Racemes 1 in. long, few-flowered. Flowers white 1 in. long. Calyx-tube short, green, glabrous, lobes ovate acute. Petals connate in middle, sub-glabrous outside, linear, villous within. Stamens rather longer. Fruit ellipsoid, smooth, narrowed at base crowned by the sepals, black, 1 in. long. Hab. Mountains at about 4000 to 5000 ft. altitude. Selangor, Menuang Gasing (Kloss); Mengkuang Lebah (Robinson). Perak, Gunong Inas at 5000 ft. altitude (Wray). Distrib. Java.

King’s **P. parviflora** is based on a very young state of the inflorescence of this plant.


Tree 40 to 50 ft. tall with spreading branches. Stem 1'5 to 2 ft. through. Leaves ovate-elliptic, cuspidate acuminate, cuneate at base, thin, margins distinctly denticulate, glabrous above and beneath except midrib and prominent nerves 12 pairs; secondary nerves prominent, 6 to 7 in. long, 3'5 in. wide; petioles stout 5 in. long, flat, thin, pubescent. Racemes 6 in. long; peduncles 1 in. long, sparingly pubescent. Buds narrow, cylindrical, blunt, on 1 in. long pubescent pedicels. Calyx-tube cylindrical, lobes broad, ovate acutus as long as tube. Petals sub-glabrous, white, base greenish, narrow linear, sparingly villous inside. Stamens shorter. Hab. Hill forests. Perak, Larut Hills 3500 to 4000 ft. altitude (Kunstler).

(3) **P. integrifolia** Bl. Bijdr. 659; King, l.c. 302, in part.

Small tree. Leaves thin, elliptic acuminate or cuspidate, base cuneate, glabrous above; nerves 10 pairs, slender, and midrib puberulous beneath, 4'5 in. long, 2'1 in. wide; petioles puberulous, 5 in. long. Racemes 6 to 8 in. long, dense-flowered. Flower-buds straight, narrow, cylindric; pedicel yellow-hairy 1 in. long. Petals linear, grey pubescent, villous inside. Stamens shorter. Fruit elliptic, narrowed slightly at both ends, 35 in. long, 2 in.
wide; pedicels '1 in. long. Hab. Malacca (Griffith and Maingay), apparently not at all common. Distrib. Java.

(4) P. conocarpa Ridl. Journ. Roy. As. Soc. S. Br. 75, p. 31; P. mutabilis King, l.c. 301, not of Blume.

Tree 20 to 100 ft. tall. Young parts appressed, hairy. Leaves thin, elliptic-lanceolate acuminate, long narrowed to base, glabrous; nerves about 8 pairs conspicuous beneath and inarching well within margin, edge quite entire 3'5 to 6 in. long, 1'25 to 2 in. across; petioles '2 in. long, appressed-hairy when young. Racemes 5 in. long, appressed-hairy. Flowers white, scattered or in little groups, pedicelled; pedicels '1 in. long, in fruit '2 in. long. Calyx-tube campanulate, hairy with very small sub-acute teeth. Petals linear, narrow, '2 in. long, sparsely hairy outside, hairy within. Stamens nearly as long. Fruit conoid truncate, strongly ribbed when dry, '25 in. across at the base, narrowing upwards. Hab. Forests up to about 1000 ft. altitude. Scented like privet. Singapore (Wallich 8472). Pahang, Kwantan (Foxworthy). Perak, Larut (Kunstler 4344); Birch's Hill (Wray 508). Penang, Pentlands (Curtis 1081). Lankawi, Gunong Raya (Haniff). Kelantan Woods by Pehi River, Chaning. Distrib. Sumatra Padang, Ayer Mantjur (Beccari 524). Native names: Tembosa jantan; Poko Tupai; Sa-Senduk.


This seems to be a scarce tree.


A small tree 20 to 30 ft. tall, glabrous. Leaves elliptic to lanceolate acute, base narrowed, coriaceous, glaucous beneath; nerves very obscure, 3 to 3'5 in. long, 1'75 to 1'5 in. wide; petioles '1 in. long. Racemes pubescent, 2'5 to 3 in. long. Flowers crowded yellowish white, '2 in. long. Buds oblong, blunt, dilate at base. Calyx-tube very short, funnel-shaped, pubescent, lobes acute, spreading. Petals oblong, obtuse, sparsely strigose outside, villous at tip within. Stamens shorter. Hab. Open rocky slopes in small woods. Pahang, Gunong Tahan on the Padang and at Skeat's Ridge (Robinson and Ridley).
(7) *P. coriacea* King, l.c. 300.

Shrub or small tree. Leaves thinly coriaceous, ovate to lanceolate, glabrous, acuminate or acute, base cuneate, not glaucous beneath; nerves invisible above about 8 pairs, 3 to 3·2 in. long, 8 to 1·75 in. wide; petioles 1 in. long. Racemes 4 in. long, terminal, many-flowered. Buds grey pubescent, cylindric, blunt not dilate at base, distinctly pedicelled; pedicels 95 in. long. Calyx short, teeth short, ovate, rather blunt. Petals narrow, linear, blunt. Stamens a little shorter. *Hab.* Mountains. Selangor, Gunong Mengkuang Lebah (Robinson). Perak, Gunong Bubu 5000 ft. altitude (Wray).

(8) *P. Scortechinii* King, l.c. 301.

Tree 30 to 50 ft. tall. Leaves narrow, elliptic-lanceolate or oblanceolate, thinly coriaceous, sometimes drying green, glabrous, acuminate blunt, base long narrowed; nerves very fine, visible on both surfaces, about 12 pairs, 5 in. long, 1·5 in. wide; midrib strong; petioles '2 to '3 in. long, blade sometimes decurrent nearly to base. Raceme 2·5 to 3 in. long, glabrous. Flowers nearly sessile. Calyx campanulate, lobes short, widely triangular, acute, glabrous. Petals '3 in. long, linear blunt, not dilate at base, very sparsely pubescent on edges, tip inside sparsely hairy. Stamens shorter; filaments hairy. *Hab.* Mountains. Perak (Scortechini); Gunong Inas at 3700 ft. altitude (Yapp).


Shrub. Leaves sub-coriaceous, elliptic, base narrowed blunt, tip sub-acute, glabrous, edges sparsely denticulate; nerves obscure 6 to 10 pairs, 4 to 6 in. long, 1·75 to 2 in. wide; petioles '5 to '75 in. long. Spikes 6 in. long, dense, puberulous. Buds cylindric, blunt, sparsely pubescent, '4 in. long, fascicled in groups. Calyx-tube short, sub-campanulate, pubescent, lobes ovate acute. Petals short, oblong-linear, obtuse, sparsely villous inside. Stamens little shorter. *Hab.* Kedah Peak (Ridley). Rare.

(10) *P. lute-virens* Griff. in *King*, l.c. 303. (Fg. 60, p. 686.)

Tree 20 to 50 ft. tall, 8 to 12 in. through. Branchlets yellowish tomentose. Leaves coriaceous, bright yellow green, smooth above; midrib depressed, velvety-green yellow beneath, lanceolate or narrow elliptic, acute, base narrowed 3 to 4 in. long, 1·2 to 1·75 in. wide; petioles '2 to '3 in. long. Racemes 3 to 5 in. long, yellow tomentose, '1 in. long. Calyx short, cylindric, lobes wide ovate acute, hairy. Petals white, silky pubescent outside, densely villous inside, narrow linear, '2 in. long. Stamens shorter. Fruit obovoid, rounded crowned with calyx lobes, yellow-pubescent, '2 in. long; pedicel '1 in. long. *Hab.* Mountains. Malacca, Mt. Ophir (Griffith), a very glabrous form. Negri Sembilan, Senawang (Foxworthy). Selangor, Kwala Lumpur; Sungei Buluh (Foxworthy). Perak, Ulu Kerling (Kunstler). Penang, West Hill (Curtis). *Native names:* Poko Tupai; Tambal.
var. robusta Ridl. Leaves elliptic, abruptly cuspidate, stiffly coriaceous 5·25 in. long, 3·5 in. wide; petioles 1·25 in. long. Fruit 3 in. long. Pahang, Gunong Tahan 5000 to 6000 ft. altitude (Robinson, Ridley).

Fig. 60.—Polyosma laté-virens.

(11) P. Ridleyi King, l.c. 304.
Tree. Branches tomentose. Leaves coriaceous, narrowly elliptic caudate-acuminate, base cuneate, above glabrous when adult, beneath dense yellowish-tomentose; nerves 9 to 11 pairs, prominent beneath as are secondaries, 6 to 6·5 in. long, 2 to 2·5 in. wide; petioles 1 to 2 in. long, tomentose. Racemes stout 5 in. long, densely yellow-tomentose. Flowers 4 in. long on a 1 in. pedicel. Calyx-tube shorter, teeth broad. Petals linear, blunt, villous inside. Stamens, filament villous as long. Hab. Lowland woods, very rare. Singapore, Selitar (Ridley).

Spreading tree 40 ft. tall, 12 to 18 in. through. Branchlets velvety. Leaves stiffly coriaceous obovate to ob lanceolate, narrowed to base, acuminate or shortly cuspidate, above glabrous; nerves depressed beneath, soft yellow-hairy, especially on the
nerve about 14 pairs elevate, secondary nerves as prominent, 6 to 8 in. long, 2'5 to 3 in. wide; petioles 2 to 1 in. long, velvety. Racemes 8 in. long, velvety pubescent; pedicels 15 in. long with several acute bracts. Calyx-tube very short, obconic; lobes triangular, acute, longer, yellow-hairy. Petals white, linear-oblong, 3 in. long, puberulous outside, villous within. Stamens shorter, villous. Fruit conic, base broad, 3 in. long; apex acute 4-ridged, 4 in. long; pedicels 2 in. long, all pubescent. Hab. Forest. Dindings, Bruas (Ridley). Perak, Goping and Larut (Kunstler). Penang Hill, Balik Pulau (Curtis).

This is certainly not P. velutina Bl. of Koorders and Valeton Booms. Pl. 195, as the fruit is four times as big as in that plant.

4. ITEA, Linn.


(i) I. macrophylla Wall. Roxb. Fl. Ind. ii. 419; Hook. fil. F.B.I. ii. 408.

A medium-sized tree. Leaves ovate acuminate, base round edge, glandular-denticulate; nerves 4 pairs, elevate beneath, 3'5 to 5 in. long, 2'5 to 3 in. wide; petioles 75 to 1 in. long. Racemes 4 in. long, puberulous. Flowers 2 in. across. Calyx-tube gradually narrowed to base, in fruit campanulate, 2 in. long; fruit valves widely diverging 3 in. long. Hab. Rare. In woods on rocky stream banks, mountains. Pahang, Gunong Tahan at 5000 ft. altitude by the Teku River (Ridley). Distrib. India, Java, Borneo.

Order L. DROSERACEÆ.

Small insectivorous herbs, with leaves covered with glandular hairs. Flowers small, racemose, white, pink or violet. Calyx free from ovary 4- to 8-lobed. Petals 4 to 8 hypogynous. Stamens as many. Ovary 1- to 3-celled; ovules parietal, numerous; styles 3 to 5. Capsule 2- to 5-valved. Seeds numerous. Species 110, most temperate and tropical lands.

1. DROSERA, Linn.

The Sundews occur all over the world except Polynesia; most abundant in Australia.
Leaves linear; flowers rose pink (1) D. indica
Leaves spatulate; flowers white (2) D. Burmanni

(1) D. indica Linn. Sp. Pl. 282; King, l.c. 306.

(2) D. Burmanni Vahl. Symb. iii. 50; King, l.c. 306.
Stem very short. Leaves forming a rosette 1 in. across, radical, spatulate-cuneate, rounded, glandular-pubescent, red 5 in. long; petioles as long. Scapes 2 to 8 in. tall, slender, red glabrescent. Flowers few at top small, white; pedicels less than 1/2 in. long, glabrous. Styles 5, not bifid. Hab. Not common, but locally plentiful, usually in damp sandy spots. Pahang, sandy country, Pekan. Malacca, Mt. Ophir in moss (leaves green) at 3000 ft. altitude. Tringganu (Yapp). Setul Heath, with D. indica. Distrib. W. Africa, all tropical Asia, China, Japan, Australia.

Order I.I. Crassulaceae.

Herbs, usually fleshy, succulent. Leaves simple (or divided). Flowers cymose or panicled, regular. Calyx 4- to 5-fid (rarely more). Petals as many as calyx lobes (free) or connate. Stamens as many or double (hypogynous) or attached to corolla. Carpels as many as petals with a hypogynous (gland or) scale at the base. Ovules many. Follicles dehiscing on inner face. Seeds many. Species about 400, whole world except Malaya and Polynesia.

1. Bryophyllum, Salisb.

A tall succulent herb. Leaves opposite, simple, crenate. Flowers in a tall panicle of cymes, greenish or dull red. Calyx inflated, cylindric, 4-lobed. Corolla campanulate, 4-lobed. Petals connate. Stamens 8 in 2 series insert on the middle of the corolla tube. Hypogynous scales 4 blunt. Carpels 4 attenuated into the styles; follicles 4, many-seeded. Species 4, African, one now dispersed all over the tropics.

(1) B. caiycinum Salisb. DC. Prodr. iii. 396; Hook. fil. F.B.I. ii. 413; Bot. Mag. l. 1409.
Stems 1 to 4 ft. tall. Leaves simple or 3-partite; leaflets oblong or elliptic, crenate. Calyx purplish green, 1 to 1.5 in. long. Corolla green constrict in middle, reddish purple at top. Fruit enclosed in the persistent now papery perianth. Hab. Sandy

2. KALANCHOE, Adans.


This is a common pot plant with the Chinese. I have never seen it here in flower, but Maingay's specimens are in flower. It is not native or wild anywhere in our region, but might occur as an escape in dry spots.

Order LII. HAMAMELIDEÆ.

Trees or shrubs. Leaves alternate simple or palmate-lobed. Flowers often unisexual in heads (or spikes). Calyx small or 0, adnate to ovary. Petals 0 to 5. Stamens 4 to many. Ovary 2-celled; styles 2, spreading; ovules 1 to many. Capsule woody dehiscing at tip so as to split each style in two. Seeds 1 to many. Species over 30, Persia, India, China, Japan, India, N. America and S. Africa. (King, Journ. As. Soc. Beng. lxvi. (1), p. 307.)

Petals present.

Petals oblong, pink 2 to 4; stamens 7 to 10 .... 1. RHODOLEIA
Petals linear, white, 5; stamens 5 .... 2. MAINGAYA
Petals linear, spathulate; leaves cordate ovate; stamens 10 to 14 .... 3. BUCKLANDIA
Petals 0; leaves oblong-lanceolate serrate; stamens many .... 4. ALTINGIA

1. RHODOLEIA, Hook.

Shrubs or small trees, extipulate. Leaves coriaceous alternate, glaucous beneath. Flowers in axillary peduncled decurved heads with whorls of bracts. Calyx-tubes connate in heads adnate in lower half to ovary; limb annular. Petals unilateral pink, 2 to 4, absent in central flowers, clawed, oblong. Stamens 7 to 10 inserted with petals; filaments thick; anthers linear-oblong. Ovary half inferior ovoid, tip bifid. Capsule woody, 2-celled, 2-valved with many small angular seeds. Species 3, 1 Hongkong and 2 Malay Peninsula (one also in Sumatra).
Leaves oblong-lanceolate; capsules glabrous. (1) **R. Teysmanni**
Leaves ovate, red, scurfy beneath; fruit red scurfy. (2) **R. ovalifolia**

Tree or big shrub, glabrous. Leaves oblanceolate or oblong, blunt narrowed at the base, coriaceous, glabrous; nerves very fine and inconspicuous, 6 to 10 pairs, beneath glaucous, 3 to 4.5 in. long, 1.75 to 2 in. across; petioles 1 to 1.25 in. long. Heads solitary about 1 in. long, ovoid on curved peduncles, ‘25 in. long.

![Fig. 61.—Rhodoleia ovalifolia.](image)


A big shrub with stout branches about 10 ft. tall. Young parts densely red-pubescent. Leaves adult very stiff coriaceous above glabrous, beneath at first red-scurfy eventually glabrous and white or glaucous, ovate acute, base rounded, sub-cordate;
nerves and reticulations depressed above; nerves 6 to 8, strongly elevate beneath, some secondary nerves prominent, 4 in. long, 2.5 in. wide; young leaves lanceolate acute, base acuminate, 4.5 in. long, 1.75 in. wide; petioles densely velvety eventually glabrous, 1.5 in. long. Heads solitary; peduncle 1.5 in. long, hairy red. Bracts rounded, inner ones very densely red hairy. Petals linear spathulate, 1.5 in. long, 1 in. across, blunt, rose pink. Filaments slender, 1.75 in. long; anthers oblong. Capsule 1.5 in. long, densely red-hairy. *Hab.* Mountains on open rocky spots. Pahang, Gunong Tahan at 5000 ft. altitude (Robinson, Ridley).

2. **MAINGAYA**, Oliver.


(1) **M. malayana** Oliver, in Trans. Linn. Soc. xxviii. 517, t. 44; *Hook. fil.* F.B.I. ii. 428; *King, l.c.* 307.

Tree 30 to 60 ft. tall. Stem 18 to 24 in. through. Leaves 3.5 to 10 in. long, 1.25 to 3.75 in. wide. Peduncles 1.5 to 2 in. long. Heads 1.75 in. through. Capsule tapering into a thick pedicel, 1.75 in. long, apex truncate more than half enclosed in calyx-tube, usually 2 together. *Hab.* Mountains, 2000 to 3000 ft. altitude. Perak, Gunong Bubu (Kunstler). Penang Hill, Sungei Penang and Moniot’s Roads (Curtis).

3. **BUCKLANDIA**, Br.

Tree about 80 ft. tall. Leaves alternate, cordate ovate acuminate, petioled; stipules large coriaceous oblong deciduous. Inflorescence of 3 to 5 peduncled heads at first enclosed in a pair of stipules. Flowers adnate by calyces, about 8 in a head. Calyx-tube adnate to ovary, 5-lobed. Petals in bisexual flower linear spathulate, fleshy. Stamens 10 to 14; filaments long. In females, petals rudimentary. Stamens 0. Ovary half inferior, 2-celled; styles 2, separate; ovules 6 in 2 rows in each cell. Capsule nearly superior, woody, sub-globose. Seeds 6, upper wingless, sterile, lower winged fertile. Species 1, Himalaya, Burma, Java, Sumatra.

(1) **B. populnea** Br. Wall. Cat. 7414; *Griff. As. Res.* xix. 95, plates; *Hook. fil.* l.c. 429; *King, l.c.* 308.

Leaves coriaceous often base rounded, apex acuminate; young leaves tricuspidate; nerves 5, prominent, radiating from base; 3 to 8 in. long, 2.75 to 7 in. wide; petioles 1 to 2.5 in. long. Stipules 2 in. long, 1.75 in. wide, apex round. Peduncles silky at first 1.5 in. long. Heads 1.3 to 4 in. through in flower, 1.5 in. in fruit. *Hab.* High mountain forests, but very rare in flower or fruit, at 5000 ft.
altitude. Pahang, Kluang Terbang (Barnes). Selangor, Menuang Gasing, Ulu Langat (Kloss); Semangkok Pass. Perak, Gunong Inas (Wray).

4. ALTINGIA, Noronh.


A big tree. Leaves 3 to 4 in. long, 1 75 in. wide, tip apiculate, blunt, base narrowed glabrous; nerves 8 pairs, slightly elevate beneath; petioles 1 in. long. Peduncle 2 in. long. Capitula 5 in. through. Hab. Rare on mountains. Pahang, Gunong Tahan at 5000 ft. altitude (Ridley). Distrib. India, Java.

Our plant has stiffer leaves shortly narrowed to a blunt point, the Indian and Javanese forms have thinner long acuminate leaves.

Order LIII. HALORAGEÆ

King, l.c. 309, gives two species of this order as inhabitants of the region, but the evidence for their occurrence here is so doubtful that I exclude both. They are:—

HALORAGIS MICRANtha R. Br.

Perak? Scortechini. "No specimens in Scortechini's collections, but a field note from him" (King).

Not given by King.

MYRIOPHYLLUM INTERMEDIUM DC.

"Malacca, Griffith, probably on Mt. Ophir." No specimen occurs in Griffith's collections at Kew, nor is it mentioned in the F.B.I. Mt. Ophir is a most improbable locality for this pondweed.

Order LIV. RHIZOPHORACEÆ

Tidal mud trees. Leaves opposite stipulate, coriaceous. Flowers in axillary cymes, rather large. Calyx-tube obscure, adnate to ovary; sepals coriaceous 4 to 14. Petals 4 or more, entire or lacerate. Stamens 8 to many. Ovary inferior, 1- to 4-celled. Fruit fleshy, more or less conic. Embryo germinating before the fruit falls and emitting a long thick root. Species about 20, tropics. The Mangroves, Bakau of Malays.
Petals 4. entire; stamens 8; ovary 2-celled. 1. Rhizophora
Petals 5 to 6, emarginate; stamens 10 to 12; ovary 3-celled. 2. Ceriops
Petals 5 to 6 lacerate; stamens many; ovary 1-celled. Petals and sepals 8 to 14; petals bifid; stamens 16 to 28; ovary 2- to 4-celled. 3. Kandelia
Petals and sepals 6 to 14; petals truncate; stamens 8 to 12. 4. Bruguiera

1. RHIZOPHORA, Linn.


Leaves broad, elliptic; cymes 3-flowered; petals fleshy, woolly. (1) R. mucronata
Leaves narrow, lanceolate; cymes 2-flowered; petals thin, glabrous. (2) R. conjugata

(1) R. mucronata Lam. Dict. vi. 189; Ill. 396, f. 2; Wight, Ill. i. 209; King, l.c. 312.
Very large shrub or tree 60 to 80 ft. tall. Leaves elliptic, tapering to each end, mucronate; nerves invisible, 5 to 8 in. long, 2'5 to 4'25 in. wide; petioles 1'2 to 1'75 in. long. Cymes 2 in. long, 3-flowered. Flowers 5 to 6 in. long yellow. Calyx-lobes triangular, sub-acute. Petals shorter, linear-lanceolate, woolly inside. Stamens 8. Fruit obovoid, 1'5 in. long; radicle 1 to 2 ft. long, cylindric. Hab. Mangrove swamps everywhere. Distrib. Old World tropics to Australia. Native names: Belukap; Bakau Korap.

R. stylosa Griff. Notulae. iv. 666; Ic. Pl. As. t. 640, seems to be a smaller form with smaller leaves and flowers, more villous petals and longer style. It was obtained in Malacca, and I have seen specimens much like it from the Malay Islands to New Guinea. It should be looked for again.

(2) R. conjugata Linn. Sp. Pl. 443; King, l.c. 313.
Large shrub or tree 60 to 80 ft. tall. Leaves oblong-lanceolate, tapering to both ends, mucronate; nerves visible, 5 to 6 in. long, 1'25 to 2'5 in. wide; petioles 8 to 1'25 in. long. Cymes 2-flowered, 5 in. long. Sepals ovate acute. Petals shorter, glabrous. Stamens 11 to 12. Fruit obclavate, 1 in. long; radicle slender, 12 in. long. Hab. All mangrove swamps. Old World tropics, less widely distributed than the last. Native names: Bakau (name applied to all mangroves); Akit; Bakau Minyak. Use: In tanning and dyeing.

2. CERIOPS, Arn.

Small trees or shrubs. Leaves opposite, obovate. Cymes condensed. Flowers few, small. Calyx 5- to 6-lobed, with connate bracts at base. Petals 5 to 6, insert at the base of a 10- to 12-lobed

(i) **C. Candalleana** Arn, Ann. Nat. Hist. i. 364; Wight, Ill. 209.

Large shrub or tree. Leaves obovate-oblong blunt, narrowed long to base, 1'75 to 2 in. long, 1 to 1'5 in. wide; petioles '6 to 1 in. long. Cymes 1 in. long, branched. Flowers '25 in. long. Calyx-lobes 5, oblong. Petals oblong-obovate, truncate with 3 short appendages. Stamens 10, as long. Fruit obclavate, nearly 1 in. long; radicle 6 to 12 in. long, slender, thickened near tip, grooved when dry. Hab. Mangroves, common. Singapore, Jurong, etc., to Penang. Distrib. India and Ceylon, Borneo. Native name: Tengah. Use: In dyeing, giving a bright brown colour, and in tanning nets and sails. Cloth dyed in Tengah bark and then in indigo, becomes purple or black.

**C. Roxburghiana** Arn, King, l.c. 316. “Probably in all the provinces,” has never been collected in the Malay Peninsula.

### 3. KANDELIA, Wight and Arn.


(i) **K. Rheedii** W. and A. Prodr. i. 311; King, l.c. 317.

Leaves 2 to 4 in. long, 1'5 in. wide; petioles 5 in. long. Peduncles 2 in. long, 4- to 9-flowered. Flowers '6 to '8 in. long. Fruit 1 in. long; radicle 6 to 15 in. long. Hab. Tidal rivers, very local. Johor, Batu Pahat. Pahang, Pulau Lang, Rumpin (Foxworthy). Distrib. India, Ceylon, Malay isles.

### 2. BRUGUIERA, Lamk.

Trees or large bushes. Leaves coriaceous. Peduncles axillary, cymose, or solitary. Flowers large or small. Calyx-lobes narrow, 8 to 14, tube obconic, ebracteate. Petals oblong, as many, 2-lobed or emarginate, embracing pairs of stamens. Stamens 16 to 28; filaments filiform; anthers linear, as long. Ovary 2- to 4-celled, not projecting; cells 2-ovuled. Stigma 2- to 4-lobed, minute. Fruit obconic; radicle long. Species 7, Old World Tropics.

Flowers solitary, axillary, large; calyx red.

Petals 2-lobed; lobes with 2 to 4 bristles, glabrous.

(i) **B. gymnorrhiza**
Petals 2-lobed; lobes with 1 bristle in the cleft; inner face woolly  (2) B. eriopetala

Flowers cymose, small, green.
Calyx lobes as long as tube; petals bifid  (3) B. caryophylloides
Calyx lobes quarter length of tube; petals emarginate  (4) B. parviflora

(1) B. gymnorrhiza Lam. Encycl. iv. 696; Ill. i. 397; King, l.c. 314.

Large tree with stout branches. Leaves thick, elliptic acute, base cuneate; nerves invisible, 3'5 to 6 in. long, 1'75 to 2'5 in. wide; petioles 1'5 in. long. Flowers solitary, axillary, 1'25 to 1'5 in. long; peduncles 1'35 in. long. Calyx coriaceous campanulate cut into 12 narrow acute teeth, bright red. Petals shorter, as many, bilobed at tip and with 2 to 4 bristles on each lobe, base pubescent not woolly. Stamens 2 opposite each petal, shorter. Fruit small; radicle 1 to 2 ft. long. Hab. Common in mangrove swamps, Singapore to Penang. Distrib. Africa, tropical Asia to Papua.

(2) B. eriopetala Wight, Ill. i. 210; King, l.c. 314.


Bushy tree smaller than the two former. Branches slender. Leaves bright green, oblong or elliptic-lanceolate acute, base narrowed; nerves faintly visible above when dry, 3 to 4 in. long, 8 to 2 in. wide; petioles 1 in. long. Cymes about 1 in. long, 2- to 3-flowered. Flowers green, 4 to 5 in. long. Calyx-tube urceolate; lobes linear blunt, 8, eventually reflexed. Petals shorter, tip bifid sparsely white-hairy; lobes obtuse with 3 to 5 hairs at tip. Stamens 16. Fruit 1'5 in. long, obconic with reflexed sepals half as long; radicle 2'5 to 8 in. long. Hab. Mangrove swamps, common. Singapore, Pulau Ubin (Hullett) to Perak, Sapetang (Wray) and the Adang islands. Native names: Buah Brus; Bakau Putih. Distrib. India, Ceylon, Malay isles.

(4) B. parviflora W. and A. Prodr. 311; King, l.c. 315.

Shrub or small tree. Leaves oblong-lanceolate or elliptic acute, base cuneate; nerves visible on both sides when dry, 3 to 3'5 in. long, 8 to 1'25 in. wide; petioles 75 to 1 in. long. Cymes 2- to 5-flowered, erect, 1 in. long. Flowers 4 to 5 in. long. Calyx-tube
cylindric; lobes 8 much shorter. Petals 8 much shorter, oblong, tip broad emarginate and except for 5 white hairs glabrous. Stamens 16. Fruit cylindric, ribbed, 1 in. long; radicle 4 to 5 in. long. Hab. Mangroves, fairly common, but less so than the last. Whole peninsula. Native name: Lenggadai. Distrib. India, Malay isles.

**ORDER LV. LEGNOTIDÆ**

Trees or shrubs. Leaves opposite, stipulate. Flowers small, white, axillary cymose. Calyx tubular adnate more or less to ovary. Petals 4 to 5, usually lacerate on the edge of the tube. Disc lining tube. Stamens twice as many as petals. Style 1. Fruit drupaceous. Seed 1. Species about 80, tropics.

Flowers in short cymes; petals on edge of disc; ovary half inferior... 1. **CARALLIA**

Flowers fascicled; petals from below disc; ovary superior... 2. **GYNOTROCHES**

Flowers 1 or 2, axillary; petals on edge of tube... 3. **PELLACALYX**

**1. CARALLIA**, Roxb.

Trees or shrubs. Leaves coriaceous (rarely thin) glabrous, petioled ovate or elliptic. Cymes short axillary trichotomous, simple or branched. Calyx-tube campanulate, 5- to 8-lobed; lobes short, valvate. Petals 4 to 5 on edge of crenulate disc lining the tube, clawed, entire orbicular or more or less lacerate. Disc epigynous, 10- to 16-lobed. Stamens insert with petals; filaments filiform; anthers small, oblong. Style filiform. Fruit globose or ovoid, fleshy, 1-celled, 1- to 2-seeded. Seed globose-reniform. Species 12, Indo-Malaya, Australia.

Leaves entire coriaceous.

Leaves obovate; cymes as long as peduncles; flowers several, '15 in. long... (1) **C. integerrima**

Leaves obovate; cymes on peduncles longer than petiole; flowers 3 together, '25 in. long... (2) **C. eugenioides**

Leaves elliptic, sub-acute; peduncles long 3-flowered, '25 in. long... (3) **C. montana**

Leaves elliptic cuspidate, larger, thinner; flowers 3 to 5 in cyme, '15 in. long... (4) **C. Scortechinii**

Leaves coriaceous elliptic acuminate serrulate 1.75 in. long; cymes of 3 or more flowers small... (5) **C. euryoides**

Leaves thin elliptic, large and spinulose on edge.

Flowers in peduncled cymes; bracts imbricate; seeds 2... (6) **C. spinulosa**

Flowers in very short racemes; shrub... (7) **C. suffruticosa**

(1) **C. integerrima** DC. Prodr. iii. 33; Hook. fil. F.B.I. ii. 439. C. lucida King, l.c. 318, not of Roxburgh.

A glabrous tree 40 to 60 ft. tall. Leaves coriaceous obovate to elliptic-oblong, shortly cuspidate, base long-narrowed, edge entire;

(2) C. eugenioidea King, l.c. 320.

Tall tree. Leaves oblanceolate or obovate, apex blunt or rounded, base narrowed, tip edge minutely crenulate, with raised dots on the lower surface; nerves 6 pairs, fine conspicuously inarching, 1 to 1.75 in. long, '7 to '8 in. wide; petioles 1 to 2 in. long. Cymes 3-flowered, axillary peduncles 1 in. long, slender. Flowers 25 in. long. Calyx-tube narrow, campanulate; lobes 5, triangular. Petals 0. Stamens 10, inserted on a 10-lobed disc. Ovary 5-celled. Fruit obovoid, crowned by the enlarged sepals 3 in. long, 2 in. thick. Hab. High mountains. Not common. Selangor, Gunong Mengkuang Lebah (Robinson) at 5000 ft. altitude. Perak (Scortechini).

I have seen no petals on this plant, but they may be early caducous.


Shrub 8 to 10 ft. tall. Leaves only at branch ends, obovate or elliptic-ovate, shortly acuminate blunt, base cuneate, edge denticulate, coriaceous, gland-dotted beneath; nerves 7 pairs, midrib grooved above, prominent beneath, 2 in. long, 1.25 in. wide; petioles stout 25 in. long. Cymes 3-flowered, axillary 75 in. long. Flowers 25 in. long. Calyx-tube funnel-shaped, lobes 5, triangular. Petals ovate, laciniate, clawed, white. Stamens 10. Hab. High mountains, open rocky places at 4500 to 5000 ft. altitudes. Pahang, Gunong Tahan (Ridley, Robinson); Kluang Terbang (Barnes). Perak, Gunong Kerbau (Haniff).

(4) C. Scortechinii King, l.c. 319.

Shrub or small tree. Leaves lanceolate or ovate-lanceolate caudate acuminate, narrowed to base; nerves numerous, very fine, 2 to 2.75 in. long, 1 to 1.25 in. wide; petioles 2 to 2.5 in. long. Stipules lanceolate, 25 in. long. Cymes axillary 2 to 3 in. long; peduncle slender, trichotomous. Flowers 3 to 5, 1 in. long. Calyx-tube campanulate; lobes triangular 5. Petals reniform erose-crenate, clawed, each embracing a stamen. Stamens 10 on a 10-toothed epigynous disc. Ovary 5-celled. Hab. Lowland

(5) C. euryoides Ridl.
A small tree. Branches black, leafy at tips. Leaves coriaceous, elliptic acuminate with a long blunt point, base cuneate, edge serrulate, 1'75 in. long, 5 in. wide; nerves 7 pairs; petioles 25 in. long. Cymes axillary 25 in. long of 3 flowers or compound of 3 branches with 2 flowers on each; pedicels 1 in. long. Flowers 12 in. long. Calyx urn-shaped; lobes 5 lanceolate acute. Petals 5 very narrow linear as long as sepals. Stamens 10. Style stout, as long as sepals. Stigma pulvinate. Fruit ovoid with persistent sepals. Hab. Quartzite rocks at 1000 ft. altitude. Selangor, Klang Gates (Ridley).

Tree (or shrub). Leaves thin, elliptic abruptly acuminate, base narrowed, edge spinulose; nerves fine, 14 pairs, 4 to 5 in. long, 1'75 to 2 in. wide; petioles 2 in. long. Cymes 4 in. long; peduncles 2 in. long; branches short with numerous rounded imbricating bracts. Flowers sessile 2 in. long. Sepals triangular acute. Petals shorter, obovate reniform, edge crisped, claw short, white. Stamens outer row adnate to sepals, inner wrapped in petals, all shorter than petals. Disc annular, slightly lobed. Fruit ellipsoid, 2-seeded. Hab. Rare. Low swampy country near rivers. Pahang, Sungei Lamar, Bentong (Foxworthy). Perak, Tanjong Malim (Ridley). Distrib. Tonkin. Native name: Gandang.

A shrub, glabrous. Leaves elliptic acute at both ends, edges closely spinulose, membranous; nerves 12 to 13 pairs, secondaries nearly as prominent, 3 to 5 in. long, 1'5 to 1'75 in. wide; petioles 5 in. long. Stipules lanceolate, keeled 25 in. long. Flowers yellow and white in short axillary racemes 4 in. long. Bracts ovate, keeled. Calyx campanulate, 12 in. long; lobes 5, lanceolate-acute. Petals linear-oblong lacerate nearly to base as long as calyx. Stamens 10. Hab. Forests, rare. Selangor, Dusun Tua (Ridley).

2. GYNOTROCHES, Bl.

Medium-sized trees. Leaves coriaceous, opposite. Flowers in small axillary fascicles. Calyx 4- to 5-lobed, ebracteate. Petals 4 to 5 inserted below on an 8- to 10-lobed disc, spathulate fimbriate clawed white. Stamens 8 to 10, on the disc. Ovary superior, ovoid-globose, 3- to 6-celled; style conical, columnar; ovules 4 in a cell. Stigma peltate, 5-lobed. Berry globose, many-seeded. Seed obovoid. Species 2, Malayan.

A slender tree, about 40 ft. tall or less, 6 in. through, glabrous.
Leaves oblong or elliptic acuminate at both ends, dark shining green above, yellowish beneath; nerves 9 to 12 pairs, 3'-5 to 5'-5 in. long, 1'-5 to 2'-5 in. wide; petioles '25 in. long. Fascicles 6- to 10-flowered, '5 in. long. Flowers less than '1 in. across, males with perfect white petals; pistil abortive. Female with imperfect stamens and petals. Fruit globose, '1 in. through, at first red, then black. Hab. Common all over the peninsula. In dry woods often a fair-sized tree; in wet swamps very slender, about 12 to 14 ft. tall, with very black bark. Distrib. Malay isles. Native names: Janggut Keli; Mata-Keli; Membelu and M. Kechil. Use: Timber for rafters and posts, rather durable.

3. PELLACALYX, Korth.

Slender trees. Leaves opposite bifarious, petioled sometimes serrate. Stipules interpetiolar, elongate. Flowers solitary or paired, axillary, medium size. Calyx-tube urceolate, adherent to ovary at base; teeth 4 to 6, recurved. Petals 4 to 6, lacerate, on the edge of calyx-tube. Stamens 8 to 12, on the edge of a crenulate disc lining the tube. Ovary half inferior, 5- to 10-celled; style subulate. Stigma discoid lobed. Fruit fleshy, globose, 5- to 10-celled. Seeds many. Species 3 or 4, Malay Peninsula and islands.

Leaves red-pubescent beneath; calyx-teeth 5 or 6. (1) P. axillaris
Leaves glabrous; calyx-teeth 4. . . . (2) P. Saccardianus

(1) P. axillaris Korth. in Van der Hoev. and De Vr. Tijdsch. iii. 20, t. 2; Griff. Notulæ iv. 420; Ic. Pl. As. t. 486; King, l.c. 320.


Medium straight, rather slender tree. Leaves thinly coriaceous, oblong short-acuminate, base round, above glabrous, beneath slightly reticulate, glabrous or very slightly puberulous; nerves 7 to 9 pairs, prominent beneath, 4 to 7 in. long, 1'-6 to 2 in. wide;

Fig. 62.—Pellacalyx Saccardianus.


**Order LVI. ANISOPHYLLEÆ**

Trees or shrubs. Leaves alternate, exstipulate. Flowers very small, white, unisexual. Calyx adnate to ovary; lobes 4. Petals 4, sometimes lacerate. Stamens 8. Styles 4; ovary 4-celled, inferior. Fruit more or less drupaceous. Seed 1. Species 10, tropical Asia and Africa.
ANISOPHYLLEA, Br.

Leaves sub-coriaceous, ovate-lanceolate or rhomboid; nerves 3 to 5, radiating from base, rarely pinnate. Flowers in axillary spikes, single or panicked. Calyx-tube in female ovoid. Petals white or pink, very small or o. Stamens 8. Filaments short; anthers small, abortive in females. Ovules 1 in a cell. Fruit drupe or woody oblong or pear-shaped.

Leaves rhomboid, distichous.
Flowers fascicled below leaves.

(1) **A. disticha**
Flowers in 1 in. pubescent spikes.
Leaves ovate or oblong; nerves stout radiating from base.

(2) **A. Scortechinii**
Flowers apetalous.

(3) **A. apetala**

(4) **A. Gaudichaudiana**
Flowers petalled.
Petals deltoid; leaves and fruit pyriform, large.

(5) **A. Curtisii**
Petals divided to base in narrow lobes.

(6) **A. Griffithii**
Leaves with pinnate nerves from midrib.


Shrub about 8 to 10 ft. tall, with pendent branches. Leaves (young red) dimorphous, densely covering the branches, large ones trapezoid, polished green, sub-falcate acute, base cuneate, sub-sessile, pubescent or puberulous, 75 in. long, 3 to 4 in. wide, sub-coriaceous; small ones lanceolate from below the big ones, lying flat on branch, 1 to 25 in. long. Flowers, males on the underside of the branch, fascicled 0'5 in. across white; racemes very short. Calyx 4-lobed. Petals shorter, fimbriate. Stamens 8. Females solitary, larger, sub-sessile. Calyx-tube elongate, connate with ovary; lobes 4, triangular. Petals and stamens as in male. Drupe oblong, truncate, pulpy, bright red; seed oblong 8-ribbed. *Hab.* Common in low woods and secondary growth. Singapore common, to Perak, Waterfall, Thaiping (Wray), Kedah, Kulim (Haniff) and Gurun (Robinson). *Distrib.* Borneo, Sumatra. *Native names:* Poko Kanchil; Kayu Pachat.

(2) **A. Scortechinii** King, l.c. 325.

Shrub or treelet 25 ft. tall, habit of *A. disticha*. Branchlets tomentose. Leaves falcate rhomboid, long acuminate, base oblique acute, glabrous except a few hairs on back and nerves pubescent; nerves 3 to 5 from base, prominent beneath, 2'5 to 3 in. long, 6 to 125 in. wide; petioles 1'5 in. long. Panicles 5 to 1 in. long, pubescent 1 to 2 branches. Male flowers 1 in. across; pedicels as long. Sepals 4 to 5, ovate acute. Petals shorter, trifid, white. Stamens 8. Fruit ellipsoid, 75 in. long, 4 in. through, red. *Hab.* Dry open woods, local. Pahang, Baloh Residency, Kwantan (Foxworthy). *Dindings* at Simpit. Perak, Ulu Kerling (Kunstler). Province Wellesley, Tasek Gelugur. *Native name:* Kayu Ribu-Ribu.
(3) **A. apetala** Scort. King, l.c. 323.

Tree 30 to 40 ft. tall, glabrous, 10 to 15 in. through. Branches pendulous. Leaves membranous, elliptic or ovate-elliptic, caudate-acuminate, base round or slightly cuneate; nerves 5 from base, 3 to 8 in. long, 1.25 to 3 in. wide; petioles 2.5 to 3 in. long. Racemes panicked, few, glabrous. Flowers globular, pink, males pedicelled. Calyx deeply 4- (or 5)-lobed; lobes thick, triangular. Petals 0. Stamens 4. Females with males, sessile. Calyx tubular, lobes short; ovary 4-angular, included in tube. Fruit ovoid or elliptic, light brown, purple striped, 2 to 3 in. long, 1 to 1.25 in. through; pericarp woody. *Hab.* Forests up to 2500 ft. altitude. Malacca, Bukit Naning (Cantley). Selangor, Petaling. Perak, Goping and Larut Hills (Kunstler). Negri Sembilan, Bukit Tampin (Goodenough). Dindings, Pangkor; Gunong Tungul (Curtis); Telok Sera. Native names: Dalik Limau Manis; Medang burunit.

(4) **A. Gaudichaudiana** Baill. Adansonia xi. 311; King, l.c. 324; Hook. fil. Ic. Pl. 1551.

Tree 60 to 50 ft. tall, 15 to 20 in. through. Leaves coriaceous, dark, drying yellow green, oblong or elliptic narrowed to a long acuminate point, glabrous, strongly 5-nerved from base, transverse nervules conspicuous, 6 to 10 in. long, 2.5 to 4 in. wide; petioles 2.5 to 4 in. long, thick. Panicles axillary, 6 in. long; branches reniform with few short branchlets, pubescent. Male flowers globose 0.5 in. across, pedicelled. Sepals 4, triangular. Petals 4 deltoid. Stamens 8. Female flowers sessile, calyx elongate, tubular. Stamens 0. Fruit large, woody, 3 to 4.5 in. long, 2.5 in. through, pear-shaped, rusty-pubescent. *Hab.* Woods up to 2500 ft. altitude. Perak, Larut (Kunstler); Waterfall, Thaiping (Wray). Penang Hill, 1000 ft. altitude (Wallich, Curtis).

(5) **A. Curtissii** King, l.c. 326.

Tree 60 to 50 ft. tall. Branchlets slender, pubescent. Leaves thin, coriaceous, elliptic-lanceolate slightly oblique, caudate-acuminate, glabrous; nerves 3 or 5, prominent beneath, 2.5 to 3.5 in. long, 8 to 1.25 in. wide; petioles 2 in. long. Spikes 5 in. long, male and female flowers on different ones. Males 15 in. across, sessile. Calyx-tube elongate, pubescent; lobes 4, broad, triangular. Petals 4 cut into filiform lobes nearly to base. Stamens 8, unequal. Styles subulate. Females 2.5 in. long. *Hab.* Hill forests. Perak, Thaiping Hills (Haniff). Penang, West Hill (Curtis).

(6) **A. Griffithii** Oliver, Trans. Linn. Soc. xxiii. 460, t. 48; King, l.c. 325.

Tree 40 to 50 ft. tall, glabrous. Leaves thinly coriaceous, bright green, lanceolate or ovate-lanceolate, cuspidate, acuminate, base cuneate; nerves fine, inconspicuous, pinnate, 2.5 to 3.5 in. long, 1.2 to 2 in. wide; petioles 2 in. long. Spikes slender, solitary to 3 together, 1.5 to 2 in. long, puberulous. Flowers distant

**ORDER LVII. COMBRETACEÆ**

Trees or shrubs, often climbing. Leaves simple, entire; stipules 0. Flowers small in spikes or racemes, often panicled. Calyx-tube adnate to ovary and produced above it, lobes 4 to 6. Petals 4 or 5 or 0. Stamens 4 or 5 or 8 to 10 on calyx. Ovary inferior, 1-celled; style simple; ovules 2 to 7. Stigma simple. Fruit a drupe, or winged by calyx-lobes or with 4 to 5 wings from the angles. Species 240, whole tropics and S. Africa.

The *Gyrocarpaceæ* formerly included (*Illigera* and *Gyrocarpus*) are excluded from the order and placed in *Apetalæ*.

Petals 0.
Trees with drupes often angled, and some winged from angles  I. **TERMINALIA**
Shrubs with accrescent calyx wings  2. **CALYCOPTERIS**

Petals 4 to 5.
Calyx-limb persistent; fruit a small woody drupe, seashores  3. **LUMNITZERA**
Calyx-limb deciduous.
Calyx-tube beyond ovary under '5 in. long  4. **COMBRETUM**
Calyx-tube beyond ovary '75 to 2'5 in. long  5. **QUISQUALIS**

**1. TERMINALIA, Linn.**

Large often vast trees. Leaves alternate or sub-opposite, coriaceous. Flowers small, spicate (spikes sometimes panicled), bisexual, but upper flowers sometimes males only. Calyx-tube produced above only; mouth campanulate; lobes 5, triangular. Petals 0. Stamens 10 on calyx tube; disc epigynous, hairy. Ovary 1-celled inferior; ovules 2 to 3. Fruit ovoid, drupaceous or with 2 to 5 wings. Seed 1. Species 135, tropics generally.

Fruit not winged.
Leaves oblong, narrowed upwards; fruit oblong, 5-angled  (1) **T. citrina**
Leaves obovate or broadly elliptic, base rounded; fruit ovoid tomentose  (2) **T. belerica**
Leaves obovate base long, narrow.
Fruit ellipsoid not flattened  (3) **T. foetidissima**
Fruit flattened.
Leaves 3 to 4 in. by 2 in. wide  (4) **T. phellocarpa**
Leaves 6 to 9 in. long, 1'25 in. wide  (5) **T. Catappa**
Fruit 2-winged, broad.
Leaves blunt oblanceolate  (6) **T. subspatulata**
Leaves lanceolate acuminate. Fruit oblong, 3-winged; leaves small often 1 in. long. (7) T. bialata

(1) T. citrina Roxb. Fl. Ind. ii. 435.

The Herbarium specimens seem quite indistinguishable from the Indian plant, but both Curtis and Kunstler affirm it is not a big tree, as in India, but a climber. Fruit unknown.

Tree 60 to 80 ft. tall. Leaves coriaceous, elliptic to ovate lanceolate, sub-acutae, base rounded; nerves about 12 pairs, slightly elevate, 4 in. long, 2½ in. wide, minutely reticulate beneath; petioles ½ in. long. Spikes panicled, axillary, at the ends of branches, hairy, 3 in. long. Flowers sessile; 2 in. across. Ovary glabrous. Calyx pubescent outside, villous inside. Drupe lanceolate, narrowed to tip, obscurely 5-ridged, 1 in. long. Hab. Malacca, Mt. Ophir (Griffith, Maingay). Pahang, Binchal Residency, Kuala Lipis (Foxworthy). Native name: Belawan.

This has more coriaceous elliptic leaves round-based, shorter and more hairy panicles. It is probably specifically distinct from T. citrina.

(2) T. belerica Roxb. Fl. Ind. ii. 431; King, l.c. 329. var. laurinoides Miq.
Tall tree. Leaves clustered at the branch-ends, coriaceous dotted, obovate or elliptic, tip rounded, base cuneate; nerves 6 to 8 pairs, prominent, 4½ to 8 in. long, 3½ to 4½ in. wide; petioles 1½ to 4 in. long. Spikes slender, 3 to 4 in. long, pubescent. Flowers ¼ in. across. Calyx-tube short, tomentose, lobes broad, mouth densely villous. Stamens long-exsert. Drupe ovoid, densely minutely tomentose, obscurely 5-angled, when dry 1 in. long, ½ in. wide. Hab. Forests. Selangor, Kuala Lumpur; Batu Road (Foxworthy). Perak (Scortechini and Kunstler). Distrib. India and Malay islands. The species here is the Javanese form laurinoides, somewhat different from the Indian form, especially in the form of the fruit, and perhaps should be kept specifically distinct. Native name: Jilawei.

(3) T. fœtidissima Griff. Notulae iv. 685; King, l.c. 331.
A big tree. Leaves at the branch ends, coriaceous obovate blunt or shortly cuspidate, glabrous except the midrib and 8 pairs of nerves, sometimes sparsely puberulous, 5 to 6½ in. long, 2½ to

(4) **T. phellocarpa** King, l.c. 330.

A stout spreading tree about 40 to 60 ft. tall and 2 to 3 ft. through. Leaves crowded at branch ends, obovate blunt, tapering to base, dark green, glabrous; nerves 4 to 6 pairs, 3 to 4 in. long, 1'75 to 2 in. wide; petioles '8 in. long. Racemes produced with young leaves, red-woolly, 1'5 to 2 in. long. Flowers very small, '2 in. wide; buds conoid; pedicels short, thick, hairy. Bracts linear hairy. Sepals ovate acuminate, hairy both sides. Stamens 10; filaments longer than sepals. Calyx-tube hairy. Fruit elliptic flattened, round at both ends with a terminal mammilla green; pericarp thick spongy fibrous. Hab. Low country in damp ground in the south. Singapore, Tanglin; Bukit Mandai Road; Selitar. Malacca, Bukit Bruang (Derry). Native names: Mampelam Babi (Pig's Mango); Pelawei.

(5) **T. Catappa** Linn. Mantissa ii. 519; King, l.c. 331; Bot. Mag. t. 3004.

A stout tree up to 80 or more ft. tall with large spreading branches. Leaves deciduous, obovate narrowed to a cordate base, glabrous; nerves 8 to 12 pairs, 6 to 9 in. long, 3'5 to 5'5 in. wide; petioles '35 in. long, broad. Spikes axillary, '6 in. long. Flowers '2 in. across. Calyx-tube conic, glabrous outside, woolly inside. Ovary glabrous. Drupe ellipsoid, compressed, green flushed pink, keeled all round; pericarp fleshy; endocarp woody, fibrous; 2 in. long, 1'25 in. wide. Hab. Common on sandy seacoasts, wild, but now planted or sporadic everywhere in villages and cultivated ground, and known as the Singapore almond. Native name: Ketapang. The tree sheds its leaves entirely and flowers after this. The withering red leaves make the tree very conspicuous.

(6) **T. subspathulata** King, l.c. 332.

A gigantic buttressed tree 150 ft. tall, 2 to 3 ft. through. Leaves crowded at branch-ends, thinly coriaceous, spathulate, glaucous beneath obtuse; nerves 8 pairs, elevate beneath, reticulations fine, conspicuous, 3'5 in. long, 1 to 1'6 in. wide near tip; petioles 1'15 to 1'5 in. long. Spikes solitary, 3'5 in. long, puberulous. Flowers green, '15 in. long, upper ones male only, lower bisexual. Calyx-tube narrow, cylindric; teeth 5, broad. Fruit very broadly 2-winged, 1'5 in. long, '2 in. wide, transversely rounded, oblong striate, pale yellow. Hab. Forests, Singapore, Botanic Gardens. Malacca, Sungei Hudang (Derry). Perak, Goping (Kunstler). Native name: Jilawei.

(7) **T. bialata** Steud. Nomencl, ii. 668; King, l.c. 332.

Tree 80 to 100 ft. tall. Leaves crowded at branch-ends, obovate

Fl.M.P., r.
or obovate-oblong, short cuspitate, narrowed to the oblique base, glabrous; nerves 7 to 9 pairs, 6 to 9 in. long, 2.75 to 4 in. wide; petioles 2.25 to 2.75 in. long. Spikes solitary, puberulous. Flowers '2 in. across, sessile. Calyx pubescent outside, villous inside, lobes triangular. Ovary villous. Fruit ellipsoid 1.75 in. long, '5 to .75 in. wide with two large coriaceous, puberulous striate wings; 1.75 in. across. *Hab.* Open country in the north. Perlis, Kanga and Chupeng (Ridley). *Distrib.* Andamans and Burma.

(8) **T. triptera** Stapf, *Kew Bulletin* 1895, p. 103.

Medium-sized tree, glabrous with slender branches. Leaves sub-coriaceous elliptic or oblong acuminate glaucous above; nerves 6 to 8 pairs, 1.5 to 2.5 in. long, 1 to 1.75 in. wide; petioles '2 in. long. Spikes '5 to 1 in. long in a terminal panicle, slender puberulous. Flowers '1 in. wide. Calyx-tube ovoid; lobes 4 sub-acute villous inside. Fruit oblong, 3-winged, 1 in. long, '5 in. wide. *Hab.* Lankawi and Terutau isles (Curtis).

2. **CALYCOPTERIS**, Lam.

A diffuse drooping shrub. Leaves opposite, petioled, elliptic or ovate acuminate. Racemes dense crowded at the ends of branches so as to form a panicle. Flowers small greenish yellow. Calyx-tube 5-striate produced above ovary, 5-lobed. Petals 0. Stamens 10, 5 upper between sepals, 5 lower alternate and lower down on tube. Ovary 1-celled, inferior; ovules 3. Fruit narrow-ovoid 1-seeded surmounted by the sepals as long lanceolate spreading wings. *Species* 1, Indo-Malaya.

(1) **C. floribunda** Lam. *Dict. Supp.* ii. 41; *Ill. t*. 537; *Clarke, in Hook. fil. F.B.J.* ii. 449; *King, l.c.* 333.

Leaves sub-coriaceous, tomentose on both sides; nerves 5 to 6 pairs, 2.5 to 4 in. long, 1 to 2 in. wide; petioles '2 to '3 in. long. Inflorescence usually 6 to 12 in. long, in fruit 12 in. across. Flowers '35 in. across, sessile. Fruit '35 in. long, 5-angled; wings '75 to 1 in. long, '2 in. across. *Hab.* Penang, near the Waterfall (Curtis, Wallich).

"Singapore, Lobb," must be an error. He no doubt collected it in Penang.


Tidal swamp and seacoast trees. Leaves clustered towards the branch-ends obovate or oblanceolate, tip rounded, base narrowed at both ends; lobes 5, persistent. Petals 5, oblong. Stamens 5 to 10 in 2 series. Ovary inferior 1-celled; style subulate simple. Fruit woody elliptic, '5 to 1 in. long, woody 1-seeded. *Species* 2; coasts from Africa to Polynesia.

Racemes elongating lax; flowers white . . . . . (1) **L. racemosa**
Racemes dense; flowers scarlet . . . . . . . . (2) **L. coccinea**

Shrub or small tree. Leaves oblanceolate or oval obtuse 1 to 3 in. long, 75 to 1:5 in. wide; petioles 7 in. long. Racemes elongating lax 2 in. long. Flowers 3 in. long. Petals small white. Stamens 5 to 10, white. *Hab.* Tidal swamps and sea-shores, but much less common than **L. coccinea**. Malacca, Tanjong Kling to Kelantan, Kamposa. *Distrib.* Maccarone islands to Polynesia.

(2) **L. coccinea** W. and A. Prodr. 316; King, *l.c.* 334.


4. **COMBRETUM**, Linn.

Climbing shrubs. Leaves entire, opposite rarely alternate. Flowers in spikes or panicles, small. Calyx-tube constrict above the ovary, urceolate or tubular, lobes 4 to 5. Petals 4 to 5 on the calyx limb. Stamens twice as many insert in 2 series. Ovary inferior, 1-celled; style 1, simple; ovules 2 to 5. Fruit with 4 (or 5) angles or wings dry. Seed 1. Species 160, all tropics.

- **C. trifoliatum**
- **C. tetralophum**
- **C. acuminatum**
- **C. sundaicum**
- **C. extensum**
- **C. chinense**
- **C. squamosum**
- **C. Wrayi**
- **C. nigrescens**
- **C. Scortechinii**
(1) C. trifoliatum Vent. Choix t. 58; King, l.c. 336.
Big climber. Leaves coriaceous, oblong-lanceolate to oblanceolate, base cuneate, shining; nerves 5 to 7 pairs, indistinct above, 1·75 to 5·5 in. long, 8 to 2 in. wide; petioles 2 in. long. Spikes axillary, solitary or panicked, terminal. Flowers 15 in. wide, crowded. Calyx-tube constrict above; sepals narrow, acuminate, all appressed silky. Petals 5, lanceolate, little longer. Fruit acutely 5-angled, 1·25 in. long, 5 in. through. Hab. Open country in the north. Perlis at Kanga. Distrib. Rangoon, Cambodia, Siam, Borneo, Java. Native name: Akar Sung-sung Harus.

(2) C. tetralophum Clarke, in Hook. fil. F.B.I. ii. 454; King, l.c. 336.
A big climber with scaly branches. Leaves opposite, thinly coriaceous, oblong-elliptic, short acuminate, base cuneate, glabrous except midrib on back at base pubescent; nerves 7 to 8 pairs, 2·5 to 5·5 in. long, 1 to 2 in. wide; petioles 3 to 4 in. long, pubescent. Spikes axillary, solitary or terminal, panicked, scaly. Flowers 1 in. across. Calyx-tube constrict above ovary, mouth campanulate; lobes 4, ovate, pubescent. Petals little longer, narrow, linear. Stamens and style exsert; disc and mouth of tube villous. Fruit oblong, 4-angled, black, 75 to 1 in. long. Hab. Lowland open country. Malacca, river-bank (Griffith). Pahang, Pekan. Penang, Batu Feringhi (Curtis); Tanjong Tokong. Distrib. Siam, Borneo.

(3) C. acuminatum Roxb. Fl. Ind. ii. 228; Clarke, l.c. ii. 455.
Large scandent shrub. Leaves coriaceous, ovate-lanceolate (puberulous) or glabrous, minutely dotted beneath, 4 to 6 in. long, 2 in. wide, base slightly narrowed, tip acute; petioles short. Racemes axillary or terminal, panicked. Flowers 15 in. wide. Calyx campanulate. Fruit ellipsoid narrowed to both ends with 4 blunt ridges, 2 in. long, 5 in. through. Hab. Open country in the north. Pahang River (Burn-Murdoch). Perlis, Besih Hangat, Kanga (Ridley). Distrib. India, Burma.

(4) C. sundaicum Miq. Fl. Ind. Bat. Supp. 327; Clarke, l.c. ii. 458; King, l.c. 337.
Large climber. Branchlets densely scaly. Leaves opposite, thinly coriaceous, broadly elliptic abruptly short-acuminate, base round, sometimes unequal, glabrous scaly beneath; nerves 6 pairs, slightly prominent beneath, 2·75 to 4 in. long, 1·8 to 2·75 in. wide; petioles 4 to 8 in. long. Panicles axillary, terminal, umbellate; branches terminated by globose spikes 75 to 1 in. across. Calyx-tube 35 in. long, pubescent, 4-ridged on ovary above cylindric, mouth funnel-shaped; lobes 4 triangular, acuminate, light green, a ring of hairs inside at base. Petals shorter, white, oval. Fruit elliptic, round, with 4 coriaceous straw-coloured wings 1 in. long and wide. Hab. Common on edges of forests. Singapore, Bukit Timah Road; Changi; Bedoh; Jurong. Malacca, Merlimau (Derry). Selangor,
Petaling; Batu Caves; Kwala Lumpur. Perak, Batang Padang district (Kunstler); Thaiping (Haniff). Penang, Ayer hitam (Curtis). _Distrib._ Sumatra. _Native name:_ Akar Gegambar. _Use:_ This was the "anti-opium" plant which produced a sensational hoax in 1907.

(5) _C. extensum_ Roxb. _Hort._ Beng. 28; _Fl. Ind._ ii. 229; Clarke, _l.c._ ii. 458; _King,_ _l.c._ 337.

A big climber. Leaves opposite, coriaceous glabrous, broad elliptic, round, tip abruptly short acuminate, base broad, round; nerves 6 to 7 pairs, 4'5 to 7 in. long, 2'75 to 4 in. wide; petioles 1'6 to 1'5 in. long, stout. Spikes axillary, solitary, sometimes panicked, terminal, puberulous. Flowers 1'25 in. across; buds ovate-acute. Calyx-tube 3'5 in. long, infundibuliform a ring of hairs in mouth outside, puberulous, lobes 4 deep, triangular. Petals obovate. Fruit 1'25 to 1'5 in. across, and as broad. _Hab._ Rare, in thickets. Malacca, Ayer Panas (Derry). Penang, Waterfall (Haniff). _Distrib._ India, Burma.

(6) _C. chinense_ Roxb. _Hort._ Beng. 28; Clarke, _l.c._ ii. 457; _King,_ _l.c._ 338.

Large climbing shrub. Leaves opposite, thinly coriaceous, elliptic acuminate, base slightly narrowed, quite glabrous; nerves 7 to 8 pairs, slightly prominent beneath, 3'25 to 5 in. long, 1'5 to 2'35 in. wide; petioles 1'5 to 4 in. long. Spikes solitary, axillary, 3 to 4 in. long, many-flowered. Calyx-tube 1'25 in. long, base slender upwards, funnel-shaped, 1'5 in. across, lobes 4; deep triangular acute, scaly. Petals obovate, yellowish white, clawed, longer than sepals. Disc and inside of calyx pubescent. Fruit 4-winged, 8 in. long and wide, oblong, apex notched. _Hab._ Edges of forests in the northern part. Penang, road to Balik Pulau (Curtis).

var. _Porterianum._ Leaves stiffer; nerves 8 pairs, more elevate. Penang (Porter).

var. _pubescens._ Leaves stiff, long-acuminate, pubescent beneath. Perak, Sungei Rayah (Kunstler). _Distrib._ India.

(7) _C. squamosum_ Roxb. _Fl. Ind._ iii. 231; Clarke, _l.c._ ii. 456; _King,_ _l.c._ 339.

A large climbing shrub. Young branches, inflorescence and under-side of leaves and petioles scaly. Leaves opposite, thinly coriaceous, broad elliptic or ovate, short blunt acuminate, base round or short narrowed; nerves 3 to 4 pairs, faint, 3'25 to 4'5 in. long, 1'75 to 2 in. wide; petioles 3 in. long. Spikes axillary or terminal panicked 3 to 4 in. long. Flowers 1'5 in. across. Calyx-tube shortly constricted above the 4-angled ovary; mouth cupular, teeth 4, broad triangular. Petals small obovate. Disc and base of calyx inside villous. Fruit 1'25 to 1'5 in. long and as broad with 4 wide membranous wings, scaly in the grooves between the wings. _Hab._ Open country and dry woods. Pahang River, Pulau
Chengei. Penang (Wallich); Waterfall and Western Hill (Curtis).
*Distrib.* Andamans, India, Burma.

In some of Curtis’s plants the flowers are umbellate at the ends of branches. The Indo-Burmese plants have much bigger leaves.

(8) C. *Wrayi* King, *l.c.* 339.

Woody climber hardly scaly. Leaves opposite, coriaceous, narrow elliptic sub-acute or shortly blunt-acuminate, base round, glabrous except a few hairs on base of midrib; nerves 6 to 7 pairs, 2'5 to 3'5 in. wide, 1'15 to 1'5 in. long; petioles '35 to '4 in. long; upper leaves smaller. Spikes solitary, axillary 1 in. long, floriferous part scaly and hairy. Flowers few. Calyx-tube '15 in. long, constrict above ovary, mouth campanulate, 4 triangular acute lobes, scaly. Petals little longer, oblanceolate blunt. Stamens 8, exsert. Fruit ovate, flattened with 4 short wings, 1'2 in. long, '6 in. wide, scaly. *Hab.* Perak, Matang, seashore (Wray).

I have only seen one poor bit of this. It seems to me to be near *C. tetralophum*.

(9) C. *nigrescens* King, *l.c.* 340.

A climber 30 to 60 ft. tall. Branchlets, midrib on both sides, nerves beneath and petioles red-hairy. Leaves opposite, membranous, drying black, narrow, elliptic-oblong, base minutely cordate; nerves 7 pairs, elevate beneath, 2'25 to 2'75 in. long, '75 to 1 in. wide; petioles under 1 in. long. Panicles terminal, lax very hairy, 3 to 4 in. long; branches slender. Calyx-tube '05 in. long; limb longer, campanulate; teeth 4, acute, pubescent; throat hairy. Fruit black oblong, glabrous with 4 narrow wings, '8 in. long, '4 in. wide. *Hab.* River-banks and thick forest, low country. Pahang, Tahan River. Selangor, Batu Caves. Negri Sembilan, Gunong Berumbun (Cantley). Perak, Larut (Kunstler); Kota (Wray).

var. *Kunstleri* C. *Kunstleri* King, *l.c.c.*


(10) C. *Scortechinii* King, *l.c.* 341.

Branches appressed-hairy. Leaves opposite, thin coriaceous, oblong-elliptic acute, base minutely cordate, above when young appressed-hairy, then glabrous, beneath nerves 7 pairs elevate with midrib appressed-hairy, 3'25 to 4'5 in. long, 1'4 to 1'75 in. wide; petioles 1 in. long. Panicles axillary and terminal, 2 in. long or less, silky-tomentose. Calyx-tube cylindric wide campanulate above, teeth broad, acute. Petals 4, ovate-lanceolate pubescent. Fruit glabrous with 4 thin wings pointed at ends, 1'25 in. long, '65 in. wide. *Hab.* Perak, Goping (Scortechini).
5. QUISQUALIS, Linn.


Calyx-tube less than 1 in. long . . . . . . (1) Q. densiflora
Calyx-tube 2 in. long or more . . . . . . (2) Q. indica

(1) Q. densiflora Wall. Cat. 4011; King, l.c. 341.
Climbing shrub. Leaves elliptic-oblong acuminate, base round or minutely cordate, glabrous except midrib above depressed pubescent; nerves 6 pairs, 3½ in. to 4½ long, 1½ to 2 in. wide; petioles ½ to ¾ in. long, pubescent above. Spikes terminal and axillary, numerous, pubescent; rachis thick gradually lengthening to 4 in. long. Flowers numerous 1 in. long, ½ in. across. Calyx-tube under 1 in. long, cylindric, tomentose, lobes lanceolate, subacute. Petals shorter, red, silvery-pubescent outside. Fruit oblong; wings 5, narrow, 1 in. long, ½ in. wide. Hab. Malacca (Griffith); Negri Sembilan (Cantley); Perak (Wray); Province Wellesley, Ara Kudah. Penang, Telok Bahang; road to Balik Pulau (Curtis); (Wallich). Lankawi, Burau (Robinson). Native names: Selimpas; Sumang.


(2) Q. indica Linn. Sp. Pl. 556; Clarke, l.c. ii. 459.
A strong climber. Leaves elliptic acuminate, base rounded, dark green, glabrous above, hairy beneath; nerves 6 to 8 pairs, 3 to 4 in. long, 1½ in. wide; petioles 3 in. long. Spikes axillary and terminal ½ in. long or more, pubescent. Flowers numerous, pendent, 3 in. long, 1½ in. wide, at first white, then deep red. Calyx-tube and triangular acute lobes 2½ in. long, pubescent. Petals lanceolate, acute, ½ in. long. Fruit ellipsoid acutely 5-angled, glabrous, brown, 1½ in. long. Hab. River-banks and over rocks. Very common in cultivation and known as "Drunken Sailor." Wild on Pahang river-banks near Pekan and Perlis near Kanga. A garden escape in Singapore, etc. Distrib. Burma, Malaya. Native names: Akar Pontianak; Akar Suloh.
Order LVIII. MYRTACEÆ.

Trees or shrubs. Leaves opposite, rarely alternate (Tristania, Barringtoniaæ), simple, usually with an intramarginal nerve, coriaceous. Flowers regular, bisexual; axillary solitary to corymbose, white or pink. Calyx superior; limb 4- to 5-lobed. Petals on the edge of the calyx-tube as many as sepals. Disc lining the tube. Stamens numerous, on edge of disc; filaments long. Ovary inferior, 1-celled, ovules 1 or more, or 2-celled with many ovules. Fruit capsular or drupaceous. Species 2000, tropics and sub-tropics (King, Journ. As. Soc. Beng. lxx. ii. 66).

(a) Fruit capsular.
Leaves narrow.
Flowers few or solitary.
Stamens 10 or less; leaves very narrow, opposite
Stamens many; leaves broader, alternate
Flowers in spikes or heads; stamens numerous
Leaves broad, alternate; flowers cymose

(b) Fruit a berry; leaves opposite.
Ovary 1-celled; flowers small; leaves 3-nerved
Ovary 1- to 3-celled; flowers large; leaves 3- to 5-nerved
Ovary 5- (or 4-)celled; seeds few; flowers small; leaves not 3-nerved

(c) Fruit a drupe; leaves opposite; seed 1, rarely 2.
Stamens numerous; flowers cymose usually many; fruit green, fleshy
Stamens 8; flowers few, small axillary; drupe red pulpy

(d) Fruit a drupe, fleshy; leaves alternate.
Flowers large; fruit oblong; seed 1

(e) Fruit globose; seeds several.
Inner stamens without anthers
Outer stamens without anthers

1. Bæckea, Linn.


A heath-like shrub from a few inches high to 20 ft. tall, and 1 ft. through the stem. Branches wiry. Leaves 25 to 5 in. long, very narrow, terete acute. Flowers 0.8 in. wide, on short pedicels, white with a green ring in the centre, becoming red. Hab. On all mountains where dry enough above 3000 ft. altitude, common. Pahang, Gunong Tahan, to 7000 ft. altitude; Lambak Camp, Kwantan

2. LEPTOSPERMUM, Forst.


(i) L. flavescens Sm. Trans. Linn. Soc. iii. 262; Bot. Mag. t. 2695; King, l.c. 69.

A bush 1 to 8 ft. tall or a small tree. Leaves often silky on edge, 4 to 1 in. long, 1 to 2 in. wide, sub-acute. Flowers sessile or nearly so; 4 to 5 in. wide. Calyx-tube glabrous or silky. Capsule 15 to 25 in. long, 4 to 5-valved, turbinate. Hab. Dry spots on mountains, common at 4000 to 7000 ft. altitude.

var. javanica King, l.c. Leaves oblongate to lanceolate blunt or acute, edges, as well as bracts and calyx, silky at high altitudes, but glabrous at lower ones. Malacca, Mt. Ophir (all collectors). Pahang, Gunong Tahan. Selangor, Gunong Mengkuang Lebah (Robinson). Perak, Gunong Inas (Yapp); Gunong Bubu (Kunstler); Gunong Kerbau (Robinson). Kedah, Gunong Bintang (Kloss). Distrib. Moulmein, Malay islands. Type of species Australia.

var. angustifolia Ridl. Leaves very narrow, linear-lanceolate, 75 in. long, 1 in. wide, glabrous. Fruit smaller. A very distinct form, resembling some of the Australian forms. Apparently confined to Kedah Peak (Lobb, Ridley). Native name: G'lam Bukit. Use: The aromatic leaves make a very refreshing tea.

3. MELALEUCA, Linn.


(i) M. Leucadendron Linn. Mantissa 105; King, l.c. 70.

A tree about 50 ft. tall, 2 ft. through. Bark papery whitish, peeling off in layers, an inch or more thick. Leaves oblong-elliptic, acuminate sub-acute; nerves vertical, 5 to 7, glabrous (except
when young), 1:5 to 5 in. long, 2 to 3 in. wide (largest on young shoots); petioles short. Spikes 2 to 6 in. long, flowers in whorls, numerous; rachis silky. (The spike is really the end of a branch with axillary flowers, the leaves suppressed. It continues to grow and become leafy and branch after the fall of the perianth.) Fruit sessile, 1:5 in. across, cylindric, short. Hab. In wet low-lying spots and sandy heaths; indigenous, but sometimes planted also. Singapore, Changi. Malacca, wet ground near the town. Setul Heaths. Kelantan, near Kota Bharu. Perlis, Kanga. Distrib. Mergui, Cambodia, Borneo, Amboina. Native names: Gelam; Kayu Putih (white wood). Uses: Leaves for making Caje-put (kayu putih) oil. Bark for caulking boats and lighting fires. Timber for poles, etc.

The form here is M. minor with silky spikes. It is certainly wild in the north of the peninsula, and there were apparently wild plants in Singapore, on the east side, at one time. The Malacca Gelam forests were said formerly to have been planted by the Dutch, but are probably wild also.

4. TRISTANIA, R. Br.


Leaves sessile sub-auriculate
Leaves narrowed to petiole; big trees; cymes shorter than leaves; leaves coriaceous.
Leaves 6 to 8 in. by 2:25 in.; petiole winged to base.
Leaves lanceolate, distinctly petioled, 1:75 to 3:5 in. long.
Leaves oblanceolate; shrub.
Nerves very numerous; calyx in fruit very short, recurved.
Nerves 13 pairs; calyx cupular one-third length of fruit.
Tree. Cymes longer than leaves; leaves thin; flowers very small.

(1) T. sub-auriculata King, l.c. 72.

Tree 10 to 40 ft. tall, up to 20 in. through. Leaves very coriaceous, sessile, obovate-oblong, blunt or sub-acute, base auricled, glabrous, 2:5 to 6 in. long, 1:5 to 2:5 in. wide. Cymes few-flowered, 5 to 7:5 in. long; peduncle stout, silky. Flowers 2:5 in. across. Calyx tubular, campanulate, pubescent; teeth triangular, short. Petals round, pale yellow. Capsule sub-globular, 2:5 in. across.
Hab. Limestone rocks, local. Perak, Kwavla Dipang and Gunong Malacca (Kunstler).


Tree. Leaves obovate or oblanceolate, blunt or blunt-acuminate decurrent to the base of the petiole, 6 to 8 in. long, 1'25 to 2'25 in. wide. Cymes stout, 1'5 to 2 in. long, pubescent. Flowers densely crowded at the tips, '25 in. across. Calyx pubescent, broad cupular. Petals transversely oblong, clawed. Capsule '4 in. through, half enclosed by calyx. Hab. Woods on mountains and coast. Singapore, Sungei Morai. Johor, Gunong Pantai. Malacca, Cape Rachado (Finlayson, Wall. Herb. 3648, 3649); Mt. Ophir (Griffith and all collectors). Negri Sembilan, Bukit Senaling (Hudson); Pasir Putih (Foxworthy); Pahang, Pekan; K’luang Terbang (Barnes). Perak (Scor.techini), Dindings, Lumut. Distrib. Tenasserim.

The mountain forms have usually smaller and thicker leaves than the coast forms.


Tree. Bark yellowish white, not peeling (Maingay). Leaves narrow oblanceolate acute or blunt acuminate, narrowed gradually to base, 1'75 to 3'5 in. long, '5 to 1'25 in. wide; petioles '1 to '2 in. long, not winged. Cymes '5 to 1'25 in. long, pubescent. Flowers few, crowded, '2 in. across. Calyx cup-shaped; teeth sub-acum. Petals round. Capsule globose, '3 in. long covered by the calyx to the top. Seeds winged. Hab. Penang Hill at 2000 ft. altitude (Maingay, Curtis). Native name: Pasir Lingga.


Bushy shrub 3 to 4 ft. tall. Bark red, flaking. Leaves stiff coriaceous, oblanceolate, blunt, slightly narrowed at tip, long narrowed at base, decurrent on petiole, dark green, 2 to 4 in. long, 1 to 2 in. wide. Cymes axillary and terminal, 1 in. long, puberulous. Flowers '25 in. across, glabrous. Calyx cupular; lobes spreading. Petals obovate small. Capsule '25 in. long, only attached to calyx at base. Seeds 3 in each cell. Hab. In woods on rocky slopes at high altitudes, local. Pahang, Gunong Tahan on the Padang at 4500 ft. altitude.

The nerves of the leaf are very numerous, and the calyx in fruit remarkably short and saucer-shaped.

(5) T. spathulata Ridl. Journ. Roy. As. Soc. S. Br. 82, p. 185. T. obovata King, l.c. 73, not of Bennett.

Shrub about 12 ft. tall. Leaves stiff coriaceous, oblanceolate blunt, spathulate or lanceolate narrowed to a blunt point, base long acuminate, midrib prominent on back; nerves faint 13 pairs, intramarginal conspicuous, 2'5 to 2'75 in. long, '75 to 1 in. wide; petioles '25 in. long. Flowers not seen. Fruit '25 in. long. Calyx
cupular with very short points, 1 in. long; valves broad, oblong, tip round, blunt. Hab. Rocky places near sea, Pulau Battam (Ridley).

This species grows just outside our area, but so close that we may expect it on our southern coasts.


Tree. Leaves oblongate, thinly coriaceous, blunt acuminate, long, narrowed to the base, '3 to 5'5 in. long, '75 to 1'75 in. wide; petioles '25 to '5 in. long. Cymes corymbose panicled; peduncles 5 to 6 in. long. Inflorescence 2 to 3 in. wide, pubescent velvety. Flowers '7 in. across, white. Calyx obconic, pubescent. Petals orbicular. Capsule '1 in. across, free from calyx except at base. Hab. Woods by the sea and along rivers in the lowlands. Singapore (Wallich); Pulau Ubin; Raffles Lighthouse. Johor, Kota Tinggi; Scudai River. Pahang, Tahan River; Kerat Road, Bentong and Sungei Riau, Kwantan (Foxworthy). Distrib. Sumatra. Native names: Pelawan; Changal.

5. **RHODAMNIA**, Jack.


Tree about 30 ft. or more tall. Leaves ovate-oblong, acuminate, above glabrous reticulate, beneath white silky (or in shady places green on both sides), '75 to 4'5 in. long, '72 to 2 in. wide; petioles '2 to '35 in. long. Peduncles fascicled, silky, 4 to 6 together, '25 in. long. Flowers '25 in. across, white. Berry black. Hab. Common in secondary jungle and woods all over the peninsula. King's var. *concolor*, with the leaves green on both sides, is merely a state of the plant grown in the shade. Distrib. Tavoy, Siam, Malay islands and Australia. Native names: Empoyan; Empoyan Batu; Munkoyan Pinang; Rusa Babi (Johor); Sedomang (Malacca). Use: Timber hard though small.

var. *caudata* Ridl. Leaves rather stiffly coriaceous; nervules more prominent, minutely conspicuously reticulate above, ovate-elliptic 2'5 to 4 in. long, with a long narrow acute point 5 to 1 in. long. Pedicels very slender, 2 to 5 in. long, nearly glabrous, as is the narrow, funnel-shaped calyx. Petals glabrous, 2 in. long. Hab. Mountains at 4000 to 5000 ft. altitude. Pahang at Wray's
Camp, Tahan. Perak, Gunong Kerbau (Robinson). A plant collected by Robinson at Koh Pennam, just outside of the boundary, has the leaves of *cinerea*, though more acuminate and reticulate, and the flowers and pedicels of *caudata*, except that the petals are silky.


Shrub 10 to 12 ft. tall. Leaves coriaceous stiff elliptic acuminate, fugaciously silky above, dotted silvery beneath, 1·2 in. long, 5 to 7·5 in. wide; petioles 4 in. long. Flowers 1 to 2 in each axil; pedicel 1·5 in. long silky. Petals glabrous. Fruit silky. *Hab.* Mountains over 4000 ft. altitude. Pahang, Gunong Tahan at Wray’s Camp and upwards. Malacca, Mt. Ophir (Griffith). Perak, Gunong Kerbau at 5500 ft. altitude (Robinson).

6. **RHODOMYRTUS**, DC.


(1) **R. tomentosa** Wight Spicil. Neillg. i. 60, t. 71; King, l.c. 75.

Shrub 4 or 5 ft. tall, tomentose. Leaves glabrous above, tomentose beneath, elliptic-obovate blunt, 1·5 to 2·5 in. long, 6·5 to 1 in. wide; petioles 1·5 in. long. Flowers 1 to 3 together. Petals rose pink turning white, obovate. Fruit obovate ovoid tomentose, light purple, pulp sweet. *Hab.* Common in open lowland dry country and sandy heaths, Singapore, Johor, Malacca, Perak, Tringganu, Penang, Setul. *Distrib.* China, S. India, Malay islands to Philippines, Cambodia. *Native name:* Kamunting.

7. **DECASPERMUM**, Forst.

Small bushy trees. Leaves opposite. Flowers small white in axillary and terminal panicles. Calyx campanulate, lobes 4 to 5. Petals 4 to 5. Stamens numerous in several series. Ovary 4- to 5-celled. Ovules 2 or few in each cell. Berry globose. Seeds 8 to 10, reniform, sub-globose. Species about 6, tropical Asia, Australia, Polynesia.

Tree. Leaves oblong to ovate-lanceolate; flowers panicled . . . . . . . . . . . . . (1) **D. paniculatum**

Shrub. Leaves obovate; flowers racemose . . . . . . . (2) **D. montanum**

(1) **D. paniculatum** Kurz, Journ. As. Soc. Beng. xlvi. (2), 61; Wight, Ill. ii. t. 97, fig. 10.

A small tree about 30 ft. tall. Young parts and inflorescence silky tomentose; nerves 10 fine, glabrous except midrib on both sides and edges, 1·25 to 3·5 in. long, 4 to 1 in. wide; petioles 1 to 3 in. long. Panicles axillary 1 to 2 in., terminal one 3 in. long.
Flowers '2 to '3 in. wide. Petals white hairy. Berry globose, '1 in. through, black. Hab. Common in woods all over the peninsula from Singapore to Lankawi, in lowland districts. The plant varies to some extent in form of leaves and hairiness, and is sometimes unisexual, and some of these forms have received names. Distrib. Burma, India, Malay Archipelago. Native names: Kelintat Nyamok; Kelintat Kring; Kelapat Nyamok; Empoyan Padang; Kamuning Batu.

(2) D. montanum Ridl. in Journ. Roy. As. Soc. S. Br. 61, p. 6.
A shrub. Leaves opposite, coriaceous, obovate blunt, base narrowed; nerves 5, inconspicuous, 2 to 3 in. long, 1 to 1.5 in. wide; petioles '1 in. long. Flowers 6 in axillary racemes '1 in. long, small, white, often unisexual. Male flowers larger than female. Sepals orbicular, ciliate. Petals obovate. Female flowers clove-shaped with abortive stamens. Berry '13 in. long, globular. Seeds 4 to 5 reniform. Hab. Mountains at 4000 ft. altitude. Malacca, Mt. Ophir and Kedah Peak (Ridley).

8. EUGENIA, Linn.

Trees, shrubs, very rarely climbers, glabrous, rarely hairy. Leaves opposite, usually coriaceous; nerves pinnate, inarching in an intramarginal vein. Inflorescence paniced or cymose, usually terminal, with some panicles in the upper axils, occasionally fascicled, rarely racemose, sometimes on the old wood. Bracts very small, usually caducous. Flowers small or moderate, few or very many. Calyx campanulate or funnel-shaped, narrowed to a pseudo-stalk; lobes 4 to 5. Petals from mouth of calyx caducous, free or joined into a cap (calyptrate). Stamens numerous, white, red or green, in one or more circles; filaments filiform; anthers minute. Style filiform. Ovary inferior. Fruit 1- or 2-seeded; pericarp pulpy or pithy. Species about 1000, whole of the tropics. A very difficult genus to break up into sections or to give a suitable key to species.

i. Jambosa. Leaves usually large. Flowers in small fascicles usually large and terminal. Calyx funnel-shaped (in 1 species fusiform); lobes large, persistent. Petals free, large. Staminal disc thickened. Stamens long. Fruit usually large, fleshy or pulpy.

Trees.
Flowers fascicled on old wood, 2 to 3 in. wide.
Flowers on branches, crimson; fruit oblong large; leaves oblong.
Flowers on trunk, crimson; fruit small; leaves lanceolate.
Flowers on ends of branches, white, 1 in. across or more.
Fruit large, pear-shaped; leaves narrow.
Fruit turbinate; leaves broader.

(1) E. malaccensis
(2) E. trunciflora
(3) E. Jambos
(4) E. aqua
Eugenia.]

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Fruit globose; leaves elliptic lanceolate. Leaves very narrow, willow-like. Leaves elliptic, round; flowers 2 in. wide.

Flowers red; leaves oblong; fruit oblong 5 in. long.

Flowers pink and white; leaves thin, lanceolate.

Flowers terminal and below the leaves; leaves elliptic petioled; flowers cymose white.

Leaves sub-sessile 12 to 18 in. long, cordate.

Leaves 6 to 9 in. long, base auricled.

Flowers smaller '5 in. wide in terminal cymes.

Calyx campanulate; leaves elliptic; flowers white.

Calyx funnel-shaped; leaves lanceolate; flowers white.

Calyx fusiform; flowers white.

Flowers red in terminal raceme; calyx campanulate.

Flowers pale green; leaves few-nerved. Mountain shrub; leaves round or obovate, stiff coriaceous.

Stream-shrub; leaves coriaceous, very narrow.

ii. JAMBOSELLÆ. Flowers smaller, hardly '5 in. wide in single terminal panicles; petals free.

Panicles spreading, hairy, wide.

Panicle spreading, glabrous, moderate.

Panicles compact, glabrous.

Trees with red, flaky bark.

Flowers numerous, crowded; leaves elliptic, sub-acute; nerves few.

Flowers fewer, smaller; leaves lanceolate acuminate or cuspidate; nerves many.

Flowers numerous; leaves stiff, coriaceous lanceolate acuminate.

Bark not red-flaky; leaves elliptic, sub-obtuse; panicle rather few-flowered.

Calyx not ribbed.

Calyx ribbed.

Leaves short, very coriaceous; panicle branches thick.

Leaves 7 to 12 in. long, oblong-elliptic; branches 4-angled.

Branches terete; base of leaves narrowed, petiolate; panicle glabrous.

Leaves amplexicaul; panicle velvety.

Panicles several fascicled, peduncled from upper axils and terminal branches short; flowers small.

(5) E. pseudo-formosa

(6) E. tiumanensis

(7) E. johorensis

(8) E. Scortechinii

(9) E. siamensis

(10) E. javanica

(11) E. perakensis

(12) E. auriculata

(13) E. pendens

(14) E. Rostadonis

(15) E. fusiformis

(16) E. porphyrantha

(17) E. plumbea

(18) E. jugalis

(19) E. salictoides

(20) E. mollis

(21) E. Foxworthyi

(22) E. densiflora

(23) E. limnææ

(24) E. Gageana

(25) E. grandis

(26) E. lepidocarpa

(27) E. selangorensis

(28) E. quadrata

(29) E. garcinifolia

(30) E. papillosa
Leaves 5 in. long.
Nerves slightly elevate
Nerves strongly elevate
Nerves very close, parallel numerous.
Leaves 6 to 12 in. long; flowers small.
Calyx ribbed.
Fruit ribbed, 2-seeded, large.
Calyx not ribbed.
Leaves 4 in. long or less; flowers 2 in. across.
Leaves 9 in. long, drying black; flowers 25 to 4 in. wide.
Leaves 12 in. long; flowers 75 in. wide; fruit smooth, dries black.
Leaves stiff, coriaceous, 6 in. long; flowers and fruit small, dries brown.
Leaves sub-ovate 6 in. long; flowers 5 in. wide; bark whitish.
Leaves elliptic, cuspidate; panicles very short and dense; bark whitish.
Panicles fascicled with spreading branches and fruit small.
Leaves lanceolate.
Leaves elliptic dry black; nerves few.
Leaves elliptic pale beneath; nerves many, close.
Panicles axillary and terminal short few-flowered.
Flowers bright pink; leaves 6 in. long.
Flowers white; leaves elliptic cuspidate.
Panicles terminal only, large; leaves drying green; nerves very fine; leaves 3 in. long; flowers moderate.
Panicles short 1.5 in. long, few-branched.
Panicles 3 in. long, few-branched; reticulations obscure.
Panicles 4 in. across; reticulations conspicuous.
Panicles rather small, few-flowered; leaves dry fuscous.
Leaves 6 in. long; nerves about 6 pairs, remote; flowers light green.
Leaves 4 in. long narrow, many-nerved.
Leaves elliptic cordate; petioles very short.
Panicles short, dense, few-flowered; leaves 6 in. long dry greenish; branches pustular.
Flowers in very short axillary and terminal racemes of 5 flowers.
Leaves coriaceous, glaucous beneath; panicles few-flowered, lax.
Leaves obovate, short, mucronate.
Leaves larger narrowed to tip.
Leaves not glaucous, small, elliptic cuspidate; flowers small chiefly in axillary cymes.
Leaves thin coriaceous, fine-nerved; panicles large, terminal; calyx funnel-shaped.
Stamens 1 in. long; calyx ribbed; fruit 1 in. long.
Stamens 5 in. long; calyx not ribbed; fruit 5 in. long.
Panicles small, dense, axillary and terminal; leaves stiff coriaceous small.
Calyx sub-obconic; small trees or shrubs; bark red, flaky.
Tree, calyx pustular; bract short.
Small tree; calyx ribbed; bracts short.
Small tree; calyx ribbed; bracts broad, oblong, truncate.
Leaves ovate minutely cordate, sessile; cymes few-flowered, terminal.
Tree; nerves inconspicuous.
Shrub 2 ft. tall; nerves strongly elevate.
Leaves ovate cordate 1 in. long; flowers very small; bracts broad.
Leaves elliptic cordate; flowers few on slender branches and pedicels.
Pedicels 1 in. long; leaves long, caudate.
Pedicels filiform, nearly 1 in. long; leaves shorter caudate.
Flowers with long narrow calyx-tube.
Flowers small in terminal clusters.
Flowers larger orange or yellow, all in very short axillary racemes.
Leaves thin coriaceous; flowers pale orange; calyx and pedicel 25 in. long.
Leaves stiff coriaceous; flowers white; calyx and pedicel 75 in. long.
Flowers on numerous short panicles or cymes axillary below the leaves.
Leaves coriaceous; cymes 25 in. long, dense.
Leaves thinly coriaceous; cymes spreading 1 in. or more.
Leaves 6 in. long; flowers very crowded often in short cymes.
Leaves 4 to 6; panicles spreading 1 in. or more; calyx lobed.
Cymes short axillary in all axils; flowers large.

iii. Syzygium. Flowers small 4- to 5-merous; calyx disc not thickened; lobes 4 to 5 or 0; petals calyptrate (connate falling off as a cap); drupes small; panicles terminal.
Leaves 9 in. long; panicle large; branches not winged; nerves very prominent.

(58) E. pyrifolia
(59) E. lineata
(60) E. zeylanica
(61) E. grata
(62) E. polita
(63) E. tecta
(64) E. pseudo-tetraptera
(65) E. jasminifolia
(66) E. caudata
(67) E. filiformis
(68) E. penangiana
(69) E. leptantha
(70) E. claviflora
(71) E. conglomerata
(72) E. urceolata
(73) E. polyantha
(74) E. Graeme-Andersoniae
(75) E. valdevenosa
Leaves 6 to 8 in. long; branches winged.
Leaves 4 to 5 in. long; nerves fine, not prominent.

Panicles terminal compact; leaves elliptic cuspidate.
Panicles several fascicled, terminal.

Leaves broad; nerves 5 pairs, faint.
Leaves light green; nerves numerous faint; panicles 1 in. or less long.

Leaves 4 to 5 in. long; panicles lax of few rather large flowers.

Nerves over 20 pairs distinct; flowers 5 in. wide.
Nerves over 20 pairs, faint; flowers 25 in wide.
Nerves 12 pairs; flowers in very short panicles (under 5 in. long).

Leaves 4 to 5 in. long; nerves about 8 pairs ascending distinct; panicles fasciculate, spreading; flowers and fruit very small.

Leaves coriaceous.
Leaves 4 to 6 by 2 in., elliptic.
Leaves 2 by 3 in., lanceolate or oblanceolate.
Leaves elliptic or obovate, blunt; panicles small usually.

Leaves thin; nerves 8 pairs, prominent 5 by 1.5 in.

Leaves thick coriaceous, obovate blunt; nerves faint, numerous; fruit 5 in. long.

Nerves numerous, faint, parallel, hardly ascending; leaves obovate, dry greenish; panicle small, terminal; flowers small.

Bracts conspicuous; leaves narrowed at tip.
Bracts 0; leaves obovate often retuse.

Leaves 4 to 6 in. long, dry pale green; nerves very fine and inconspicuous, nearly parallel; leaves thin coriaceous; panicles wide; flowers very small.

Leaves lanceolate acuminate 4 in. long; fruit 5 in. long, blue.
Leaves elliptic-oblong, abrupt acuminate 6 in. long.
Leaves elliptic, base long acuminate, 2.5 in. long.
Leaves lanceolate, long acuminate 2 in. long, panicle wide; flowers minute.
Leaves elliptic acuminate, 2 in. long, stiff; panicle short.

Leaves lanceolate-elliptic; panicles dense; flowers rather large.

Flowers large 5 in. wide; leaves lanceolate acuminate.

(76) E. alata
(77) E. oblongifolia
(78) E. cinerea
(79) E. chloroleuca
(80) E. Klossii
(81) E. expansa
(82) E. pauper
(83) E. microcalyx
(84) E. myrianthia
(85) E. pseudo-susbtillis
(86) E. Kunstleri
(87) E. venulosa
(88) E. bracteolata
(89) E. punctulata
(90) E. acuminatissima
(91) E. Evansii
(92) E. pallidula
(93) E. verecunda
(94) E. scoparia
(95) E. oblata
Eugenia.

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Flowers '2 in. wide, dense crowded; leaves lanceolate-acuminate.

Flowers '3 in. wide, dense; leaves lanceolate caudate.

Flowers '1 in. wide; panicles of few branches; leaves coriaceous, stiff, bluntly caudate (mountains).

Flowers '25 in. wide; leaves small, lanceolate.

Leaves stiff coriaceous, crowded to base; nerves very fine, parallel drying black; panicle large, dense, many-flowered.

Flowers '25 in. wide; leaves oblong-lanceolate acuminate, broad.

Flowers '5 in. wide; leaves narrow lanceolate.

Flowers '25 in. wide; leaves more rigid; fruit large, a prolonged cylindric calyx-tube.

Flowers smaller and fewer; leaves shorter abruptly cuspidate.

Leaves broad elliptic narrowed to base; panicles short.

Leaves stiff coriaceous; nerves close horizontal, numerous; leaves round, blunt or very shortly narrowed.

Leaves 5 by 3 in., base narrowed, edge crenulate.

Leaves 4 by 2-5 in., base very short narrowed not crenulate, bright green.

Leaves obovate 4 by 2-5 in.; nerves 8 pairs.

Base of leaves rounded quite blunt; nerves fine and close.

Leaves nearly sessile, ovate or oblong.

Leaves sub-sessile, oblong, pale green (mountains).

Mountain shrubs or small trees; leaves very coriaceous, small, crowded; flowers rather large in dense heads, sub-sessile.

Leaves lanceolate elongate long acuminate; calyx campanulate, warty.

Leaves narrowed to base, lanceolate rhomboid, petioled, 1-75 in. long.

Leaves obovate, slightly narrowed at base '5 in. long.

Leaves obovate, 1-25 by 1 in.; flowers 1 in. long.

Leaves round cordate, sub-sessile.

Leaves 2 by 1-75; flowers '2 in. long.

Leaves 1 by 1 in.; flowers '3 in. long.

(96) E. Curtisii

(97) E. linocieroidea

(98) E. cyrtophylloloides

(99) E. myrtifolia

(100) E. inophylla

(101) E. laxiuscula

(102) E. Prainiana

(103) E. nigricans

(104) E. inasensis

(105) E. crenulata

(106) E. pahangensis

(107) E. tahanensis

(108) E. subdecussata

(109) E. viridescens

(110) E. longicauda

(111) E. rhomboidea

(112) E. Stapfiana

(113) E. oreophila

(114) E. spissifolia

(115) E. Wrayi
Leaves '75 by '75 in.; flowers '1 in. long. (116) E. clypeolata
Trees, panicles below the leaves; flowers small, no calyx-lobes.
Leaves finely close-ribbed. (117) E. Jambolana
Leaves with few distant nerves. (118) E. operculata
Leaves lanceolate, densely punctate beneath; nerves 13 pairs. (119) E. balsamea
Climber with bristly stems. (120) E. setosa

(1) E. malaccensis Linn. Sp. Pl. 470; Duthie, in Hook. fil. F.B.I. ii. 82.
Tree about 40 to 60 ft. tall, 12 in. through. Leaves stiff coriaceous dark green, oblong; nerves rather slender, conspicuous, 8 to 12 in. long, 3 in. wide, base narrowed; petioles thick '2 in. long. Flowers on the branches below the leaves, 2 in. across, crimson pink. Fruit oblong pear-shaped, 3 in. long, 1 to 2 in. through, white, or blotched pink or entirely light or dark pink. Hab. Orchards, cultivated. Origin unknown. Native name: Jambu Bol. Use: Fruit eaten raw, cooked or in syrup.

(2) E. trunciflora Ridl. E. cauliflora Ridl. Trans. Linn. Soc. iii. 299, not of Bergius.

(3) E. Jambos Linn. Sp. Pl. 470; King, l.c. 82.
Shrub about 12 to 14 ft. tall or small tree. Leaves narrow lanceolate acuminate, base narrowed; nerves prominent 10 pairs, secondaries nearly as prominent, 4 to 6 in. long, 1 to '15 in. wide; petioles thickened at base, '2 in. long. Flowers white, about 2 in. across in a terminal corymb of about 5. Calyx turbinate, lobes large, round. Fruit pear-shaped, 3 in. long or more, 1 to 2 in. through, white. Hab. Cultivated in gardens; probably of Indian origin. Native name: Jambu Mawar. Rose apple. Use: Fruit eaten.

(4) E. aqua Burn. Fl. Ind. 114; Duthie, in Hook. fil. F.B.I. ii. 473.
Small tree. Branchlets 4-angular. Leaves oblong-lanceolate, short acuminate; nerves prominent about 10 pairs, inarching '1 in. from edge, 6 to 12 in. long, 2 to 3 in. wide; petioles '05 to '1 in. long. Flowers about 4 or 5 in a cyme, 'in. across, white. Calyx turbinate, '5 in. long; lobes rounded. Fruit turbinate, 1 to '1.5 in. long, translucent pink or white, juicy. Hab. Cultivated in gardens, probably native of India. Native name: Jambu Ayer. Use: Fruit eaten.

A shrubby plant or straggling tree. Branchlets pale. Leaves elliptic-lanceolate or narrow lanceolate, base cordate, rather stiffly coriaceous, pale when dry; nerves 12 to 14 pairs, prominent, inarching 2 in. from the edge, 8 to over 12 in. long, 2.5 to 4 in. wide; petioles thick, corky, 2 in. long. Flowers white, 1 in. across or more, 3 to 5 shortly stalked, at the end of the branch. Calyx campanulate with a rather long pseudo-stalk; lobes short, round, 1 in. long on pedicel 5 in. long. Fruit globose, medium-sized. *Hab.* Thick forests up to 2000 ft. altitude. Singapore, Garden Jungle. Selangor, Weld's Hill, Kwa Lumpur (Foxworthy). Perak, Larut (Kunstler). Penang, Richmond Pool; Moniot's Road (Curtis). *Distrib.* Sumatra.

The Burmese *E. formosa* Wall. differs in being a big tree with axillary pink flowers and a different venation. A plant collected by me at Klang Gates may possibly be this, but it was in too poor a condition to be certain.


(8) **E. Scortechinii** King, l.c. 85.

Tree 20 to 30 ft. tall. Branches angled. Leaves sub-coriaceous, ovate oblong to lanceolate acute, base rounded, narrowed; nerves prominent, 7 to 10 pairs inarching to form an intramarginal 2 in. from edge, with another much finer near the edge, 4 to 6 in. long, 1.35 to 2.35 in. wide; petioles 15 in. long or 0. Racemes terminal, condensed, about 7-flowered, 1.5 in. long. Flowers 1 in. across, red. Calyx campanulate, narrowed to a short pseudo-stalk 4 in. long; lobes broad, short, unequal. Petals red, orbicular. Fruit oblong 5 in. long, crowned by a deep-cupped calyx. *Hab.* Swampy forests. Johor, Kota Tinggi. Malacca (Maingay). Perak, Ulu Bubong and Goping (Kunstler).

(9) **E. siamensis** Craib, Kew Bulletin, 1911, p. 153.


(10) **E. javanica** Lam. Dict. iii. 200; King, l.c. 81.

Large tree about 60 ft. tall or more. Stem 2 ft. or more through. Leaves elliptic, narrowed slightly to rounded base, blunt; nerves about 12, inarching, 2½ in. from the edge, 6 to 10 in. long, 3 to 4½ in. wide; petioles 2 in. long. Cymes terminal and axillary of 3 to 5 flowers stalked, on a peduncle 1 to 3 in. long. Calyx cup-shaped 4 in. long, pseudo-stalk 2 in. long, lobes round. Whole flower white, 1 in. across. Fruit 7½ in. long, globose, green or whitish, uneatable. *Hab.* Sea-shores and sandy country near the sea. Singapore, Gardens. Malacca (Hervey). Pahang, Pekan. Kedah, Yan. *Distrib.* Andamans and Malay isles.

(11) **E. perakensis** King, l.c. 81. **E. scalarinervis** King, l.c. 87.

Tree 50 to 70 ft. tall. Stem 12 to 18 in. through. Leaves very large, coriaceous, oblong-elliptic, sub-acute, base broad, cordate, nearly sessile; nerves very prominent beneath, inarching 2 to 4 in. from the edge, about 20; 12 to 18 in. long, 5 to 8 in. wide; petioles very thick and short. Flowers 6 to 8, fascicled on the branch below the leaves, and terminal; peduncles 5 in. wide, reddish pink. Petals white, 1 to 1½ in. across. Calyx campanulate, 5 in. long. Stamens long. Fruit globular, ovoid. *Hab.* Dense low wet jungle. Perak, Larut; Goping (Kunstler). Dindings, Lumut.


Tree. Leaves stiff coriaceous, elliptic obtuse, base round, auricled; nerves 12 pairs, inconspicuous beneath, 6 to 9 in. long, 3 in. wide. Flowers fascicled on a short stout peduncle, axillary or terminal, white. Calyx campanulate, narrow to base, no pseudo-stalk, 3½ in. long and as wide; lobes obscure 4. Petals oblong 2½ in. long. *Hab.* Dindings, Lumut (Ridley).

(13) **E. pendens** Duthie, l.c. ii. 475; King, l.c. 94.

A small tree about 20 ft. tall. Leaves rather thin, elliptic shortly acuminate, base narrowed acuminate; nerves 10 elevate beneath, inarching 1 in. from the edge, light green, 4½ to 6 in. long, 1½ to 2½ in. wide; petioles 2 in. long. Cymes few-flowered, 3 to 5 flowers axillary and terminal, 2 in. long; peduncle short or 0. Branches 3. Flowers white 5 in. across. Calyx broad, cup-shaped, 3 in. long, pseudo-stalk very short or 0. Petals pustular.

Branches slender. Leaves lanceolate acuminate, base narrowved, thinly coriaceous, 4 to 6 in. long, 1 to 1.75 in. wide; nerves 6 to 7 in. long, elevate beneath, inarching 12 in. from the edge; petioles 25 in. long. Cyme terminal 4- to 5-flowered. Flowers 75 in. across; pedicels 12 in. long. Calyx funnel-shaped, gradually narrowed to the pseudo-stalk, 5 in. long; lobes ovate, over 25 in. long. Petals white, orbicular, 25 in. long. Stamens 5 in. long. Hab. Tringganu, Bundi (Rostado).

(15) **E. fusiformis** Duthie, l.c. ii. 479.
Large tree. Leaves thin or rather stiffly coriaceous, elliptic or obovate-lanceolate, sub-acute, base cuneate; nerves numerous or 13 pairs, inarching 15 to 2 in. from edge, with a second intra-marginal near edge, 3.5 to 7 in. long, 2 to 3 in. wide; petioles 3 to 4 in. long. Panicle 1.5 to 2 in. long, terminal, few-flowered; branches few, 4-angled. Flowers pedicelled. Calyx narrow, fusiform, pseudo-stalk with broad campanulate top, lobes rounded. Petals oblong or orbicular 2 in. long. Stamens 3 in. long. Style long persistent. Hab. Forests. Johor, Sungei Tempayang (Ridley). Malacca (Maingay). Distrib. Borneo, Labuan.

Tree. Branches terete, slender. Leaves lanceolate acuminate, sub-coriaceous, cordate, 6 in. long, 2 in. wide; nerves 16 pairs, elevate inarching 12 in. from edge; petioles thick, 12 in. long. Raceme short, terminal, 2- to 3-flowered, 25 in. long. Calyx 5 in. long, obconic narrowed to pseudo-stalk; lobes very indistinct. Petals ovate. Stamens 5 in. long, purple. Hab. Rare in hill woods. Selangor, Bukit Kutu (Ridley).

(17) **E. plumbea** King, l.c. 35.
Tree. Leaves thin coriaceous lanceolate-acuminate, base a little narrowed blunt, shining lead colour when dry; nerves 10 to 12 pairs, sunk above, prominent beneath, inarching into an undulating vein 1 in. from edge, 3 to 6 in. long, 1 to 1.75 in. wide; petioles 1 in. long. Cyme 1- to 3-flowered; peduncle 5 in. long, terminal. Flowers delicate green, 1 in. across. Calyx funnel-shaped 4 in. long. Petals round, reniform. Hab. Perak, Gunong Batu Putih (Wray).

Shrub. Branchlets pale. Leaves very coriaceous, elliptic, blunt or round or obovate dotted beneath; nerves 8 pairs, faint on both sides, secondaries and reticulations conspicuous, 1.75 to 2.5 in. long, 1.25 to 1.5 in. wide; petioles thick, 2 in. long, channelled. Corymbs terminal, 1 to 1.5 in. long; branches few, slender; pedicels
Eugenia.

4 in. long. Calyx campanulate 2 in. long, lobes ovate, rather large. Petals white. Stamens 5 in. long. Hab. Mountains at high altitudes, local. Perak, Gunong Kerbau from 4000 to 6000 ft. altitude (Robinson).


A willow-like bush or small tree. Leaves coriaceous, linear-lanceolate acuminate at both ends, blunt; nerves very fine, numerous, parallel, 4 in. long, 3 to 5 in. wide; petioles 25 in. long. Panicles 5 in. long; peduncles 1.5 to 2 in. long. Buds pear-shaped, sub-sessile. Flowers white 5 in. across. Calyx funnell-shaped, narrowed to base, lobes round. Petals ovate 1 in. long. Fruit globose, pithy white, 5 in. through, on pedicels 75 in. long. Hab. On gravelly banks and islands by rapid streams. Pahang, Tahan River, abundant (Ridley).

20 E. mollis King, l.c. 86.

Tree 15 to 40 ft. tall, 8 to 15 in. through. Leaves oblong-lanceolate, finely acuminate, base cordate, glabrous above, velvety beneath, as are branchlets and panicle, 9 in. long, 3 to 3.25 in. wide; petioles thick, 2 in. long. Panicles terminal very lax, spreading about 8 in. long; lower branches 3.25 in. long, upper ones in whorls of 4 ending in cymes of 3 to 5 white flowers about 3 in. across. Calyx puberulous, funnel-shaped, 2 in. long, the large round lobes as long; pedicels 1 in. long. Hab. Low dense wet forests, rare. Perak, Larut (Kunstler).

21 E. Foxworthyi Ridl.

Tree. Leaves lanceolate shortly blunt acuminate, base narrowed, thinly coriaceous; midrib sunk above, prominent beneath; nerves fine, 18 to 20 pairs hardly elevate inarching within the margin, secondary ones often as conspicuous, reticulations fine, small, 6 to 7.5 in. long, 1.5 to 2.5 in. wide; petioles 25 in. long. Cymes terminal panicked; panicles 4 in. long, 3 in. wide. Branches few eventually angled. Flowers in cymes of 3; pedicels stout, 25 in. long or less. Calyx-tube funnel-shaped, 12 in. long; lobes large, round 4 ovate persistent. Petals round white. Stamens long. Hab. Pahang, Bukit Goh, Reserve (Foxworthy). Tahan River (Seimund).

22 E. densiflora Duthie, l.c. ii. 473; King, l.c. 84.

Tree about 40 to 60 ft. tall. Leaves coriaceous elliptic oblong acuminate, base cuneate; nerves fine, distinct inarching irregularly, 5 to 7 in. long, 2.5 in. wide; petioles 2 in. long. Panicle terminal, many-flowered, dense, 4 in. long and wide. Flowers 75 in. across, white, flushed with pink. Calyx short and broad, cup-shaped. Petals rather large orbicular. Fruit globose with persistent calyx-lobes. Hab. Low wet jungle, river-banks. Singapore, Bukit Mandai; Changi. Malacca (Maingay). Pahang, Kwalá Tembeling. Perak, Chanderiang and Goping (Kunstler); Kwalá Kangsa.


Tree. Bark of branches red-flaky. Leaves elliptic coriaceous, base very shortly narrowed, tip acuminate blunt; nerves very fine and numerous, distinctly raised beneath, inarching close to edge, 5'5 in. wide; petioles '3 to '4 in. long. Panicles terminal 2 in. long, 2'5 in. wide, on peduncles '1'5 in. long. Flowers numerous, crowded into a dense mass. Calyx campanulate with a slender pseudo-stalk '2 in. long and as wide; lobes short rounded. Petals free orbicular glandular '1 in. long. Stamens '3 in. long. *Hab.* Open country, local. Province Wellesley, Nibong Tebal and Krian (Ridley). Perak (Scortechini).

This resembles *E. densiflora*, but the flowers are hardly half as big. It has no relationship to *E. oblongifolia*, of which King made it a variety.

(24) **E. Gageana** King, l.c. 96.

Tree 40 to 50 ft. tall, 6 to 8 in. through. Bark of twigs thin bright brown. Leaves thick coriaceous, oblong-lanceolate blunt acuminate, base cuneate (drying brown); nerves fine 12 to 18 pairs, faint elevate beneath, secondaries and reticulations numerous distinct, 5 to 6 in. long, 1'5 to 2'25 in. wide; petioles '25 to '3 in. long. Panicles terminal sessile, 3 in. long, 4'5 in. wide, much branched. Branches 4-angled. Flowers sessile in threes at ends of branches. Calyx narrow campanulate, rather abruptly narrowed to a pseudo-stalk, '05 in. long; lobes small, waxy white, tinged with red. *Hab.* Dense jungle. Perak, Larut (Kunstler).

The only specimen seen in very young bud looks like *E. densiflora*, but the calyx-lobes are smaller.

(25) **E. grandis** Wight, *Ill. ii.* 17; *Ic. t.* 535; *King*, l.c. 91.

Big tree 60 to 80 ft. tall, 2 ft. through. Bark pale. Leaves stiff coriaceous dark green with numerous fine ribs and reticulations, 4 to 6 in. long, 3 to 4 in. wide, elliptic or oblong or ovate blunt or short acuminate, base narrowed; petioles '4 in. long, channelled. Panicles terminal and in the uppermost axils 6 in. long and wide. Flowers numerous, white, 1 in. across. Calyx funnel-shaped, smooth, sessile '3 in. long, lobes short, round. Petals short, round. Stamens '5 in. long. Fruit globose or elliptic, about '5 in. through, green. *Hab.* Common on sea shores and now planted largely as a roadside tree. Singapore to Penang and Perlis. *Distrib.* Siam. *Native names:* Jambu Ayer Laut; Krian Batu.
(26) **E. lepidocarpa** Wall. Cat. 3618; King, l.c. 89.
Tree about 40 to 60 ft. tall. Leaves smooth dark green, elliptic stiffly coriaceous blunt to cuspidate, very shortly narrowed at the base; nerves very fine, hardly elevate, about 20 pairs inarching close to the edge, 4.5 to 6 in. long, 2.5 to 3 in. wide; petioles 5 to 1 in. long. Panicles terminal, 3 in. long, 4 in. wide, many-flowered. Flowers white clustered on the ends of branches 1 in. across. Calyx campanulate narrowed to a short pseudo-stalk, 2 in. long, longitudinally ribbed; lobes short rounded. Stamens short. Fruit sub-globose, crowned by the conspicuous calyx-rim, ribbed. *Hab.* Common in woods and thickets, Singapore, Johor, Malacca, Perak. *Distrib.* Burma. *Native names:* Samak Tebrau; Samak Ular. *Use:* Bark for tanning nets.

Tree. Branches thick. Leaves thickly coriaceous elliptic with short deflexed point, base cuneate; nerves very numerous with secondaries and reticulations fine and conspicuous on both sides, 4.5 in. long, 2 in. wide; petioles thick, grooved, 5 in. long. Panicles sessile terminal, 2 in. long with numerous very thick 4-angled branches (longest 1 to 75 in. long). Calyx-tube campanulate, narrowed to a short thick ribbed pseudo-stalk; lobes short, caducous in flower, 3 in. long. Petals short, oblong, soon falling. Stamens 3 in. long. *Hab.* Mountains. Selangor, Mengkuang Lebah at 5000 ft. altitude (Robinson).

(28) **E. quadrata** King, l.c. 86.
Tree 20 to 30 ft. tall, 3 to 4 in. through. Branches 4-angled. Leaves thin coriaceous, narrow oblong acuminate, base round cordate; nerves 20 to 25 pairs, inarching 1 in. from the margin, 8 to 10 in. long, 1.75 to 2.75 in. wide; petioles 05 in. long. Cymes axillary and terminal, 3 to 5 together or fewer, short; peduncles 1.5 to 2 in. long. Flowers 5 in. across, white. Calyx campanulate, gradually narrowed into a pseudo-stalk 5 in. long. Petals orbicular. *Hab.* Low wet ground. Perak, Larut (Kunstler).

(29) **E. garcinifolia** King, l.c. 90.
Tree 70 to 80 ft. tall, 2 to 4 ft. through. Leaves glossy bright green stiffly coriaceous, elliptic-oblong blunt or with a short point, base narrowed; nerves 10 to 12 pairs, fine but conspicuous, inarching 2 in. from the margin, with an intramarginal nerve close to edge, reticulations conspicuous on both sides, 7 to 8 in. long, 3.5 to 4 in. wide; petioles channelled 1 in. long. Panicles 3 in. long, 3.5 in. wide, sessile. Flowers 2 to 3, terminal on branches, white tinted pink. Calyx narrow, campanulate, 4 in. long, no pseudo-stalk; lobes ovate. Petals orbicular. Fruit (young) globular, ovoid. *Hab.* Perak, Goping and Larut (Kunstler). *Distrib.* Sumatra.

(30) **E. papillosa** Duthie, l.c. ii. 495; King, l.c. 84.
Big tree. Leaves stiffly coriaceous, amplexicaul oblong-elliptic,

(31) E. Griffithii Duthie, l.c. ii. 481; King, l.c. 92. E. Valetoniana King, l.c. 112.

Small tree 50 to 80 ft. tall. Leaves coriaceous, oblong or narrowly elliptic, shortly acuminate, base cuneate; nerves fine, 15 to 20 pairs, inconspicuous above, inarching '1 in. from the edge, reticulations faint or invisible, 4 to 6 in. long, 2 to 2'5 in. wide; petioles '5 in. long. Panicles terminal and in upper axils, about 8, terminal 2 to 6 in. long, with distant flowers solitary or in cymes of 3, pedicelled. Calyx campanulate, barely '2 in. long, narrowed to the pedicel '2 in. long, lobes short. Petals free, orbicular. Stamens '2 in. long. Fruit globular ovoid, green, '5 in. through. Hab. Lowland woods. Singapore, Changi; Garden Jungle. Malacca, Bukit Bruang; Merlimau (Derry). Perak, Goping (Kunstler). Matang (Wray). Native name: Kelat Bising.

E. Valetoniana King, seems to me to be the same thing.

(32) E. Duthieana King, l.c. 103.

Tree 40 to 50 ft. tall. Leaves coriaceous elliptic, or ovate-elliptic acuminate (caudate-acuminate); nerves 4 to 8 pairs, inarching '2 in. from the edge, impressed above, elevate beneath, reticulations faint, 3 to 5 in. long, '1'25 to '2'25 in. wide; petioles '15 to '2 in. long. Racemes axillary and terminal, as many as 6 together. Flowers few sessile, white, '3 in. across. Calyx campanulate, with pseudo-stalk, '2 in. long; mouth wide, lobes rounded. Petals orbicular. Fruit globular, '75 in. long, green. Hab. Dense jungle, sea level to 2500 ft. altitude. Singapore, common, Garden Jungle; Bukit Timah; Jurong. Johor, Bukit Banang. Malacca, Mt. Ophir. Pahang, Pekan. Perak, Larut (Kunstler) up to 2500 ft. altitude. Penang Hill (Curtis).

(33) E. Goodenovii King, l.c. 117.

Tree 50 to 70 ft. tall. Leaves coriaceous, elliptic or oblong, cuneate acuminate (drying pale green); nerves numerous very fine, invisible above, 3'5 to 5'5 in. long, '1'5 to 2 in. wide; petioles '3 in. long. Panicles fascicled, terminal and axillary, '1 to '1'5 in. long and as wide. Branches few. Flowers shortly pedicelled when adult, '2 to '3 in. across. Buds club-shaped, as long. Calyx funnel-shaped, gradually narrowed downwards into a rather thick pseudo-stalk; lobes broad round, 4. Petals calyptrate. Fruit broad, urn-shaped, apex truncate with a thick calyx ring, with the

(34) **E. Hemsleyana** King, l.c. 88.
A tree 30 to 40 ft. tall, very closely resembling *E. Dyeriana* in all points except that the nerves are more numerous and more slender, and the young fruit is ribbed. Hab. Perak, Ulu Kerling and Goping (Kunstler).

(35) **E. corrugata** King, l.c. 93.
Tree 30 to 40 ft. tall, 10 to 15 in. through. Leaves elliptic-lanceolate acuminate, '5 in. long, '2 in. wide, drying black with globular ribbed. Fruit over 2 in. through, corrugate. Seeds 2. Perak, Larut Hills 3000 to 4000 ft. altitude (Kunstler). Penang, Muka Head (Curtis) is probably fruiting *E. Hemsleyana* King.

(36) **E. Koordersiana** King, l.c. 128.
Tree 40 to 80 ft. tall, 8 to 10 in. through. Leaves coriaceous drying black, elliptic or ovate caudate acuminate, base cuneate; nerves 8 to 10 pairs, fine but conspicuous beneath, inarching in an intramarginal nerve '1 in. from the edge, 3 to 4'5 in. long, '1'5 to 2 in. wide; petioles '2 in. long. Panicles axillary and terminal, peduncled (peduncles '1 to 2 in. long), 4 to 4'5 in. long, 2'5 in. wide; branches angled. Flowers white. Calyx obconic, with no pseudo-stalk, ribbed, '2 in. long and as wide, 4-lobed. Petals 4, oblong, round, not calyptrate. Hab. Perak, Larut (Kunstler).

(37) **E. Dyeriana** King, l.c. 88. E. Clarkeana King, l.c. 93.
Tree 25 to 70 ft. tall, 15 to 24 in. through. Leaves stiffly coriaceous, drying dark brown, elliptic to oblong, base slightly narrowed; nerves 13 to 20 pairs prominent beneath, inarching near the edge, 7 to 9 in. long, 3'5 to 5 in. wide; petioles '4 to '6 in. long, thick. Panicles axillary and terminal, 5 to 8 in. long, stout with short, thick-angled branches '1 in. long, lower ones occasionally longer, re-branched. Flowers white, sessile in clusters on the branch ends, '25 to '4 in. long. Calyx obconic, shortly narrowed to a short pseudo-stalk. Petals orbicular. Stamens '25 in. long. Fruit globose smooth, or oblong, '1 in. long, '1'2 in. wide. Hab. In forests. King’s two species seem to me the same thing. Perak, Gunong Pondok; Larut (Kunstler).

var. oblonga King. Form with narrow leaves, 4 to 8 in. long, '1'25 to '2'75 in. wide. Hab. Perak, Gunong Pondok (Kunstler).

(38) **E. pergamentacea** King, l.c. 87.
Small tree. Leaves papery coriaceous, narrow oblong short acuminate, base narrowed blunt; nerves 28 to 32 pairs, prominent beneath, parallel joining a nearly straight intramarginal one, 12 to 14 in. long, 3 to 4 in. wide; petioles thick, 2 in. long. Panicles terminal, 4 in. long with no peduncle; branches few rather distant, thick with 3 to 4 flowers, '5 in. across, sessile. Calyx

(39) **E. subrubra** King, *l.c.* 592.

Tree 20 to 30 ft. tall. Bark flaky red. Leaves thickly coriaceous, narrowly elliptic shortly acuminate, base cuneate; midrib and 7 pairs of fine nerves prominent beneath; nerves inarching in loops '1 in. from edge, 3'5 to 5 in. long, 1'5 to 2 in. wide; petioles '3 to '4 in. long. Panicles terminal and axillary peduncled; branches few crowded at tip. Flowers '5 in. long, sessile in threes. Calyx campanulate funnel-shaped, mouth undulate, 4-toothed. Fruit ovoid, smooth, crowned by the calyx-ring. Hab. Rare in forests. Singapore, Bukit Timah; Changi Road. Penang Hill (Curtis).

var. robusta. Leaves larger; panicles longer, branches more numerous. Penang (Curtis).


Tree. Branches with white bark. Leaves obovate to oblanceolate, thin coriaceous, shortly blunt apiculate, base cuneate; nerves over 20 pairs, slender inarching close to the edge, 3'5 to 5 in. long, 1'5 to 2'5 in. wide; petioles thick, '2 in. long. Inflorescence 2'5 to 6 in. long, of peduncled few-flowered racemes; peduncles thick angled. Flowers 2 to 3, sessile on the ends of the branches. Calyx '4 in. wide, funnel-shaped, limb undulate spreading, '4 in. across; lobes '2 in. long round. Petals orbicular. Stamens '4 in. long. Hab. Malacca (Griffith). Perak, Thaiping Hills at 2000 ft. altitude (Curtis).

(41) **E. Hoseana** King, *l.c.* 106.

Tree 30 to 40 ft. tall. Branches pale. Leaves coriaceous, elliptic shortly caudate acuminate, base cuneate; nerves 15 to 20 pairs elevate beneath, inarching '1 in. from edge, 4'5 to 7 in. long, 1'75 to 2'5 in. wide; petioles '15 in. long. Flowers white, sessile in dense terminal and axillary racemose heads, 1 in. long with several ovate persistent bracts as long as themselves. Calyx widely campanulate, contracted at base, no pseudo-stalk, leathery, '5 in. across; lobes blunt. Stamens '3 in. long. Fruit globose campanulate crowned by lobes '5 in. long, '4 in. through. Hab. Rather rare in lowland woods. Johor town (Ridley). Perak, Larut (Kunstler).

(42) **E. subhorizontalis** King, *l.c.* 112.

Small tree. Leaves thin coriaceous oblong acuminate both ends, nerves fine with secondaries numerous (20 pairs or more) inarching '05 to '1 in. from edge, 4'5 to 7 in. long, 1'5 to 2'3 in. wide; petioles '5 in. long. Panicles axillary and terminal, axillary ones 1- to 4-fascicled, terminal one 2'5 to 3 in. long; branches few, lax. Flowers sessile white in clusters at ends of branchlets. Calyx '25 in. long, funnel-shaped; lobes 4, round or sub-acute. Rare.
Perak, Thaiping and Asam Kumbang (Wray). *Distrib* Sumatra.

(43) **E. Thumra var. penangiana** King, l.c. 92.
Medium-sized tree. Leaves thinly coriaceous, oblong-elliptic or oblong-lanceolate, shortly acuminate, base cuneate; nerves 15 to 20 pairs, slender elevate beneath inarching '1 in. from the edge, 4 to 5 in. long, '8 to 2 in. wide; petioles '3 to '5 in. long. Panicles 3 to 6 in. long, terminal and in upper axil; branches distant 2 in. long, bearing at the end 2 to 3 branchlets ending in 3 to 6 or 8 sessile flowers. Calyx short, cup-shaped, suddenly narrowed to a ribbed pseudo-stalk, '15 in. long. Flowers white, '2 in. across. Petals ovate. Stamens short. *Hab.* Hill forests. Penang, Waterfall and Highlands (Curtis). *Distrib* Of typical Thumra, Roxb. Burma.

Large tree. Bark pale. Leaves thinly coriaceous, elliptic shortly acuminate blunt, base narrowed; nerves slender, 25 pairs, intramarginal straight, '05 in. from edge, 6 to 7 in. long, 3 in. wide; petioles less than '25 in. long. Panicle 2 in. long or less; branches few (4) as long. Flowers sessile, '25 in. long. Calyx funnel-shaped, truncate. Petals small, orbicular, white. Stamens short. Fruit globose crowned with the ring-shaped calyx mouth, '5 in. through. *Hab.* Forests at 4000 ft. altitude. Pahang, Telom (Ridley).

(45) **E. chloranthera** Duthie, l.c. ii. 487; King, l.c. 97.
Tree about 40 to 50 ft. tall. Stem 10 to 15 in. through. Leaves coriaceous, elliptic shortly acuminate, base cuneate (drying green); nerves fine, very numerous and parallel with a fine intramarginal near the edge, 4'5 to 6 in. long, 2 to 3 in. wide; petioles '3 to '35 in. long. Panicles sessile, 2 in. long; branches thick, 4-angled. Calyx '35 in. long, cylindric, ribbed; lobes short, thick. Petals orbicular, greenish white. Stamens '2 in. long, brilliant crimson. Fruit sub-globular crowned by the prominent calyx-lobes, '3 to '4 in. through. *Hab.* Common, especially in the south in woods up to 2500 ft. altitude in Penang. Singapore (Wallich); Bukit Timah: Tangelin. Johor, Pengerang (Cantley). Malacca (Griffith and Maingay). Pahang, Pekan. Perak, Chanderiang (Kunstler). Penang, Balik Pulau; West Hill (Curtis). *Distrib* Sumatra.

An unfortunate name of Duthie's; the petals are truly greenish white, but fall off very quickly, exposing the brilliant crimson stamens.

(46) **E. Benjamina** King, l.c. 106.
Shrub 4 to 6 ft. tall. Leaves thinly coriaceous, dotted, elliptic cuneate, base cuneate; nerves numerous, very fine, distinct, 3 in. long, '5 in. wide; petioles slender '15 in. long. Racemes terminal and in upper axils about 5-flowered, '1 in. long. Flowers '5 in. across. Calyx clavate; lobes broad. Petals orbicular. Fruit depressed, globular, '1 in. long and as broad, claret-coloured, waxy. *Hab.* Mountains in forests, rare. Perak, Larut, 1500 to 2000 ft. altitude (Kunstler). *Distrib* Sumatra.

Low, bushy tree, sometimes large. Leaves narrowly elliptic narrowed to both ends, tip blunt, coriaceous drying yellowish; nerves 12 pairs, very inconspicuous above, intramarginal near edge, 2'5 to 3'25 in. long, 1 to 1'25 in. wide; petioles 2 in. long. Panicles terminal 1'5 in. long and a little wider; branches with red scaling bark. Flowers 5 in. across. Calyx funnel-shaped, attenuated to slender pseudo-stalk, 2 in. long; lobes 4, unequal. Petals larger orbicular, glandular on the back. *Hab.* Sandy ground near sea or in rocky forest. Perak, Larut (Kunstler). Penang, Waterfall and Government Hill at 500 ft. altitude (Curtis). *Distrib.* Burma.

(48) *E. Hullettiana* King, *l.c.* 97.

Tree 20 to 30 ft. tall. Stem 5 to 7 in. through. Leaves coriaceous elliptic long-acuminate blunt, base cuneate, smooth deep green above, beneath nerves very faint, reticulations visible but very fine, 3'25 to 4'5 in. long, 1'5 to 2 in. wide; petioles 3 to 4 in. long. Panicles in upper axils and terminal about 3 in. long; branchlets angled. Flowers pale green. Calyx cylindric funnel-shaped ribbed, 2 in. long, mouth expanded, recurved; lobes short and broad. Petals ovate. Stamens white, slightly red towards centre, 2 in. long. *Hab.* Perak, Larut (Kunstler). *Distrib.* Sumatra.

This species is very close to *E. Helferi*.

(49) *E. Burkilliana* King, *l.c.* 94.

Tree 40 to 60 ft. tall, 15 to 20 in. through. Leaves light green, lanceolate acuminate, base cuneate, coriaceous; nerves many very fine with reticulations conspicuous on each side, 2'25 to 3'5 in. long, 9 to 1'25 in. wide; petioles 35 to 5 in. long. Panicles sessile, terminal, much branched, 2 in. long, 4 in. wide; branches 4-angled. Flowers 7 in. long, pale red in bud, white when open, sessile in threes at branch-ends. Calyx 35 to 4 in. long, funnel-shaped, narrowed to a rather long pseudo-stalk; lobes ovate. Stamens 2 in. long. Petals glandular on back. *Hab.* Perak, Asam Kumbang (Wray); Goping (Kunstler).

(50) *E. Ridleyi* King, *l.c.* 98.

A big tree about 80 ft. tall. Leaves thinly coriaceous, oblong or ovate-lanceolate shortly acuminate, base cuneate; nerves 7 to 10 pairs, fine but prominent forming large loops, 1 to 2 in. from edge, 3'5 to 7 in. long, 1'25 to 2'25 in. wide; petioles 4 to 5 in. long. Panicles terminal and in upper axils, 2 to 3 in. long; the long branches 2 in. long, spreading. Flowers 3 to 5 in terminal clusters, apple green, 2 in. across. Calyx funnel-shaped, narrowed to a slender pseudo-stalk 2 in. long; lobes large, ovate. Petals ovate, round. Stamens short. *Hab.* Woods, low country. Singa-
pore, Garden Jungle. Negri Sembilan, Senaling (Burkill); Seremban (Kinsey); Penang, Penara Bukit (Curtis).

This tree is conspicuous from having the flowers bright apple green. It is almost the only green-flowered species in our region.

(51) E. anisosepala Duthie, l.c. ii. 481; King, l.c. 96.

A large tree. Leaves thinly coriaceous ovate to ovate-lanceolate, short acuminate, base cuneate; nerves fine, 12 to 14 pairs, secondaries nearly as conspicuous, 2'5 to 3'5 in. long, 1 to 1'75 in. wide; petioles '2 to '25 in. long. Panicles terminal, corymbose; branches angled, rather thick, 2 to 4 in. long. Flowers '5 in. long, sessile in threes at ends of branches. Calyx 3 in. long, campanulate, lower half contracted to a pseudo-stalk; lobes 4, unequal, 2 larger sub-petaloid. Petals free. Hab. Malacca (Griffith and Maingay). Sungei Hudang (Derry).


Branches pale whitish. Leaves thickly membranous, elliptic shortly acuminate blunt, base narrowed blunt sub-cordate; nerves slender, raised beneath, about 18 pairs inarching far from margin, 4 in. long, 1'5 in. wide; petioles '1 in. long. Panicles terminal spreading; peduncles 2 in. long; longest branch 3 in. long. Flowers in threes on branchlets crowded at top. Buds pyriform with a long pseudo-stalk. Calyx-lobes ovate. Hab. Perak (no locality, Scortechini).

The only specimen seen is very young, but it is totally different from Kunstler's 7590 from Larut, Perak, which is also King's Swettenhamiana.

(53) E. pustulata Duthie, l.c. ii. 495; King, l.c. 127.

Small tree. Leaves lanceolate-oblong cuspidate, base cuneate, sub-coriaceous, green when dry, 6 in. long, 2 in. wide; nerves 18 to 20, fine sunk above, elevate, slender beneath, inarching '05 in. from the edge; petioles '3 in. long. Panicles terminal and axillary 3 in. long; branches thick, 4-angled, few, distant minutely pustular. Flowers crowded about 6 at the ends of the short branches. Calyx broad campanulate, hardly lobed; lobes rounded, no pseudo-stalk, '2 in. long and wide. Petals oblong not calyptate. Stamens short, sulphur yellow. Fruit globose, base narrowed. Calyx ring persistent. Hab. Open rocky creeks and stony forests. Singapore, Garden Jungle; Changi; Jurong. Malacca (Maingay); Ayer Panas Residency (Foxworthy). Perak, Larut (Kunstler). Native name: Glam Tikus.

(54) E. variolosa King, l.c. 107.

A small slender tree 20 to 30 ft. tall. Branches, leaves and flowers minutely pustular. Leaves thinly coriaceous dark green, oblong-lanceolate cuneate-acuminate, base cuneate; nerves 10 to 12 pairs, prominent beneath, inarching '1 in. from edge, 5'5 in. long, 2'5 in. wide. Racemes 3- to 4-flowered, 1 in. long, mostly
axillary, sometimes terminal. Flowers '5 in. across, greenish yellow, base inside reticulated red. Calyx '2 in. long, narrow campanulate; lobes round in two unequal pairs. Petals orbicular. Stamens '75 in. long. Fruit globose, '8 in. through, green. Hab. In lowland woods, common. Singapore Gardens; Bukit Timah; Johor, Sungei Tebrau; Gunong Pulai. Selangor, Kwala Lumpur; Sungei Buluh (Foxworthy). Perak, Goping (Kunstler); Sungkai (Burn-Murdoch).

(55) **E. glauca** King, l.c. 102.
Tree 40 to 50 ft. tall. Bark of branches red flaky. Leaves stiffly coriaceous, oblong to ovate-lanceolate, sub-acute with a short point above shining, beneath glaucous; nerves fine, conspicuous, numerous, as are the reticulations on both sides, intramarginals close to edge, 2·25 to 4 in. long, 1 to 2 in. wide; petioles '25 to '3 in. long. Flowers sessile, '3 in. across in racemes or few-branched panicles, 1·5 to 3 in. long, terminal or in upper axils. Calyx a wide truncate saucer on a short pseudo-stalk, '15 in. long. Petals 4, clawed, free. Hab. Malacca, Sungei Hudang; Bukit Bruang (Derry). Perak. Penang (Curtis).

(56) **E. pseudo-glauca** Ridl. E. glauca var. pseudoglaucu King, l.c. 102.
Tree, medium size. Leaves stiffly coriaceous elliptic, acuminate at both ends, finely and conspicuously reticulate; nerves numerous, intramarginals 2, very fine, 4 to 4·5 in. long, 2 in. wide; petioles '2 in. long. Panicles lax, 2 to 3 in. long; branches few, spreading 1·5 in. long. Flowers sessile, white, '4 in. across. Calyx truncate, saucer-shaped with a pseudo-stalk red, no lobes. Petals oblong. Stamens '2 in. long. Hab. Local, but abundant, apparently quite distinct from glauca. Dindings, Lumut; Pangkor (Curtis).

(57) **E. cymosa** Lam. **Dicr.** iii. 109; **King**, l.c. 100.
A small tree. Leaves thinly coriaceous ovate or ovate-lanceolate caudate-acuminate, base cuneate; nerves very numerous and fine 2 to 3 in. long, 1 to 1·5 in. wide; petioles 1·5 to 3 in. long. Panicles small, few-flowered, spreading 1·5 in. long, lowest branches '5 in. long, terminal and axillary for some way down the branches. Flowers '1 in. across, white, sessile. Calyx campanulate abruptly pseudo-stalked '1 in. long; lobes minute obscure. Petals oblong. Stamens '1 in. long. Fruit as big as a pea, purple. Hab. Open woods. Singapore, Tampiniss; Changi. Johor, Tanjong Kupang. Malacca, Bukit China (Maingay); Merlimau (Cantley). Perak, Larut (Kunstler). Dindings, Bruaus; Lumut; Pangkor (Foxworthy). Penang, Waterfall (Curtis). Lankawi, Kesap (Haniff).

var. **concinna** King, l.c.

(58) E. pyrifolia Duthie, l.c. ii. 487; King, l.c. 99. E. tumida 
Duthie, l.c.c.
Medium-sized tree, about 40 to 60 ft. tall. Leaves coriaceous elliptic-oblong cuspidate, base cuneate; nerves very numerous, fine and close, parallel, intramarginal fine close to edge, 2·5 to 4 in. long, 1 to 1·75 in. wide; petioles 2·5 to 3·5 in. long. Panicles in upper axils and terminal numerous, 2 to 2·5 in. long, lax; branches slender. Flowers sessile, white, '3 in. across. Calyx obconic, funnel-shaped, ribbed, '2 in. long, teeth 4, shallow. Petals orbicular. Stamens very short, '1 in. long. Fruit globose, 1 in. long. Hab. Open country, on edges of woods up to about 2000 ft. altitude. Common in the south. Singapore, Tanglin. Johor, Sungei Tebrau; Muar, Sungei Tegal. Malacca, Batang Malakka (Derry). Selangor, Bukit Hitam. Native names: Kelat Putih; Kelat Lapis; Samak Darat.

(59) E. lineata Duthie, l.c. ii. 487; King, l.c. 99.
Tree about 60 ft. tall. Leaves very similar to those of E. pyri-
folia, but usually narrower in proportion to length. Panicles larger and more dense-flowered; branches thicker. Calyx cylindric funnel-shaped, '2 in. long; lobes oblong-ovate '05 in. long, per-

(60) E. zeylanica Wight, Ill. ii. 15; King, l.c. 108.
Bushy tree about 30 ft. tall, with bright red flaky bark. Branches slender. Leaves coriaceous, lanceolate or ovate-lanceo-
late acuminate blunt, pale beneath; nerves numerous slender faint, intramarginal nerve straight fine close to edge, 1·5 to 3·5 in. long, '35 to 1·5 in. wide; petioles '05 to '1 in. long. Panicles terminal and axillary 1 to 1·5 in. long; branches few, slender, distant. Flowers numerous, '35 in. long, white. Calyx funnel-
shaped, '2 in. long, sessile or pedicelled, tubercled; lobes 4 or 5 round deciduous. Petals orbicular 4 to 5. Fruit pisiform, white aromatic pithy. Hab. Common in open country and near tidal rivers. Singapore, Tanglin; Kranji. Johor, Batu Pahat. Malacca (Griffith). Pahang, Pekan. Negri Sembilan, Port Dickson; Selangor, Sungei Buluh (Foxworthy). Dindings, Lumut (Fox-
worthy). Perak, Kinta (Wray); Penang Hill. Distrib. India, Ceylon. Native names: Nasi-Nasi; Merkasih; Glam Tikus Laut; Beti; Kelat Nasi-Nasi. Use: Fruit eatable, sweet and aromatic.
(61) **E. grata** Wight, *Ill.* ii. 15; King, *l.c.* 109.


(62) **E. polita** King, *l.c.* 110.

Shrub or small tree up to 40 ft. tall and 6 to 10 in. through. Branches 4-angled. Leaves coriaceous, lanceolate or ovate blunt acuminate, base cuneate; nerves 10 to 12 pairs, secondaries numerous, hardly visible above, fine beneath, 1.5 to 2.25 in. long, 75 to 1 in. wide; petioles under 1 in. long. Panicles axillary and terminal, condensed 1 in. long; branches short, thick, 4-angled and winged. Bracts oblong-lanceolate blunt as long as calyx. Flowers sessile 35 in. long, white. Calyx strongly angled, oblong funnel-shaped; lobes 5. Petals orbicular. Stamens few, short. Fruit globular, small. *Hab.* Johor, Kwala Sembong (Kelsall). Malacca, Sungei Hudang (Holmberg). Dindings, Lumut (Curtis). Perak, Ulu Kerling and Larut (Kunstler). Penang (Wallich); Hill at 1200 ft. altitude (Curtis).

(63) **E. tecta** King, *l.c.* 109.

Tree 20 to 25 ft. tall. Branches slender 4-angled; bark loose, red. Leaves ovate, thin, coriaceous acuminate, base round; nerves fine inconspicuous, midrib tubercled; 2.5 to 3.25 in. long, 1.1 to 1.6 in. wide; petioles 0.05 to 1 in. long, thick densely black tubercled. Flowers 5 in. long, in dense fascicles terminal or axillary "golden" sessile. Calyx wide funnel-shaped, 5-lobed. *Hab.* Perak, Larut, below 500 ft. altitude (Kunstler).

(64) **E. pseudo-tetraptera** King, *l.c.* 109.

Shrub about 2 ft. tall. Branchlets 4-angled and with 4 crenulate wings. Leaves ovate short acuminate, base round; nerves 14 to 18 pairs, deep depressed above, elevate beneath intramarginal 1 in. from edge, 2 to 2.75 in. long, 1.5 in. wide; petioles minute wrinkled. Flowers in terminal and upper-axillary heads, sessile, about 1.4 in. a head, white, about 25 in. Bracts as long as flowers, oblong, blunt. Calyx cylindric, lobes 5. Fruit globular, 25 in. through. *Hab.* In forests, not rare, but very seldom flowering. Johor, Gunong Pantai (Ridley). Selangor; Sungei Buluh (Ridley). *Distrib.* Carimon isles.
(65) **E. jasminifolia** Ridl. Journ. F.M.S. Mus. x. 133.

Small bushy tree, slender. Leaves thinly coriaceous, ovate blunt, caudate, base cuneate; nerves numerous, but quite invisible above and often so beneath, 1 in. long, '25 in. wide; petioles '1 in. long. Flowers small, sessile in sessile heads 1 to 5 in axils and terminal. Bracts broad, oblong, papery. Calyx cylindric, narrowed at base, '12 in. long; lobes broad persistent. Petals free, small, rounded oblong. Stamens numerous, very short. Hab. Forests. Negri Sembilan, Tampin Hill near the top (Ridley).

(66) **E. caudata** King, l.c. 105.

Tree 30 to 40 ft. tall, 4 to 6 in. through. Leaves thin coriaceous lanceolate or ovate-lanceolate caudate, tail blunt, base cuneate; nerves numerous, very faint or invisible, 1'75 to 3 in. long, 75 to 1'1 in. wide; petioles '15 to '3 in. long. Panicles axillary or terminal, 1 in. long, slender, lax; pedicels slender. Flowers white '15 in. across. Calyx broad, campanulate, '2 in. long; lobes very obscure. Petals orbicular. Stamens very short. Fruit ovoid, then globular, '5 in. long. Hab. Mountains, woods at about 2000 ft. altitude. Johor, Bukit Banang, Batu Pahat. Malacca, Mt. Ophir. Selangor, Semangkok Pass (Curtis). Perak, Thaiping Hills (Curtis). Penang, West Hill (Curtis).

King gives "Singapore, Wallich Myrtus caudata 3631," as a synonym. The type sheet contains flowerless sprays of two gatherings, the greater part of which is *Pseudo-eugenia singaparenisis*. One spray looks more like *E. caudata* King, but possibly Wallich got this in Penang. It is a mountain plant, and has never otherwise been collected in the lowlands.

(67) **E. filiformis** Wall. Cat. 3578; King, l.c. 105.

Small tree about 20 to 40 ft. tall. Branches slender. Leaves coriaceous lanceolate or ovate-lanceolate caudate-acuminate, base short narrowed; nerves numerous, faint, 1'75 to 3 in. long, 75 to 1'2 in. wide; petioles '15 to '2 in. long. Flowers white, fragrant, axillary, solitary or in terminal lax racemes of about 4 on very slender, filiform peduncles, 1'5 to 2 in. long. Calyx cup-shaped, narrowed to pseudo-stalk '2 in. long, '25 in. across; lobes short, ovate. Fruit elliptic-ovoid, '75 in. long. Hab. Common in lowland woods up to about 2000 ft. altitude. Singapore (Wallich); Garden Jungle. Johor, Genuang; Gunong Pulai. Pahang, Kwantan (Foxworthy). Malacca, Bukit Bruang; Panchur (Derry). Selangor, Federal Hill, Kwala Lumpur (Foxworthy). Negri Sembilan, Pasir Panjang road (Foxworthy). Perak, Tapah (Burn-Murdoch); Bujong Malacca; Goping (Kunstler); Gunong Batu Putih (Wray). Penang (Wallich); West Hill at 2000 ft. altitude (Curtis). Native names: Kelat Api; Kelat Belian; Kelat Lapis; Kelat Jambu Ayer; Gising; Kelat Minyak.

(68) **E. penangiana** Duthic, l.c. ii. 486; King, l.c. 98.

Slender tree 40 to 80 ft. tall. Leaves thinly coriaceous, caudate-acuminate lanceolate, blunt, base cuneate; nerves very fine,

(69) **E. leptantha** Wight, Ill. ii. 15; Ic. t. 528; *Duthie*, l.c.

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**Fig. 63.**—*Eugenia claviflora.*


Tree about 60 ft. tall. Leaves thinly coriaceous, lanceolate acuminate, base cuneate; nerves slender, very numerous and indistinct, 4 in. long, 1.5 in. wide; petioles 1 in. long. Cymes racemose, axillary often below the leaves, 1 to 1.5 in. long. Flowers club-shaped. Calyx obovoid 1 in. with a long cylindric pseudostalk, 3 in. long; lobes very short, pale orange colour. Stamens 3 in. or less long. Fruit clavate oblong. Hab. Sea coasts and open country. Singapore (Wallich). Malacca (Griffith). Pahang, Pekan. Dindings, Pangkor. Penang (Wallich). Perlis, Bukit Lagi. Distrib. Tenasserim.
(70) **E. claviflora** Roxb. Hort. Beng. 37; Fl. Ind. ii. 488. King, l.c. 107. E. Maingayi, Duthie, l.c. 484. (Fig. 63, p. 741.)

Tree about 40 to 60 ft. tall. Leaves coriaceous, often stiffly oblong acuminate, base shortly cuneate; nerves numerous, fine, 5 to 6 in. long, 1'5 to 2'5 in. wide; petioles '1 in. long or less. Flowers in dense fascicled cymes from the old wood, cymes '2 in. long or less. Calyx clavate, thick fleshy '75 in. long, truncate, white, narrowed much at base. Stamens '2 in. long. Fruit cylindric oblong, deep purple. *Hab.* Dry woods, open country to 2000 ft. altitude. Singapore, one tree on Government Hill. Malacca, Mt. Ophir (Hullett). Perak, Gunong Bubu 500 to 1000 ft. altitude (Kunstler). Province Wellesley, Permatang Bertam. Penang, Richmond Pool; Muka Head (Curtis). Perlis, Besi Hangat. Distrib. India. Native names: Banko; Sedong.

This species varies much in several points. In some forms the nerves are distinct, 17 pairs, inarching '1 in. from the edge. *E. Maingayi* Duthie is a form with corky bark, very stiff leaves and shorter condensed flowers. It grows at Richmond Pool in Penang. The var. *glandulosa* King of Mt. Ophir only differs in the branchlets being 4-angled.

(71) **E. conglomerata** Duthie, l.c. ii. 497; King, l.c. 101.

A big tree over 80 ft. tall. Leaves coriaceous, deep shining green oblanceolate or lanceolate, base long narrowed; nerves very faint, 18 to 20 pairs, 3 to 4'5 in. long, '8 to 1'75 in. wide; petioles '2 to '35 in. long. Inflorescence of numerous racemes '4 in. long, on tubercles on bare parts of branches below leaves. Flowers '1 in. across, very small, crowded, sessile. Calyx cup-shaped, as broad as long, hardly any pseudo-stalk, '05 in. long; lobes very short, round. Stamens very short. Fruit as large as small pea, bright red, pulpy. *Hab.* Forests, apparently scarce. Singapore, Gardens. Malacca (Maingay); Mt. Ophir (Ridley).

(72) **E. urceolata** King, l.c. 101.

Tree 30 to 60 ft. tall. Branches 4-angled. Leaves coriaceous, elliptic-oblong to obovate, shortly acuminate, base cuneate, black-dotted beneath; nerves 12 to 18 pairs, inarching, '1 in. from edge, 5 to 9 in. long, 2 to 4'5 in. wide; petioles '25 to '5 in. long. Simple or panicked cymes 1 or several from lower-axillary tubercles '5 to 2 in. long. Flowers '2 in. across, white or pink. Calyx an open rotate cup; lobes orbicular blunt. Fruit turbinate '5 in. across, black. *Hab.* Open forests. Singapore, Bukit Timah; Chan Chu Kang; Malacca, Gunong Mering, Ophir. Pahang, Pekan. Selangor, Rawang. Perak, Goping and Ulu Slim (Kunstler); Relau Tujor (Wray).

(73) **E. polyantha** Wight, Ill. 17; Ic. 543; King, l.c. 103.

Tree 30 to 70 ft. tall, 15 to 20 in. through. Leaves thinly coriaceous, elliptic or lanceolate shortly acuminate, base cuneate, black-dotted beneath; nerves 8 to 10 pairs, inarching '1 to '2 in. from edge, 3 to 4'5 in. long, '1 to 1'5 in. wide; petioles '2 to '3 in.
long. Panicles below the leaves, 1 to 1·5 in. long with few short branches. Flowers white, '2 in. across. Calyx campanulate, '1 in. long, narrowed to short pseudo-stalk; lobes ovate. Fruit depressed, globular with 1 seed or transversely oblong with 2 seeds, green. 

**Hab.** Woods up to 5000 ft. altitude, common. Singapore, Sungei Morai; Bukit Timah. Malacca, Ayer Panas (Griffith); Brisu (Derry). Pahang, Kwa!a Lipis (Machado); Chanang Road, Bentong (Foxworthy). Selangor, Rantau Panjang (Kloss). Dindings. Perak, Ulu Bubong, and Padang River (Kunstler); Thaiping Hills at 5000 ft. altitude (Hullett); Temoh (Foxworthy), Penang, hill at 1200 ft. altitude (Curtis). Kedah, Alor Sta. Distrib. Burma, Malay isles. **Native names:** Kelat Putih; Kelat Merah; Kelat Samak.


Tree with long pendent branches. Leaves thinly coriaceous, narrow lanceolate long-acuminate, deflexed, base narrowed; nerves very fine, numerous, parallel, 4 in. long, '75 to 1 in. wide; petioles '15 in. long. Cymes axillary, erect in the axils of all leaves, 1 in. long; branches angled. Calyx obconic with very short teeth. Petals small free, rounded, white. Stamens very numerous, fine, '5 in. long; anthers minute. Hab. River-banks, a very handsome and striking tree with leaves deflexed and erect axillary cymes. 

**Hab.** River-banks. Kelantan River near Chaning, abundant (Ridley). Pahang, Kwa!a Tahan (Seimund).

(75) **E. valdevenosa** Duthie, l.c. ii. 489.

Tree 15 to 50 ft. tall. Branches angled. Leaves coriaceous elliptic apiculate, base cuneate; nerves 14 to 24 pairs strongly elevate beneath, intramarginal '2 in. from edge, 6 to 10 in. long, 2·5 to 3·5 in. wide; petioles '25 in. long. Panicles terminal, peduncled, wide spreading; branches many, 7 to 9 in. long and as wide. Flowers numerous, '2 in. across. Calyx '3 in. long, funnel-shaped; lobes o. Petals calyptrate. Fruit depressed globular, '75 in. through. Hab. Mountain forests 2000 ft. altitude. Johor, Kota Tinggi. Malacca, Selandor (Goodenough). Selangor, Sempang Mines, Semangkok; Gunong Mengkuang Lebah (Robin- son). Perak, Larit Hills to 4500 ft. altitude (Kunstler). Penang Hill (Wallich, Maingay); Sungei Pinang (Curtis). **Native name:** Kelat Bunga.

(76) **E. alata** Ridl.

Tree, glabrous. Branches 4-angled and winged with narrow wings. Leaves elliptic acuminate-cuspidate, thinly coriaceous; nerves prominent beneath, 14 pairs, secondaries nearly as prominent, intramarginal nerve '1 in. from the edge, 6 to 8 in. long, 2·5 to 5 in. wide; petioles thick, grooved, '4 in. long. Corymb of compound cymes, 4 in. long and as wide. Flowers crowded on the branch-ends; branches flattened, 4-angled. Calyx and pedicel club-shaped '2 in. long. Corolla calyptrate, small, white. Stamens
short and few. *Hab.* Hill woods, Selangor, Semangkok Pass, Track to Bukit Telaga (Ridley).

(77) **E. oblongifolia** *Duthie, l.c. ii. 491. King, l.c. ii.*

A tree 60 to 80 ft. tall, 10 to 20 in. through. Branchlets 4-angled. Leaves thinly coriaceous, elliptic short acuminate, base cuneate; nerves 10 to 16 pairs thin, with reticulations visible on both sides when dry, intramarginal vein near the edge, 3 to 4.5 in. long, 1.25 to 2 in. wide; petioles 3 in. long. Panicle terminal corymbose, spreading 2 to 3 in. long and as wide; branches many, angled; peduncle short. Flowers 4 in. across. Calyx 2 in. long, campanulate, gradually contracted to a slender pseudo-stalk truncate. Petals 4, calyptrate, green. Fruit globular, 35 in. through. *Hab.* In forests. Singapore, Garden Jungle; Chan Chu Kang. Malacca (Maingay). Selangor, Ulu Selangor (Kunstler). Perak, Goping and Ulu Kerling (Kunstler).

Of King's two varieties, var. *robusta* is *E. limnea* Ridl. and var. *parviflora*, a slightly smaller form of this with lanceolate leaves.

(78) **E. cinerea** *Wall. Cal. 3376 (Syzygium).* E. pseudo-subtilis *King, in part:* E. brachiata, *Duthie, l.c. ii. 496, not of Roxburgh.*

Tree. Branchlets white. Leaves rather thinly coriaceous, elliptic rounded or blunt at tip, narrowed at base, drying dark above, reddish beneath; nerves 7 to 8 pairs, somewhat conspicuous beneath, inarching 15 in. from the edge, 4 to 6 in. long, 2.25 in. wide; petioles 3 to 4 in. long, broad flat, grooved above. Panicles lax terminal, several together, 3.5 in. long, lower branches 1.5 in. long or less. Flowers sessile. Calyx obconic, no pseudo-stalk, less than 1 in. long, truncate. Petals calyptrate. Stamens very short, barely 1 mm. long. *Hab.* Open country in the north. Penang (Wallich), Kedah, Alor Sta. *Distrib.* Tenasserim and Mergui. Native name: Krian Lada.

(79) **E. chloroleuca** *King, l.c. ii.*

Tree 15 to 40 ft. tall. Leaves coriaceous (drying pale green) oblanceolate, abruptly shortly acuminate; nerves 12 to 16 pairs, very inconspicuous above, 3 to 6 in. long, 1 to 2 in. wide; petioles 4 in. long. Panicles axillary and terminal, trichotomous 1.5 in. long or less; branchlets angled. Bracts ovate. Flowers in threes, 4 in. long, white. Calyx 1.5 in. long, wrinkled, teeth 4. Fruit ellipsoid crowned with the calyx teeth, 3 in. long, white. *Hab.* Hill forests, local. Malacca, Selandor; Jus (Cantley). Perak, Thaiping Hills at 1500 ft. altitude (Kunstler).


Tree. Leaves thinly coriaceous elliptic acuminate acute, base cuneate; nerves faint above, elevate beneath, about 20 pairs, parallel remote inarching 1 in. from edge; 5.5 in. long, 2.25 to 2.5 in. wide; petioles 2 in. long. Panicles 1 to 2 terminal lax, 3 in. long. Flowers few on the ends of short branchlets. Calyx 3 in. long, campanulate, 25 in. across, abruptly narrowed to a
slender pseudo-stalk, truncate, edge recurved. Petals calyptrate, small. Stamens numerous, \( \cdot 4 \) in. long. Hab. Selangor, Rantau Panjang (Kloss).

(81) **E. expansa** Duthie, l.c. ii. 491; King, l.c. ii 113.

Shrub or tree 15 to 40 ft. tall. Leaves thinly coriaceous oblong-lanceolate or elliptic acuminate, base cuneate; nerves 20 to 24 pairs slender elevate beneath, inconspicuous above, intramarginal slender close to edge, reticulations fine conspicuous, 4 to 6 in. long, \( 1 \) to 2 \( \cdot 25 \) in. wide; petioles \( \cdot 15 \) to \( \cdot 2 \) in. long. Panicles axillary and terminal \( 1 \) to 4 in. long; branches few. Flowers white, sessile \( 5 \) to 8 at branch ends, \( \cdot 3 \) in. long. Calyx \( \cdot 15 \) in. long, funnel-shaped. Petals calyptrate. Hab. Forests. Malacca, Merlimau. Perak, Gunong Batu Putih, 3400 ft. altitude (Wray); Goping 300 to 800 ft. altitude (Kunstler). Penang (Wallich), Batu Feringhi and the Hill (Curtis).


Small tree. Leaves thinly coriaceous elliptic cuspidate, base cuneate; nerves 10 to 12 pairs, depressed above, elevate beneath, inarching in a bold intramarginal nerve \( \cdot 1 \) in. from the margin, \( 5 \cdot 5 \) in. long, \( 2 \) in. wide; petioles \( \cdot 2 \) in. long. Cymes chiefly axillary \( \cdot 5 \) to \( \cdot 75 \) in. long of about 5 flowers, short-pedicelled with minute bracts at base. Calyx cup-shaped, truncate, pustular \( \cdot 1 \) in. long, narrowed abruptly with a slender pseudo-stalk. Petals calyptrate. Hab. Hills forests in the south. Johor, Gunong Pantai and Gunong Pulai (Ridley).

(83) **E. microcalyx** Duthie, l.c. ii. 493; King, l.c. 124.

Tree about 60 ft. tall. Leaves lanceolate or elliptic (rarely obovate), blunt acuminate; nerves conspicuous beneath, hardly visible above, 8 to 10 pairs inarching \( \cdot 15 \) in. from the edge, drying blackish above, red beneath, 4 to 7 in. long, \( 1 \cdot 5 \) to \( 2 \cdot 4 \) in. wide; petioles \( 3 \) to \( 5 \) in. long. Panicles \( 2 \cdot 5 \) to 3 in. long and as wide, many-branched, terminal with numerous very small white flowers with persistent small bracts. Calyx obconic, no pseudo-stalk, nearly \( \cdot 1 \) in. long, yellow, truncate. Petals calyptrate. Stamens very short. Fruit \( \cdot 1 \) in. through, globose, red. Hab. Not rare in forests. Singapore, Tanglin; Bukit Mandai. Johor, Mt. Austin. Malacca, Bukit Bruang (Derry). Pahang, Telom. Selangor, Kwala Lumpur (Burn-Murdoch); Hulu Semangkok. Dindings. Perak, Ulu Bubong (Kunstler). Penang, Batu Feringhi.

var. obovata King.

Leaves obovate, \( 2 \cdot 5 \) in. long, \( 1 \cdot 5 \) in. wide. Fruit waxy-white tinged red. Possibly a distinct species. Perak, Goping (Kunstler). Native name: Kelat Putih.

(84) **E. myriantha** King, l.c. 125.

A tall tree. Leaves very coriaceous, oblanceolate sub-acute, base much narrowed; nerves 3 to 4 pairs, faint hardly visible, \( 1 \) to \( 1 \cdot 75 \) in. long, \( \cdot 5 \) to \( \cdot 75 \) in. wide; petioles \( 25 \) to \( 3 \) in. long.
Panicles very numerous, 3 in. long, peduncled with few spreading branches. Flowers small, sessile with ovate bracts at base, crowded at tip 1 in. long. Calyx cylindric, truncate. Hab. Perak (without locality) (Scortechini).

Allied to *E. microcalyx*, but leaves and flowers very much smaller (probably a high mountain plant).

(85) *E. pseudo-subtilis* King, l.c. 123, in part.
Small bushy conical tree about 20 ft. tall. Bark red flaky; branchlets pale. Leaves coriaceous, obovate or lanceolate, blunt narrowed at base; nerves faint, 5 to 7 pairs, visible beneath, inarching within the margin, intramarginal invisible, 2.5 to 3.5 in. long, 1.5 in. wide; petioles 5 in. long. Panicles spreading, lax, 2-5 to 4 in. long. Flowers small, sessile. Calyx 0.5 in. long, urn-shaped to globular, rim of mouth projecting, teeth 4. Fruit small, globose, as big as a peppercorn, red. Hab. Hilly forests. Singapore, Tanglin, perhaps planted here. Malacca, Bukit Sadanen (Derry).


(86) *E. Kunstleri* King, l.c. 127.
Tree 50 to 80 ft. tall, over 3 ft. through. Leaves thinly subcoriaceous elliptic acuminate, narrowed to base; nerves about 10 pairs elevate beneath and conspicuously inarching 2 in. from the edge; 5 in. long, 1.5 in. wide; petioles 3 in. long. Panicles terminal from upper axils, 1.5 to 3 in. long, peduncled, branching at the top about 1.5 in. across. Flowers small, greenish yellow about 1 in. wide. Calyx obconic, no pseudo-stalk 1 in. long, teeth obscure 4. Petals orbicular, calyptrate. Stamens very short. Fruit obovoid, 5 to 6 in. long, green with a reddish tinge. Hab. Forests. Perak, Larut Hills up to 800 ft. altitude (Kunstler). Penang (Curtis).

(87) *E. venulosa* Wall. Cat.; Duthie, l.c. ii. 490; King, l.c. 123.
Tree about 20 to 30 ft. tall. Leaves coriaceous, obovate or oblanceolate blunt or round, base cuneate; nerves 10 to 14 pairs, with the secondaries and reticulations fine but conspicuous on the paler underside, less so above, 2 to 3 in. long, 8 to 2.2 in. wide; petioles 15 in. long. Panicles terminal wide lax, many-flowered 6 in. long and as wide or less; peduncle and branches 4-angled, ebracteate. Calyx 2 in. long, campanulate, narrowed to a pseudo-stalk as long as the cup, truncate. Petals calyptrate. Fruit globose. Hab. Common in the south in open woody country. Singapore, Tampinis road. Johor, Kota Tinggi; Gunong Pantai road. Malacca, Bukit Bruang (Derry); Bukit Bharu (Maingay). Perak, Haram River (Scortechini). Distrib. Karimon isles. *Native name*: Kelat Putih.

King's var. *macrothyrsa* is not worth keeping up. It is only based on good specimens.
(88) **E. bracteolata** Wight, Ill. ii. 15; Ic. Pl. l. 531; King, l.c. 122.

Tree 30 to 40 ft. tall, 2 to 3 ft. through. Branches angled. Leaves coriaceous, oblongate to obovate, base long-narrowed; nerves numerous, parallel, distinct beneath, 3 to 5 in. long, 1-5 to 2 in. wide; petioles 3 to 5 in. long. Panicles terminal 2-5 to 4 in. long, 3 in. across; branches numerous with a pair of conspicuous bracteoles at each branch and branchlet. Flowers white 3 in. long. Calyx 1-5 in. long, funnel-shaped with round lobes. Petals calyptate. Fruit oblong, 4 in. long narrowed slightly both ends, white. *Hab.* Lowland woods. Johor, Kota Tinggi. Malacca, (Maingay). Selangor, Ulu Selangor (Kunstler); Weld’s Hill, Kwala Lumpur (Foxworthy). Perak, Goping (Kunstler); Chanderiang (Kunstler); Ipoh (Curtis). Kelantan, Kota Bharu (a large shrub). *Distrib.* Burma. *Native name:* Kelat Putih.

(89) **E. punctulata** King, l.c. 122.

Tree 30 to 50 ft. tall. Branches red flaky. Leaves coriaceous obovate or oblongate, rounded, base narrowed, 1-5 to 3 in. long, 1 to 1-75 in. wide; nerves very faint beneath, invisible above; petioles 2 to 2-5 in. long. Panicles lax, terminal; branches numerous 4-angled, 6 in. or more long. Flowers numerous, small, white. Calyx campanulate, 1 in. long, obscurely toothed. Fruit ovoid, white, pulpy, 4 in. through. Singapore (Wallich), (*Syzygium punctatum*); Sungei Morai; Kranji. Malacca, Sungei Hudang; Bukit Sadanen (Derry). Pahang, Baloh, Kwantan (Foxworthy). Perak, Larut (Kunstler); Blanda Mabok (Wray). *Native names:* Kelat Penaga; Kelat Kobo; Jambu Chili; Jiwat padi; Kelat Pasir.

(90) **E. acuminatissima** Kurz, Journ. As. Soc. Beng. xlvi. (2), 67; Duthie, l.c. ii. 483; King, l.c. 126.

Big tree about 80 ft. tall. Leaves thin coriaceous, elliptic lanceolate long acuminate base short narrowed, drying pale, 3-5 to 4 in. long, 1-5 in. wide; nerves 15 to 20 pairs, slender but distinct beneath, inarching some way from the margin and from the intramarginal vein. Panicles terminal lax 2 in. long, 3 in. across or less; branches few, spreading. Flowers crowded at the ends under 1 in. long, white. Calyx cup-shaped small with a longer pseudo-stalk, 0-6 in. long, truncate. Petals calyptate, but often separating. Stamens very short, much shorter than petals. Fruit globose, 1 in. through, blackish purple with pink pulp. *Hab.* Forests common. Singapore, Garden Jungle; Changi. Malacca, Sungei Siput and Ayer Panas (Derry). Perak, Goping (Kunstler); Batu Gajah. Penang, Penara Bukit (Curtis). *Distrib.* Burma, Sumatra. *Native name:* Kelat Asam.


Branchlets dark brown. Leaves thinly coriaceous, elliptic to oblong abruptly acuminate, base very shortly cuneate; nerves
very fine and parallel, numerous, intramarginal close to the edge, 6 in. long, 2.75 in. wide; petioles 2 in. long. Cymes terminal and in upper axils; branches angled, spreading, few and short, 1.5 in. long and as wide. Flowers few, small. Calyx goblet-shaped, entire, 1 in. long. Petals calyptrate, very small. Stamens white, 1 in. long, fairly numerous. Hab. Pahang, Gunong Senyum (Evans).

(92) E. pallidula Ridl.
Tree. Branches slender, whitish. Leaves thinly coriaceous, elliptic shortly abruptly blunt-acuminate, base long-narrowed, drying pale greenish, midrib prominent beneath, channelled above; nerves faint 12 pairs, parallel and inarching into a continuous nerve along the edge, reticulations very faint, 2.5 in. long, 1.5 in. wide; petioles 2 in. long. Cyme-panicles lax terminal ones 3 in. long, 2 terminal and 1 in upper axil; branches 5 in. long with few small flowers in cymes of 3; pedicels slender, 1 in. long. Calyx cup-shaped, narrowed at base, 1 in. long and wide; lobes very small, rounded, caducous. Petals calyptrate. Stamens numerous, but short. Pahang, Rembau, Temerloh (Foxworthy). Native name: Kelat putih.

(93) E. verecunda Duthie, l.c. ii. 496; King, l.c. 125.
Small or large tree. Branches pale. Leaves thinly coriaceous, lanceolate or elliptic long acuminate, base long narrowed; nerves and reticulations very fine and close numerous inconspicuous, intramarginal close to edge, very fine, 2 to 3 in. long, 1 to 1.25 in. wide; petioles 2 in. long. Panicles terminal and in upper axil, 1.5 to 2 in. long, wide spreading; branches numerous, slender. Flowers 0.5 in. long or less, white. Buds club-shaped. Calyx wide, cup-shaped, 0.5 in. across with a distinct pseudo-stalk. Corolla small calyptrate. Stamens very short. Fruit globose, 1 in. through. Hab. Hill woods to 2000 ft. altitude. Penang Hill (Phillips, Wallich). Penara Bukit; Hill 2000 ft. altitude.

var. major Ridl.
Leaves elliptic broad, acuminate, base shortly cuneate, more coriaceous, 3.5 in. long, 1.75 in. wide; petioles 5 in. long. Apparently a lowland form. Singapore, Pulau Ubin. Dindings, Pangkor (Scortechini).

(94) E. scoparia Wall. Cat. 3594; King, l.c. 125.
Small tree. Branches slender. Leaves coriaceous oblanceolate to obovate, tip sub-acute, base cuneate; nerves invisible, black-dotted beneath, minutely pitted above, 1.25 to 2.25 in. long, 0.6 to 1 in. wide. Panicles terminal and from upper axils, 1.5 to 2 in. long; branches slender few, 4-angled ending in cymes of 2 to 3 flowers. Calyx very short cup-shaped ribbed, 0.5 in. long and little wider, lobes small. Fruit globular 1 in. through. Hab. River-banks, not common. Singapore (Wallich). Johor, Hadji Senawi near Batu Pahat (Ridley).
(95) E. oblata Roxb. Hort. Beng. 37; King, l.c. 114. E. laevicaulis Duthie, l.c. ii. 492.

Tree 40 to 50 ft. tall. Leaves elliptic acuminate, base shortly cuneate; nerves as in inophylla, 3·5 to 5 in. long, 1 to 2·5 in. wide; petioles ·5 in. long. Panicle 1·5 in. long, terminal and axillary. Calyx funnel-shaped, narrowed to base and with distinct rounded lobes ·2 in. long. Petals calyptrate. Fruit depressed globose ·5 in. through when dry. Hab. Forests. Johor, Pengerang (Cantley); Sungei Tebrau. Malacca, Merlimau (Cantley). Pahang, Pekan; Rumpin River mouth (Evans). Perak (Scortechini). Penang, Batu Feringhi; Balik Pulau. Province Wellesley, Kubang Ulu (Curtis); Nibong Tebal. Distrib. Assam to Tenasserim and Yunnan.

This is hardly distinct from E. inophylla except in the shorter panicles and shape of calyx and larger flowers.

(96) E. Curtisii King, l.c. 129.

A tree 60 to 80 ft. tall, 10 to 15 in. through. Leaves coriaceous, oblong-lanceolate short, blunt, acuminate (grey when dry) pustulate beneath; nerves very fine, numerous faint joining the intramarginal, which is ·1 in. or more from the edge, 3 to 5·5 in. long, 1 to 2 in. wide; petioles ·15 to ·2 in. long. Panicles terminal, sessile; branches rather thick with red flaky bark, scurfy 4-angled, 3 in. long and as wide. Flowers numerous, white, densely crowded. Calyx campanulate, narrowed to the base, pseudo-stalk minute or 0, ·1 in. long and wide, lobes 5, very small. Petals 5, free, orbicular. Stamens numerous short. Hab. Open jungle, low ground, Pahang, Bentong (Foxworthy). Perak, Goping (Kunstler); Tapah (Wray).

var. minor King is a form or state with narrower lanceolate leaves. It was found in Malacca by Hervey and at Tapah by Wray.

(97) E. linocieroidea King, l.c. 118.

Tree 40 to 50 ft. tall. Stem 10 to 20 in. through; branches rather slender. Leaves thinly coriaceous, lanceolate caudate, base acuminate; nerves very fine, numerous inconspicuous, intramarginal close to edge, 2 to 3 in. long, ·6 to ·1 in. wide; petioles ·1 in. long. Panicles terminal, corymbose, many-flowered, 2 to 3 in. long, 2 in. or more wide; branches many-angled. Flowers ·4 in. long, sessile, white; buds club-shaped. Calyx ·3 in. long, gradually narrowed to a ribbed pseudo-stalk, lobes round 4. Petals free. Fruit oblong vertically ridged, apex crowned by calyx-tube enlarged, and 4 inflexed teeth, ·35 in. long, pale red. Hab. Forests, Perak, Relau Tujor (Wray); Batang Padang (Kunstler).


Tree. Leaves stiffly coriaceous lanceolate acute or cuspidate, base rounded, beneath black-dotted; nerves very numerous, fine above, very inconspicuous beneath; midrib strongly elevate, 2·5 to 4 in. long, 1 to 1·5 in. wide; petioles ·2 in. long. Panicles
terminal, 2·5 to 3 in. long, peduncled; branches terete, branchlets ending in a cluster of 3 to 5 sessile flowers. Bracts caducous. Calyx urn-shaped, ·1 in. long; lobes small ovate. Corolla calyptrate. Stamens very short. Hab. Rare in mountain forests. Pahang, Wray’s Camp, Gunong Tahan at 3500 ft. altitude (Ridley).

(99) **E. myrtifolia** Roxb. Hort. Beng. 37; King, l.c. 118.

Small bushy tree about 15 to 20 ft. tall. Leaves thinly coriaceous lanceolate to ovate acuminate, base acute; nerves close, numerous fine hardly distinct, 1·5 to 2·5 in. long, 75 to 1·35 in. wide; petioles ·15 to ·2 in. long. Panicles mostly terminal, 75 to 3 in. long, spreading when large, lax corymbose. Flowers ·3 in. long, white. Fruit pea-shaped, blue black. Hab. Usually near the sea. Singapore, Tanglin; Sungei Morai; Changi. Johor, Kota Tinggi; Batu Pahat. Perak, Thaiping (Kunstler). Distrib. India.

(100) **E. inophylla** Roxb. Hort. Beng. 37; King, l.c. 114.

A tree 30 to 50 ft. tall, 8 to 12 in. through. Leaves coriaceous, elliptic-cuspidate, base cuneate; nerves very numerous, fine faint, parallel; 3 to 5 in. long, 1·25 to 2·25 in. wide; petioles ·2 to ·4 in. long. Panicles terminal and in upper axils large 4·5 in. long, 6 in. wide, corymbose, peduncles 2·5 in. long. Flowers cream-colour ·4 in. long. Calyx campanulate, shortly narrowed to a rather slender pseudo-stalk, truncate. Petals calyptrate. Stamens ·2 in. long. Fruit large, pear-shaped. Hab. Forests Pahang, Pekan; Perak, Goping and Larut (Kunstler). Province Wellesley, Kubang Ulu (Curtis). Penang, top of West Hill. Setul, Bukit Rajah Wang. Lankawi (Curtis).

var. **Bernardi** Ridl. E. Bernardi King, l.c. 115.


(101) **E. laxiuscula** Ridl. Journ. F.M.S. Mus. x. 133.

Bark of twigs red. Leaves narrow oblong-lanceolate acuminate, base cuneate, 6 in. long, 2 in. wide; nerves sub-parallel, very numerous, fine. Panicles wide, spreading, 6 in. long, 4 in. wide, lax. Calyx goblet-shaped with a distinct pseudo-stalk ·2 in. long; lobes short oblong, rounded. Corolla calyptrate. Stamens very numerous, ·4 in. long. Hab. Penang; Pulau Betong (Curtis 975).

This is somewhat like **E. laxiflora** Bl. of Java, but the calyx is much longer.

(102) **E. Prainiana** King, l.c. 116.

Tree 60 to 80 ft. tall, 2 to 3 ft. through. Leaves thick coriaceous elliptic cuspidate or acute, base narrowed; nerves very numerous and fine, visible above, hardly so beneath, 4 to 4·5 in. long, 1·75 to 2 in. across; petioles ·4 in. long. Panicle dense,
sessile, corymbose, 1·75 in. long, 3 in. across. Flowers white; branches thick, angled. Calyx 4 in. long, funnel-shaped, narrowed to base gradually; lobes rounded, short. Petals calyptrate. Fruit globular, ovoid, 75 to 1 in. long, 75 in. through crowned by the calyx-tube, 5-toothed and tubular, 25 in. long. Hab. Local in forests. Perak, Larut (Kunstler); Blanda Mabok (Wray).

var. Pearsoniana Ridl. E. Pearsoniana King, l.c.

Branchlets white. Calyx-tube truncate with no lobes. Perak, same locality (Kunstler).

(t03) E. nigricans King, l.c. 114.

Large tree. Leaves stiffly coriaceous, oblong cuspidate, base shortly narrowed; nerves and reticulations very numerous and fine on the upper surface, nerves less and reticulations not visible on back, 2·5 to 4 in. long, 1·4 to 2 in. wide; petioles 3 to 4 in. long, thick, wrinkled. Panicles terminal and axillary; branches few, about 3, each 1 in. long with flowers in threes on apices. Flowers white, 3 in. long, sessile. Calyx 15 in. long campanulate, pseudo-stalk short, truncate. Hab. Perak; Waterfall Hill (Wray) at 1000 ft. altitude.

(t04) E. inasensis King, l.c. 120.

Small tree. Bark pale. Leaves coriaceous, broad elliptic or obovate, long-tapered to base, tip blunt acuminate, edges recurved; nerves inconspicuous, 2·5 to 4 in. long, 1·25 to 2·25 in. wide; petioles 2 to 4 in. long. Panicles short, 1 or more terminal and upper-axillary peduncled. Flowers in threes, white, 3 to 4 in. across. Calyx campanulate, no pseudo-stalk; lobes 5, small. Hab. Mountains, Perak, Gunong Inas (Wray).

(t05) E. crenulata Duthie, l.c. ii. 490.

Tree. Leaves thickly coriaceous, elliptic round, base narrowed, cuneate, tip shortly apiculate, edge crenulate; nerves and reticulations very numerous, intramarginal straight close to edge, 5 in. long, 3·25 in. wide; petioles 5 in. long. Panicles terminal 4 in. long; peduncle 1·5 in. long; branches about 5, with branchlets bearing rather numerous small flowers. Calyx 2 in. long, campanulate, truncate, pseudo-stalk for half the length. Petals calyptrate. Hab. Forests, rare. Singapore, Selitar (Ridley). Malacca (Maingay).

The only species with crenulate leaves.


Small tree 20 ft. tall. Bark white. Leaves very coriaceous, thick, elliptic blunt; nerves very many, slender parallel, 3 to 4 in. long, 2 in. wide; petioles 5 in. long thick. Panicles terminal, dense 2 in. long with a few angled branches. Flowers yellowish white tinted pink, sessile, hardly 25 in. long. Calyx obconic, angled; lobes triangular, acute. Petals small orbicular. Fruit 1- to 2-seeded, globose with persistent calyx-tube at top, 75 in.
long. Hab. On rocky slopes of high mountains, Pahang, Gunong Tahan 5000 to 6000 ft. altitude (Ridley).


Shrub about 5 ft. tall. Leaves stiffly coriaceous obovate obtuse rounded or shortly acute, base narrowed; nerves 5 to 7 pairs, very slender and conspicuous beneath, 3.5 in. long, 2.5 in. wide; petioles ·25 in. long. Cymes compound in upper axils 2 to 3 in. long, many-flowered. Pedicels short, angled. Flowers white. Calyx obconic ·12 in. long; lobes ovate. Fruit oblong globose, 6 in. through. Hab. Local on high rocky mountains. Pahang, Gunong Tahan at 7186 ft. altitude (Ridley).

(108) E. subdecussata Duthie, l.c. ii. 491; King, l.c. 121.

Tree or bush 4 to 80 ft. tall. Leaves stiff coriaceous elliptic blunt, base round, shining green; nerves numerous, slender hardly elevate beneath, 3 to 5 in. long, 1.35 to 3 in. wide; petioles short or absent. Panicles terminal usually 3 in. long, sometimes longer; branchlets angled thick. Flowers ·35 in. long, white. Calyx funnel-shaped, teeth 5. Petals calyptrate. Fruit globular, ·5 or ·6 in. through. Hab. Woods and open places, from sea level to about 3000 ft. altitude common. Singapore, Tanglin; Changi. Johor, Biawak (Curtis); Scudai River. Pahang, Kwala Tenok; K'luang Terbang (Barnes). Malacca, Ayer Panas; Sungei Hudang. Perak Batang Padang; Ulu Bubong and Thaiping (Kunstler). Penang, Hill (Maingay).

var. montana King, l.c.

Small tree 6 to 8 ft. tall. Leaves 1 to 2 in. long, ·5 to 1 in. wide; a reduced form on mountains, Selangor, Ulu Semangkok. Perak, Gunong Batu Putih 4500 ft. altitude (Wray). Kedah Peak.

var. colorata King. E. colorata, Duthie, l.c. ii. 492.

Leaves lanceolate drying red, not black. Flower-buds larger. Malacca (Maingay). Native names: Kelat Belian; Kelat Kobu; Kelat Asam; Samak Pulut.


Shrub. Leaves stiffly coriaceous sessile or shortly petioled, obovate, tip rounded, base narrowed and blunt; nerves numerous, very slender and inconspicuous, drying green, 2.5 to 4.5 in. long, 1.5 in. wide. Panicle terminal, 2 in. long; branches thick. Flowers ·25 in. long, white, tipped with pink. Calyx campanulate, edge undulate, entire. Petals 4, rounded. Stamens short on a large annular disc, greenish. Hab. High rocky mountains, Pahang, Gunong Tahan at 5000 ft. altitude (Ridley).


Tree. Branches slender. Leaves lanceolate elongate long acuminate, very coriaceous punctate above; nerves faint, 8 pairs with intramarginal close to edge, 1 to 1.5 in. long, ·12 to ·24 in. wide; petioles ·12 in. long. Racemes axillary and terminal, few-flowered; peduncle ·12 in. long. Calyx campanulate, tessel-
late verrucose; lobes 5, ovate round. Hab. Rare; high mountains Pahang, K’luang Terbang (Barnes).

(iii) **E. rhomboidea** Ridl. Journ. F.M.S. Mus. v. 33.

Shrub. Leaves stiffly coriaceous, obovate acuminate, lanceolate or rhomboid blunt, base narrowed; nerves almost completely invisible, numerous parallel, underside punctate; 1·5 in. long, 6 to 7 in. wide; petioles 1 to 2 in. long. Panicles about 1 in. long; branches 4; peduncles thick, 4-angled. Calyx-tube 5 in. long, 2 in. wide at mouth, gradually narrowed to a thick pseudo-stalk. Petals calyptrate, orbicular. Stamens 1 in. long. *Hab.* Mountains at 5000 ft. altitude; rare. Selangor, Gunong Mengkuang Lebah (Robinson).

(iii) **E. Stapfiana** King, l.c. ii9.

A branching low bush. Leaves oblong to obovate or lanceolate obtuse, narrowed slightly at base, short, stiff coriaceous, pale beneath, above pitted, 5 to 1 in. long, 4 to 8 in. wide; petioles 0·5 in. long. Panicles terminal dense, 5 in. long, many-flowered; branches very short winged. Flowers 3 in. long. Calyx narrow, campanulate, dilate in the middle, papillose; lobes 4 or 5, acute. Petals orbicular, free. Stamens 15 in. long. Fruit sub-globular, 3 in. long. *Hab.* Mountains above 4000 to 7000 ft. altitudes. Selangor, Hulu Semangkok; Gunong Ulu Kali (Robinson). Perak, Gunong Kerbau (Robinson); Gunong Berumbun Pahang (Wray); Gunong Batu Putih (Wray).


Shrub with thick branches. Leaves crowded at the ends, obovate blunt rounded, coriaceous, 1·25 in. long, 1 in. wide; nerves 9 pairs, secondary nerves and reticulations elevate both sides; petioles 12 in. long. Flowers few in terminal cymes, 1 in. long; pedicels short and thick. Calyx clove-shaped, narrowed to base, lobes orbicular, half as long as tube, 12 in. long. Petals larger orbicular white. Stamens 25 in. long. *Hab.* Mountains, Selangor, Ulu Semangkok (Dennys). *Native name*: Kelat Bukit.

(iii) **E. spissifolia** Ridl. Journ. F.M.S. Mus. v. 32.

Shrub. Leaves stiffly coriaceous, sessile, elliptic or orbicular cordate, edge thickened; nerves 10 pairs, faint, 1·75 in. long, 1·6 to 1·7 in. wide. Panicles terminal 1·5 in. long, 2 in. wide; branches stout, 4-angled. Peduncles and pedicels thick. Calyx clubbed, 3 in. long, thick, very gradually narrowed to base; lobes 4 ovate. Petals very small, white, orbicular, free. Stamens hardly longer. *Hab.* Mountains at 5000 ft. altitude. Rare. Selangor, Gunong Mengkuang Lebah (Robinson).

(iii) **E. Wrayi** King, l.c. ii9.

Small tree. Leaves thick coriaceous, broad elliptic or round, blunt, base rounded; nerves and reticulations very numerous, faint, 75 to 1·35 in. long, 65 to 1·15 in. wide; petioles 1 in. long or less. Panicles very dense forming a small head, about 1 in.


Shrub with angled branchlets. Leaves ovate-cordate blunt, imbricating, stiff coriaceous; nerves very faint, 8 pairs, 1 in. long, 6 in. wide; petioles 0.5 in. long. Flowers in dense heads, terminal, hardly appearing above leaves. Calyx ribbed, 18 in. long, not pustular, gradually dilate from base; lobes round, 5, persistent. Petals calyptrate, white. Stamens rather short; style rather stout. Hab. On mountain slopes at 5500 ft. altitude. Pahang, Gunong Tahan across the Teku River (Ridley).

(ii7) **E. Jambolana** Lam. Dict. 3, p. 198; King, l.c. 131.

Tree about 30 ft. tall. Leaves coriaceous, elliptic-lanceolate to ovate blunt acuminate, base cuneate; nerves very fine close parallel numerous, beneath dotted, 2.5 to 5 in. long, 1.5 to 2.5 in. wide; petioles 6 to 75 in. long. Panicles below leaves, 1.5 to 3 in. long and as wide. Flowers white, 3 in. across, sessile. Calyx campanulate suddenly pseudo-stalked, 1 in. long, truncate. Petals falling off in a cap. Fruit ovoid, oblong, 1 in. long, pulpy, deep purple. Seed 1. Hab. Occasionally planted here and there. Native of India. Singapore, Holland Road. Malacca and Penang, Government Hill (Curtis). Native names: Jambelan; Jiwat; Salam. Use: Fruit eaten.

(ii8) **E. operculata** Roxb. Hort. Beng. 37; Wight, Ic. I. 552; King, l.c. 129.

Tree 30 to 50 ft. tall. Leaves thinly coriaceous ovate-oblong to elliptic-acuminate, base cuneate; nerves 8 to 12 pairs, leaf beneath dotted, 4 to 6 in. long, 1.6 to 2.2 in. wide; petioles 2 to 3 in. long. Panicles below leaves, 2 to 3 in. long, lax spreading; branches trichotomous 4-angled. Flowers greenish, sessile, 1 in. across. Calyx campanulate, base narrowed, smooth, mouth truncate, no lobes. Petals free. Fruit small, pea-shaped, purple, 1-seeded. Hab. Rather scarce in forests. Perak, Matang (Wray). The var. coriacea of King with slightly more coriaceous leaves, Penang, Penara Bukit (Curtis). Distrib. India.

(ii9) **E. balsamea** Wight, Ill. ii. 16; Duthie, l.c. ii. 499.

Tree 40 to 50 ft. tall. Leaves rather thin, oblong-lanceolate, shortly blunt cuspidate long-narrowed to base, densely punctate on the lower surface which is shining coppery; nerves 13 pairs, fine, inarching with marginal nerve, 4.5 in. long, 1.5 in. wide; petioles 25 in. long, slender. Cyme-panicles below the leaves, 1 in. long and wide. Flowers very small, 0.05 in. long. Bracts
;

Eugenia.]

lviii.

myrtace^.

755

minute, acute. Calyx-tube funnel-shaped with 4 very short lobes.
Hub. Lankawi, Kesap (Haniff). Disirib. India, Burma.
This -species is very common in India, and variable, and I believe the
plant described above is a variety of it, but the flowers are only in young
bud. They show distinct traces of lobes in the calyx which I do not see in
E. balsamea type.

E. setosa King, I.e. 120.
shrub or creeper 40 to 60 ft. long. Branches covered with
short black bristles.
Leaves oblong-lanceolate long-cuspidate,
glabrous except base of midrib below, base round, 1-35 to 275 in.
long, -4 to -85 in. wide
petioles very short.
Panicles hairy,
axillary and terminal, 2 in. long and wide.
Flowers small, glabrous
•4 in. long, greenish yellow.
Fruit turbinate, glandular -35 in.
long and wide. Hab. Chmbing on trees, forests.
Perak, Larut
(120)

A

;

(Kunstler).

Excluded Species
SWETTENHAMIANA King, l.C. I26.
The specimens so named by King in the Kew Herbarium, and
E.

quoted as types in the original description, are of two ver}'
distinct plants, one E. cordifoUaia Ridl., the other, a totally
different plant collected by Scortechini, does not appear to be
a myrtaceous plant at all.
The description
from the two specimens.

is

a combination

of characters

9.

Small
flowered.

Stamens

PSEUDO-EUGENIA,

Panicles small, axillary, fewCalyx turbinate 4-lobed. Petals 4, orbicular, clawed.

two rows on an annular

8, in

Species

I- to 2-seeded.

Leaves 4 to 5

in. long,

branched,
(i)
I.e.

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'6 in.

in. long-.

Ovary

disc.

wide; flowers 3 to 4 on
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wide;
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(i)

P. perakiana

(2)

P. singaporensis

panicles peduncled,
.

.

.

•

P. perakiana Scortechini, Journ. Bot. 1885,

133.

Drupe

2-celled.

Malayan.

2,

in. long, i in.

short peduncles

Leaves 2

Scort.

Leaves opposite.

trees.

Eugenia skiophila Duthie,

I.e.

ii.

p.

153

;

King,

486.

Tree 15 (to 40 ft. fide Scortechini) ft. tall. Leaves thinly coriaceous elliptic-lanceolate, base narrower, apex caudate-acuminate
nerves very fine and close, 4 to 6 in. long, 1-5 to 2 in. wide petioles
•I in. long.
Flowers 3 to 4 on a short -05 in. long axillary peduncle,
;

white.
Calyx -i in. long. Drupe -25 in. long, oblong, globose,
Perak, source of Larut River
bright red. Hcib. In thick forests.

Penang, Richmond Pool; Telok Bahang (Curtis).
Sumatra.
P. singaporensis King, I.e. 133. Myrtus caudata Wall.

(Scortechini).
Distrib.
(2)

Cat. 3631.

Tree 30 to 40

ft.

tall

with slender branches.

Leaves thin

cori-


aceous, elliptic-lanceolate bluntly caudate (drying black) 2 in. long (tail •5 in.), •6 in. wide; petioles •1 in. long, slender. Peduncles •5 in. long with 3 or 4 short branches, each bearing 3 minute greenish white flowers •02 in. long. Hab. Woods; not rare in the south. Singapore, Bukit Timah. Johor, Bukit Banang. Selangor, Sungeni Buluh (Foxworthy). Perak (Scortechini); Tapah.

10. BARRINGTONIA, Forst.

Trees or shrubs, generally growing in tidal mud or sand, close to the sea. Leaves alternate, crowded at the branch ends, entire or crenate. Flowers in long terminal and lateral pendulous racemes or spikes, large or small, pink or white. Calyx-tube turbinate, closed in bud and splitting into 2 or 3 lobes (§ Butonica) or 3 to 5 imbricate lobes (§ Stravadium). Petals 4 or 5, falling off very quickly. Stamens numerous, long, connate at the base, white or pink. Ovary 2- to 4-celled with an annular disc; style filiform. Fruit large, fibrous or somewhat pulpy, 4-angled, or rounded, oblong, 1-seeded. Species 25, Africa, Asia, Polynesia. Malay name for genus, Putat.

i. Butonica. Calyx splitting into 2 to 3 lobes. Racemes short, erect; flowers 3 in. wide; fruit 4-angled, very large

(1) B. speciosa

Racemes sub-erect; flowers under 1 in. wide; fruit with 8 wings at base.

(2) B. conoidea

Racemes pendulous, long; fruit ovoid

(3) B. racemosa

ii. Stravadium. Calyx 4-(or 3- or 5-)lobed.

Raceme terminal, erect

(4) B. pauciflora

Racemes lateral, pendulous, long; flowers many. Flowers over 5 in. wide, white.

(5) B. Scortechinii

Petioles short, thick; leaves broad, elliptic-oblong, 6 by 2 in.

(6) B. macrostachya

Petioles long, slender; leaves long, lanceolate; fruit ovoid, smooth.

Leaves rather thin; nerves prominent sunk above

(7) B. sumatrana

Leaves stiff, coriaceous; nerves inconspicuous; fruit ovoid, 4-angled.

(8) B. musiformis

Fruit 1•75 in. long by •65 in. through; shrub

(9) B. fusiformis

Flowers small •25 in. wide, pink.

(10) B. pedicellata

Flowers pedicelled; fruit fusiform; leaves with blunt cordate base

(11) B. spicata

Flowers long-pedicelled; leaves thin, narrowed to base

(1) B. speciosa Forst. Char. Gen. t. 38 & t. 38A B; King, l.c. 135.

Tree with stout stem, 30 to 50 ft. tall. Branches thick. Leaves thinly coriaceous, obovate, tip rounded, base much narrowed,
sessile, 6 to 14 in. long, 3·5 to 7 in. wide. Panicles 4 to 8 in. long, erect. Flowers 6 to 12, 2 in. long, 5 in. across, pedicelled. Calyx 2-lobed. Petals 4, white, 2·5 in. across. Stamens very numerous and long. Fruit 3 to 5 in. long, fibrous, 4-angled, base broad, 4 in. or more through, narrowed to tip; pericarp very thick, spongy. Hab. Seashores in sandy places not very common. Singapore, Kampong Glam; Kranji. Dindings, Pangkor (Scortechini). Pulau Jarak (Foxworthy). Penang (Curtis). Kedah, Pulau Song-Song (Curtis). Adang Group, Pulau Rawei. Distrib. Indo-Malaya, Polynesia.

(2) B. conoidea Griff. Notulae, Ic. 635, 636, fig. 1; King, l.c. 136.
Large erect branched shrub about 12 to 15 ft. tall, thick-branched. Leaves thickly membranous, oblong-lanceolate, base narrowed, sub-cordate, edges often crenulate; nerves 9 to 13 pairs, 4·5 to 10 in. long, 2 to 4 in. wide; petioles ·2 in. long. Racemes sub-erect about 4 in. long, few-flowered. Flowers an inch long and as wide; pedicels ·5 in. long. Calyx-tube sub-cylindric with 8 processes at base, limb bilobed. Petals 4, fleshy, white. Stamens white. Fruit green, conoid, the base with 8 fleshy semi-cordate wing-like processes, 2·5 in. long, 1·75 in. wide at base. Hab. In tidal mud by rivers and mangrove swamps. Singapore, Kranji; Chan Chu Kang. Malacca River (Griffith). Perak (Scortechini). Distrib. Borneo, Burma.

(3) B. racemosa Roxb. Hort. Beng. 52; King, l.c. 136.

(4) B. pauciflora King, l.c. 137.
Tree 30 to 40 ft. tall. Leaves thickly membranous, broad oblongate, narrowed to petiole, abruptly caudate-acuminate, 3 to 4·5 in. long, 1·25 to 2 in. wide; petioles ·4 to ·8 in. long. Raceme terminal, 1·5 to 2 in. long, with 1 to 3 flowers about 1·75 in. long, white and pink. Calyx-tube funnel-shaped, 4-angled, red mealy; lobes 4, ovate round blunt. Petals 4, ovate, oblong 1 in. long. Hab. Rare. Open jungle at 1500 to 2000 ft. altitude. Perak, Larut (Kunstler).

(5) B. Scortechinii King, l.c. 138.
Tree 50 to 60 ft. tall. Leaves thin coriaceous elliptic-oblong,
tapering to petiole, apex acute, margins dentate; nerves prominent beneath, 6 to 7 pairs, 3 to 6-5 in. long, 1-5 to 2-5 in. wide; petioles 1-5 to 1-8 in. long. Spikes pendulous 18 in. long, thick. Flowers white 2 in. long, sessile. Calyx obconic, 4-angled; lobes short, broad 4; filaments 2 in. long. Fruit oblong, truncate, 3 in. long, 1 in. through. *Hab.* Low country. Sungei Ujong, Gunong Berum-bun (Cantley). Selangor, base of Bukit Kuit; Ginting Bidai; Sungei Buluh (Foxworthy). Perak, Thaiiping (Wray, Kunstler). Province Wellesley, Krian. Penang Hill (Curtis). *Native name*: Putat Gajah. *Use*: Fruit used as a Sambal (Wray).


Large shrub or small tree. Leaves thinly coriaceous, oblong-oblancoleate narrowed to the slender petiole, abruptly acuminate, edge crenate; nerves 14 to 18 pairs, depressed above, prominent beneath, 5 to 12 in. long, 2 to 5 in. wide; petioles 1 to 4-5 in. long. Spikes axillary below, leaves 1 to 2 ft. long, thickened in fruit. Flowers sessile 2 in. long, 1 in. across. Calyx-tube obconic, 4-angled; lobes 4. Fruit ovoid or elliptic, smooth, 2 in. long. *Hab.* Dry woods. Singapore, Bajau; Malacca, Lubok Kedondong; Bukit Sadanen (Derry). Negri Sembilan, Tampin. Perak, Larut (Kunstler). Kedah, base of Kedah Peak; Alor Sta. Lankawi at Burau. *Distrib.* Borneo. *Native names*: Putat hutang; Putat bukit putih.


Large spreading shrub. Leaves coriaceous, elliptic acuminate, base narrowed, edge nearly entire; nerves very slender about 12 pairs with reticulations conspicuous on both sides, 4-5 to 7-5 in. long, 3 in. wide, petioles 2 in. long or more. Spikes long, pendulous, 15 in. long. Calyx funnel-shaped, 4-angled; lobes half as long. Petals blunt, oblong, 65 in. long. Stamens 75 in. long. Fruit oblong, 4-angled, narrowed to base, 1-75 in. long, 65 in. through. *Hab.* Sandy woods near the sea. Singapore, Toas; Jurong; Pulau Tekong. Johor, Castlewood; Kwasala Sembong (Kelsall); Pulau Dayong (Feilding). Pahang, Pulau Tawar. Penang Hill. *Distrib.* Sumatra, Celebes. *Native names*: Putat Darat; Putat Gajah.

(8) *B. musiformis* King, l.c. 139.

Large tree 60 to 80 ft. tall, 2 to 3 ft. through. Leaves coriaceous, oblong-lanceolate sub-entire; nerves 8 to 12 pairs, slender elevate beneath, reticulations visible, 5 to 10 in. long, 1-75 to 3-25 in. wide; petioles 75 to 2-25 in. long. Spikes axillary, sub-erect, 12 to 14 in. long, thick. Calyx campanulate, 1-25 in. across, pubescent; tube 1-2 in. long; lobes larger, ovate 4. Petals round. Stamens white tipped pink. Fruit oblong 4-angled, sub-truncate, 4 to 5 in. long, 1 to 1-5 in. through. *Hab.* Forests inland. Perak, Goping and Chanderiang (Kunstler).
(9) **B. fusiformis** King, *l.c.* 140.
Small tree 10 to 20 ft. tall, 3 to 5 in. through. Leaves membranous, oblanceolate, narrowed to the broad, cordate base, tip subacute, sessile serrate; nerves 12 to 16, 4 to 8 in. long, 1 1/4 to 2 1/4 in. wide. Racemes pendulous, long, slender, 1 to 2 ft. long. Flowers 1/4 in. across, deep crimson on pedicels 1 in. long. Fruit fusiform tapering to each end, 4-angled, 2 1/2 in. long, 1/2 in. through. *Hab.* Dense bamboo forest and thin woods. Pahang, Tahan River. Selangor, Batu Caves. Perak, Ulu Bubong (Kunstler). Kelantan. *Native name*: Putat Padi.

Leaves thin membranous, broadly lanceolate-acuminate, narrowed to the base; nerves 10 pairs, edge denticulate, 6 in. long, 2 in. wide; petioles 1/2 in. long. Racemes terminal, very slender 12 in. long. Flowers distant; pedicels 1/4 in. long, slender. Bracts 1 in. long, oblong blunt. Calyx-tube campanulate, lobes ovate, blunt. Corolla 5 in. across. Stamens long; style 1/4 in. long. *Hab.* Pahang, Labong, Endau (Evans). This has the foliage of *B. spicata*, but the flowers long-pedicelled.

(11) **B. spicata** Bl. *Bijdr.* 1907; *King, l.c.* 141.
Usually a shrub about 4 to 5 ft. or more tall. Leaves oblong-ob lanceolate, narrowed to the petiole, sub-acute, serrate; nerves 8 to 10 pairs, 4 to 8 in. long, 1 1/4 to 2 1/4 in. wide; petioles 1/2 to 3 in. long. Spikes long, slender, pendulous, 12 in. long or more. Flowers remote 1/2 in. across, rose pink, nearly or quite sessile. Calyx pubescent, teeth 4. Fruit sub-globose, 1/2 in. through. *Hab.* River-banks. Johor, Kawa Sembrong (Kelsall). Pahang, Pekan; Sungai Chenei (Foxworthy). Malacca, Alor Gajah; Malaka Pindah; Merlimau (Derry); Dindings. Perak, Kawa Temengoh; Goping (Kunstler). Province Wellesley, Permatang Bertam. Kelantan, Chaning. Kedah, Gunong Geriang River. Setul. *Distrib.* S. Siam, Borneo, Java. *Native name*: Juri-Juri.

I have not seen anything here exactly like the Indian *B. acutangula* Gaertn., which has distinctly pedicelled flowers. King includes it in the Materials, *l.c.* 140, with some doubt.

## 11. PLANCHONIA, Bl.

Trees. Leaves alternate or pinnate-nerved. Flowers white or yellowish green in terminal racemes. Calyx-tube turbinate, 4-lobed. Petals 4. Stamens very numerous in several series united at base, inner ones without anthers; filaments filiform. Ovary 3- to 4-celled with an annular disc; style slender. Fruit large, fibrous or fleshy, 1- to 3-celled. Seeds several; testa coriaceous. Species 4, Andamans to Australia.

Leaves obovate, thin serrate . . . . . . . . . . . . . . (1) **P. valida**
Leaves oblong, stiff coriaceous, hardly serrate . . . . . . . . . . . . . . . . . . (2) **P. grandis**
12. CAREYA, Roxb.

Trees or shrubs. Leaves alternate crowded at the branch ends, membranous, crenate. Flowers large, racemted or spicate. Calyx-tube campanulate; lobes 4 Petals 4. Stamens many in several series, connate at base; filaments filiform, inner- and outermost without anthers. Ovary 4- to 5-celled with an annular disc; ovules numerous on axile placentas in 2 rows in a cell. Fruit globose. Seeds numerous in pulp. Species 3, India.

(1) C. arborea Roxb. Cor. Pl. iii. 14, t. 218; Clarke, in Hook. fil. F. B. I. ii. 511.

Tree 30 to 60 ft. tall. Leaves obovate 12 in. long, 6 in. wide; petioles 2 to 1 in. long. Spikes 3-flowered, 3 to 8 in. long. Calyx 1 in. long. Petals 1-75 in. long, white; filaments red, 2 in. long. Fruit globose, 2-5 in. long, 2 in. wide. Hab. Open sandy country in the north; Selul. Perlis, Ginting Kabok. Lankawi. Distrib. India, Siam. Native name: Putat Kedang.

ORDER LIX. MELASTOMACEÆ.

Herbs, shrubs, or small trees. Leaves opposite 3- to 5- or 7-nerved from base, except Memecylon. Stipules 0. Flowers pink or white or blue, regular, cymose or panicled, rarely solitary. Calyx inferior adnate to ovary. Petals on margin of calyx-limb. Stamens 4, 8 or 10, all similar, or 4 smaller; anthers opening by 1 or 2 terminal pores, connective often appended at base with bristles, tubercles or a spur. Ovary 4- to 6-celled (1-celled in
Memecylon); style simple, filiform. Fruit a capsule breaking up irregularly or by slits in the tops of the cells, a berry or a drupe (Memecylon). Seed numerous, minute (except Memecylon, one seed).

Species 2700, tropical, a few sub-tropical; whole world. (King, Journ. As. Soc. Beng. lxix. (2), p. 1. The Sonerilas by Stapf, p. 18.)

A. Melastomaceæ. Ovary 3- to 6-celled; anthers opening by 1 rarely 2 pores. Seeds many.

i. Osbeckiae. Seeds curved.
   Stamens 8, similar; fruit capsular . . 1. Osbeckia
   Stamens 10, dissimilar; fruit baccate . . 2. Melastoma

ii. Oxysporaæ. Seeds straight.
   Inflorescence terminal; stamens 8.
   Panicles large, showy; fruit funnel-shaped . . 3. Oxyspora
   Panicles small; flowers small; fruit ellipsoid . . . . 4. Allomorpha
   Cymes of few large flowers; fruit urceolate or obconic . . . . 5. Oritrephes
   Cymes of few large flowers; fruit campanulate, obconic . . . . 6. Perilimnastes
   Inflorescence axillary.
   Stamens 4 . . . . . . 7. Blastus
   Stamens 10 (inflorescence occasionally terminal); fruit dehiscing very irregularly
   Stamens 8.
   Trees or large shrubs; flowers umbelled . . 8. Ochthocharis
   Shrubs. Cymes small, few-flowered . . . . 9. Anericleistus
   Shrublets. Cymes scorpioid, many-flowered . . . . 10. Phaulanthus

   Herbs.
   Petals 3; stamens 3 (in one 6); flowers few in scorpioid cymes . . . . 11. Campimia
   Petals 4; stamens 8; flowers in terminal cluster . . . . 12. Sonerila
   Halfrubbery.
   Petals 4; stamens 8; flowers many umbelled or panicled . . . . 13. Sarcopyramis

iv. Medinilleæ. Fruit baccate; shrubs.
   Stamens 8, unequal, long ones with 2 long bristles at connective base; climbers.
   Cymes lateral . . . . . . 14. Phyllagathis
   Panicles terminal . . . . . . 15. Marumia
   Long stamens with no bristles . . . . 16. Dissochæta
   Stamens unequal 8 to 10; epiphytes.
   Anther-connective with 2 tubercles in front and spur behind . . . . 17. Anplectrum
   Anther-connective bearded behind . . . . 18. Medinilla
   Anther-connective spurred behind, no tubercles . . . . 19. Pogonantha
   Stamens 20 to 25 . . . . . . 20. Pachycentria

B. Miconieæ (American).
   Hairy herb; stamens 8 similar; fruit berry . . 21. Plethiandra
C. Astronieæ. Ovary 4- to 5-celled; seeds many; anthers with slits; trees.
Panicles terminal ........................................23. Astronia
Cymes axillary, rarely panicled.
Flowers blue or white ..................................24. Pterandra

D. Memecyleæ. Trees or shrubs; ovary 1-celled; fruit drupe; stamens 8.
Leaves pinnate-nerved ..................................25. Memecylon

1. OSBECKIA, Linn.

Herbs or shrubs, usually bristly. Leaves sub-coriaceous, often sessile 3- to 7-nerved from base. Flowers terminal solitary, capitate (or panicked) showy, pink, often involucrate. Calyx-tube ovoid or urceolate, scaly or bristly; lobes subulate or lanceolate 4 to 5. Petals obovate, 4 to 5. Stamens 8 to 10, all similar. Fruit capsular opening by 4 or 5 pores. Species 32, Indian, with 2 or 3 Malaya and Australia.

Herbs erect branched. Stamens 4 or 8.
Leaves oblong or linear ..................................(1) O. chinensis
Leaves ovate-oblong ....................................(2) O. cochinchinensis
Shrub with short broad coriaceous leaves; stamens 10.
Calyx covered with whorls of hairs on short pedicels ........................................(3) O. perakensis

(1) O. chinensis Linn. Sp. Pl. 490; Roxb. Fl. Ind. ii. 224; Clarke, in Hook. fil. F.B.I. ii. 515.
Herb, erect branched, wiry, 6 in. to 2 ft. tall. Leaves oblong or linear, narrowed at base, hairy, 1.5 to 2 in. long, 0.2 in. wide. Flowers capitate, 1 in. across, mauve. Bracts ovate. Calyx campanulate, sub-glabrous, teeth lanceolate, ciliate on edge. Stamens 8. Fruit ovoid, glabrous or with a few bristles, 0.2 in. long. Hab. Open country, Setul (Haniff). Distrib. India, Cambodia, Malay islands.

(2) O. cochinchinensis Cogn. Mon. Phan. l.c. 331.

Shrub about 8 ft. tall, branching. Young parts, petioles, upper surface and nerves of leaves beneath covered thickly with short, stiff bristles. Leaves coriaceous elliptic-ovate obtuse, base round, 1.25 in. long, 0.75 in. wide; petioles 0.15 in. long. Flowers 3 to 5 in a head, sessile with a few bracts at base, in fruit pedicelled; pedicel 0.1 in. long. Calyx ovoid, densely covered with simple bristles and whorls of bristles on short stalks; lobes long narrow, acuminate. Petals 1 in. long, obovate, deep rose pink. Stamens 10. Style stout. Capsule covered with bristles as in flower, 0.4 in. long, 0.3 in. through. Hab. Mountains local. Perak, Gunong Hijau on Thaiping Hills (Mrs. Bland; J. W. Anderson).
2. **MELASTOMA,** Linn.

Shrubs scaly or strigose. Leaves oblong or lanceolate. Flowers terminal, solitary or clustered, rose or white, 5-merous. Calyx-tube ovoid campanulate, strigose or hairy, lobes deciduous. Stamens twice as many as petals very dissimilar (except *M. muticum*) longer ones, anthers purple, connective long, produced at base, bilobed, shorter ones alternate, yellow, connective not produced, 2-tubercled in front. Ovary bristly at top. Fruit baccate, pulpy, dehiscing transversely or (rarely) vertically. Seed minute in black, sweet pulp. Species 40, Asia, Australasia.

Stamens of 2 unequal series.

- Stems covered with long black hairs; leaves glabrous.
- Flowers large, white or rose; fruit dehiscing irregularly
- Flowers large white or rose; fruit dehiscing longitudinally
- Stems and leaves densely soft, hairy
- Stems and calyx scaly; leaves hairy beneath; flowers 2 in. across.
- Bracts large, oblong; calyx scaly
- Bracts large oblong; calyx hairy
- Bracts small linear or o.
- Leaves narrow lanceolate 2 in. long; scales short, ovate
- Leaves lanceolate 3 in. long; calyx densely covered with linear acuminate scales
- Leaves ovate or oblong, 4 to 6 in. long
- Leaves and stem hairless; flowers 3 in. across
- Stamens all similar


Large lax shrub about 6 ft. tall. Branchlets and petioles covered with stiff bristles. Leaves lanceolate or ovate-lanceolate, 3- to 5-nerved, glabrous except for a few scattered hairs above, 2·5 to 5 in. long, ·6 to 1·8 in. wide; petioles ·25 to ·5 in. long. Flowers solitary or 2 to 3 together, 2 to 3 in. across. Calyx-tube ·25 to ·5 in. long, densely clothed with long stiff pink hairs; teeth linear acuminate, about half as long as the globose urceolate tube. Petals 1·5 in. long, broadly obovate, pale rose. Stamens shorter. *Hab.* Mountain woods from about 1200 ft. altitude upwards, common. Malacca, Mt. Ophir. Pahang, Tahan River. Perak (Kunstler). Selangor, Ginting Sempah. Penang Hill (Curtis); Telok Bahang (Foxworthy). Kedah Peak. *Distrib.* Burma, Cochin-China.
Shrub 6 ft. tall, thickly sprinkled with long red hairs. Leaves lanceolate-acute, glabrous except some hair on midrib and nerves, 4 in. long, 2 in. wide; petioles 0.5 in. long, hairy. Flowers 2 to 3 terminal, 2 in. across. Bracts ovate cuspidate, 0.12 in. long. Calyx urceolate, 0.75 in. long, densely hairy; teeth 5, short. Petals bright rose colour, obovate. Stamens 10; anthers yellow, connective with two short linear processes, smaller ones one-third as long. Fruit 0.75 in. long dull red, densely hairy, dehiscing vertically on one side. 
*Hab.* On heaths, rare. Perlis, Ginting Kabok, Kanga (Ridley).

Low shrub. Branches (densely) and leaves covered with stiff pale hairs. Leaves elliptic-acuminate rather flaccid; nerves 5, with hairs longer than on the rest of the leaf. Corymb of 4 or 5 flowers, dense. Calyx 0.75 in. long, densely covered with long subulate pale hairs, lobes lanceolate about as half as long. Petals 1 in. long, edges and back with tufts of long hairs. Stamens shorter. 
*Hab.* Dense forest, extremely rare; probably extinct here. Singapore (Wallich 4046). A single plant without flowers was found by me in the forests of Bukit Timah many years ago, but has since disappeared. Johor, Gunong Pantai. *Distrib.* Sumatra, Philippines.

(4) **M. malabathricum** Linn. *Sp. Pl.* 559; *Clarke*, *l.c.* ii. 523; *King*, *l.c.* 6 (in *part*).
Shrub 3 to 8 ft. tall. Branches, petioles and pedicels densely clothed with short acute pale scales. Leaves lanceolate acute, base narrowed, blunt, 3- to 5-nerved, strigose on both sides, 2 to 2.5 in. long, 1 to 1.25 in. wide; petioles 0.2 in. long. Corymbs few-flowered. Bracts large, 0.2 to 0.5 in. long and broad, ovate truncate, backs scaly. Calyx-tube cylindric 0.5 in. long; scales linear-acuminate; lobes ovate acute, shorter than tube. Petals 1 in. long, rosy mauve. Fruit urceolate, globular, 0.25 in. through, dehiscing transversely. 

(5) **M. perakense** Ridl. M. malabathricum *var.* perakense *King*, *l.c.* 7.
Large lax-branched shrub. Branches clothed with linear-acuminate scales. Leaves ovate acuminate, base narrowed, nerves 5, strigose above, velvety hairy beneath, 3.5 to 4.5 in. long, 1 to 3 in. wide; petioles 1 in. long, hairy. Corymbs of 3 to 8 flowers. Bracts broad, oblong, 0.5 in. long, scales on back linear-acuminate. Calyx-tube urceolate, 0.5 in. long, densely covered with hair-like scales,

(6) **M. polyanthum** Bl. *Flora* 1831, p.480. M. appressum *Benth. in Wall Cat*. 4081. M. malabathricum var. polyanthum *Clarke, l.c. ii. 523.*

Shrub 3 to 8 ft. tall. Scales usually shorter than in *M. malabathricum*. Leaves narrow lanceolate acute, narrowed to the base, 2 to 3½ in. long, ½ to 1½ in. wide; petioles 1 in. long. Corymb of 8 to 10 flowers. Bracts minute or none. Calyx cylindric, ½ in. long; scales short ovate acute; lobes 1½ in. long, linear-acute. Petals ½ in. long, rose mauve, rarely white or pink and white. Stamens ½ in. long. Fruit ½ in. through, pink, dehiscing transversely, pulp black. **Hab.** Very common in open country in the south of the peninsula. Singapore, Malacca, Selangor, Perak, Gunong Keledang. Penang (Porter, *Wall Cat*. 4081). Kelantan, Kwa la Aring (Yapp); Kampong Kota (Gimlette). **Distrib.** Java. **Native names:** Sendudok; The Singapore Rhododendron. **Use:** Fruit for thrush in children. A decoction of the branches as an astringent in diarrhoea. Roots as a mouth-wash for toothache.

This chiefly differs from *M. malabathricum* L. in the absence of the large bracts in that species.

var. *angustifolia* Ridl. A variety with very narrow linear acute leaves, was collected on the Tahan River by Seimund.

(7) **M. normale** Don, *Prod. Fl. Nep.* 220; Clarke, *l.c. ii. 524.* *M. malabathricum* var. normale *King, l.c. 7.*

Shrub 12 ft. tall. Branchlets and ribs of leaves covered with lanceolate scales. Leaves lanceolate acute, base shortly narrowed rounded, densely velvety with fine hairs except the nerves beneath 3 in. long, 1 to 1½ in. wide; petioles 1 in. long. Corymb of 4 to 5 flowers. Bracts linear ½ in. long. Calyx urceolate densely covered with linear acuminate narrow, ciliate scales, lobes linear-acuminate, ½ in. long, as long as the tube, hairy on both sides. Petals 1 in. long, dark pink, edges ciliate. Stamens 1½ in. long. **Hab.** Mountains 3000 to 6000 ft. altitude. Perak, Gunong Batu Putih at 6700 ft. altitude (Wray); Gunong Kerbau 6000 ft. altitude (Robinson). **Distrib.** Nepal.

var. *glabrescens.*

Leaves almost glabrous above. Pahang, Telom. Selangor, Bukit Hitam. Perak, Gunong Keledang (a sub-variety with scales on calyx red strongly ciliate) (Ridley).

(8) **M. imbricatum** *Wall. Cat.* 4047; *King, l.c. 5.*

Large spreading shrub 5 to 15 ft. tall, covered with short blunt scales. Leaves ovate to oblong sub-acute, base shortly cuneate,
with scales short lanceolate acuminate; nerves 3, prominent, 4 to 6 in. long, 1·5 to 3·5 in. wide; petioles 1·5 in. long. Corymbs of about 10 flowers, dense. Bracts small. Calyx sub-globose, urceolate, 0·2 in. long, covered with short lanceolate acute scales; lobes much shorter. Petals 0·5 in. long, light rose pink. Fruit globose urceolate, 0·3 in. long, green. Hab. Common in forest on main range 1500 to 5000 ft. altitude. Selangor, Bukit Hitam; Ulu Gombak; Ginting Sempah. Perak, Gunong Keledang; Thaiping Hills. Dindings, Telok Sera. Penang (Wallich). Distrib. Assam, Cambodia, Sumatra. Native name: Sendudok Rimbah.


Shrub about 5 ft. tall. Branchlets sparsely covered with small ovate to lanceolate acuminate scales. Leaves narrow lanceolate, sub-acute, base rounded or shortly cuneate, above scabrid with short thorn-like scales; nerves 5 with larger scales, 4 to 4·75 in. long, 1·25 to 1·50 in. wide, petioles 0·6 in. long. Flowers as large as in *M. decemfidum*. Calyx 0·4 in. long campanulate, sparsely covered with lanceolate-acuminate scales, lobes linear acuminate, scales long, linear sub-acute. Petals glabrous, 1·5 in. long, pale rose pink. Stamens much shorter. Hab. Rocky woods. Lankawi, Burau at Telaya Tujoh (Ridley).


Bush. Branches with flat lanceolate triangular often laciniate scales. Leaves lanceolate-acuminate pubescent; nerves 5, hairy beneath 3 to 6 in. long, 1·5 to 2 in. wide; petioles 0·5 in. long dense hairy. Flowers few. Bracts ovate or lanceolate, hairy, 0·5 in. long and as wide. Calyx 0·5 in. long, covered with yellow hairs. Petals broad, obovate, 1·12 in. long. Stamens all similar; anthers cylindric acuminate, base bilobed. Hab. Mountain woods, at 4000 ft. altitude, rare. Selangor, Hulu Semangkok (Ridley).

### 3. **OXYSPORA**, DC.


It is difficult botanically to separate this genus from *Allassmorphia*. The original species, including *O. stellulata*, have the stamens conspicuously unequal, but in the remainder closely resembling it in habit, foliage, panicle and large flowers, the stamens are nearly or quite equal. I had referred most of these to *Allassmorphia*, but think it advisable to retain for that only the herbaceous or nearly herbaceous plants with small flowers, thin leaves and globose capsules.
Stamens unequal of 2 kinds.
- Big shrub or tree, glabrous.
- Dwarf shrubs, hairy.
- Dwarf shrub, velvety; fruit semi-globose.
Stamens similar and equal.

Tall shrub.
- Leaves ovate, pubescent beneath.
- Fruit goblet-shaped.

Low shrubs.
- Leaves elliptic cordate; petiole hairy.
- Leaves glabrous, membranous; flowers sub-umbelled, few.
- Leaves glabrous membranous; panicle large.
- Capsule obconic.
- Capsule fusiform.
- Leaves glabrous coriaceous.
- Branches terete; panicle hairy.
- Branches 4-angled; panicle.
- Leaves puberulous.

(1) *O. stellulata* King, l.c. 9.
A large shrub or tree, 5 to 30 ft. tall. Branches scurfy with minute scales. Leaves ovate acuminate, base round cordate, 5- to 7-nerved, scurfy, 5 to 9 in. long, 2·25 to 4·5 in. wide; petioles 1·25 to 4 in. long. Panicles large, terminal, 8 in. long, 10 in. wide, scurfy. Flowers rose pink in umbels of 4 to 6 on the terminal branchlets. Calyx-tube funnel-shaped, teeth 4 short, base narrowed into the pedicel, 2· in. long. Petals 4, orbicular-ovate, small. Stamens 8, 4 linear, purple, 4 half as long, yellow. Capsule clavate, opening by 4 truncate valves. *Hab*. Mountain forests, 2000 ft. altitude upwards, a very handsome plant in flower. Perak, Thaiping Hills; Gunong Batu Putih (Wray); Gunong Kerbau (Haniff); Kelantan, Chaning. *Distrib*. Sumatra.

Shrub. Branches, panicles and nerves covered with cylindric subulate processes. Leaves ovate or orbicular-ovate acuminate, base cordate covered thinly above, thickly beneath with small processes; nerves 9, more hairy, reticulations and transverse nerves conspicuous beneath, 7 in. long, 6 in. wide; petioles 2·5 in. long, hairy. Panicles 12 to 18 in. long, lower branches 6 in. long. Flowers and pedicels 5 in. long hairy. Calyx goblet-shaped, narrowed into pedicel, lobes small, triangular. Petals 4, ovate-acuminate. Stamens 8, longer ones 12 in. long, acuminate, shorter ones less curved and acuminate, all yellow. Capsule urn-shaped 12 in. long; lobes ovate acute. *Hab*. Mountains. Selangor, Mengkuang Lebra at 5400 ft. altitude (F. Dennys; Robinson).

Much-branched shrub 8 to 9 ft. tall, velvety. Leaves ovate-cordate above glabrous, beneath hairy on nerves 7, and nervules,
4 to 6 in. long, 3 to 4 in. wide; petioles hairy, 2 in. long. Panicles hairy 8 to 12 in. long, 4 to 6 in. across. Flowers small pink. Calyx obovoid, strigose, 4 small acute points, pink. Petals 4, lanceolate-acuminate, small. Stamens 8, 4 narrow linear-oblong, 4 oblong-obtuse half as long. Capsule urn-shaped, strigose, 1 in. long. Hab. Mountain ridges. Pahang, Telom on ridges at 4000 ft. altitude (Ridley).

(4) **O. floribunda** Ridl. Anericleistus floribundus King, l.c. 17.

Shrub 15 ft. tall, velvety. Leaves ovate acuminate, base round unequally obscurely cordate, 7-nerved, above shortly bristly, beneath shortly hairy, nerves on both sides densely hairy, 5 to 9 in. long, 4 to 5.5 in. wide; petioles 1 to 2 in. long. Panicles 16 in. long, 7 in. across, spreading; branches sub-whorled. Calyx-tube funnel-shaped, pink, pilose, 2 in. long; teeth 4, triangular with tufts of hairs between. Petals 4, broad, triangular, pink. Stamens 8, equal or occasionally 2 smaller or wanting. Capsule obovoid, truncate. Hab. Perak, Hermitage Hill (Curtis; Scortechini).


Shrubby stems and petioles, densely covered with stiff black hairs. Leaves elliptic sub-acute, base cordate, above glabrous, beneath sparsely hairy; nerves 5 pairs, hairy, transverse nerves prominent, 7 in. long, 3 to 5 in. wide; petioles 2.5 in. long. Panicle few-branched, 8 in. long, hairy. Flowers not seen. Fruit urn-shaped, pink, narrowed to base, 25 in. long. Hab. Damp woods on mountains. Pahang, Gunong Tahan about 4500 ft. altitude (Ridley).


Shrub, hairy, 5 ft. tall. Leaves obovate to lanceolate acuminate-caudate, base cuneate, equally, 5-nerved; nerves pubescent from base pale or pink beneath, 4 to 6 in. long, 1.5 to 3 in. wide; petioles 5 to 1 in. long, scabrid, hairy. Peduncles 2 in. long, pubescent terminal. Flowers 4 in. long in 1 or 2 whorls or umbels. Calyx funnel-shaped, pubescent; lobes 5. Petals lanceolate, pink. Stamens nearly equal, yellow, with a short process on back. Capsule short cup-shaped, 2 in. long, narrowed to pedicel. Hab. Forests. Perak, Temengoh Woods (Ridley). Lankawi, Burau (Robinson), a form with larger flowers than type.


Low nearly glabrous shrub, scurfy papillose. Leaves lanceolate-acuminate 12 in. long, 4 in. wide; petioles 3 in. long. Panicles large; branches over 6 in. long, scaly. Flowers pink 3 in. long. Calyx obconic, lobes blunt, triangular. Petals oblong. Stamens 8; filaments pubescent, similar; anthers linear-oblong. Capsule pink,
obconic, ·25 in. long, 4-angled. *Hab.* Forests. Pahang, Tahan Woods (Ridley).

(8) **O. Curtisii** King, l.c. 9.

Puberulous shrub. Leaves ovate acuminate, base round, above strigose, below glabrous, edges serrulate; nerves 7, 5 to 7 in. long, 3 to 4 in. wide; petioles 1·5 to 2·5 in. long, broadly winged. Panicles longer; branches 4-angled. Flowers pedicelled. Calyx cylindric, 8-ribbed, tapering both ends, teeth 4 minute. Petals 4 as long as filaments. Capsule fusiform ·2 in. long, mouth expanded. *Hab.* Perak, Hermitage Hill (Curtis).


Woody shrub, scurfy. Leaves sub-coriaceous, oblong or ovate oblong, glabrous, base rounded or very short cuneate; nerves 5; nervules prominent, all scurfy beneath, 3 to 5 in. long, 1·5 to 2·5 in. wide; petioles 1 to 1·5 in. long. Panicles slender, hairy; peduncles 3 in. long. Inflorescence 2 in. long. Flowers ·5 in. long. Calyx funnel-shaped, ribbed; lobes ovate, blunt, all hairy. Petals oblong-ovate, blunt, white. Stamens yellow, much longer. Capsule ·2 in. long, urceolate more or less hairy, ribbed. *Hab.* Perak, Gunong Kerbau (Haniff, Robinson) at 4000 to 7000 ft. altitude.

(10) **O. acutangula** King, l.c. 9.

Bush. Young branches 4-angled, glabrous; nerves beneath and inflorescence scurfy. Leaves sub-coriaceous, elliptic-oblong, base narrowed, rounded, tip acute; nerves 5, prominent beneath, 4 to 6 in. long, 1·75 to 2·5 in. wide; petioles ·6 to ·75 in. long. Panicle 4 in. long and nearly 4 in. across in fruit. Flowers numerous ·5 in. long. Calyx funnel-shaped, scurfy; teeth 4, triangular. Petals ovate, blunt, white. Stamens 7 to 8 lanceolate a narrow process on the back behind. Capsule ovoid, narrowed at base, glabrous, ribbed, ·25 in. long. *Hab.* Perak, Gunong Batu Putih at 6700 ft. altitude (Wray).

### 4. **ALLOMORPHIA**, Bl.

Half shrubby herbs with thin membranous leaves, equal or nearly so. Panicles terminal of small green or white flowers. Calyx 3- to 4-toothed. Petals 3 to 4. Stamens 6 to 8, equal or alternately long and short; base sagittate with a spur behind or muticous. Capsule small urn-shaped, ribbed, opening at top by 3 to 4 valves. Species 3 or 4.

Stem not winged.

<table>
<thead>
<tr>
<th>Shrubby 5 to 10 ft. tall; flowers numerous, green</th>
<th>(1) <strong>A. malaccensis</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dwarf, 6 to 24 in. tall; flowers few white; stamens pink or purple</td>
<td>(2) <strong>A. exigua</strong></td>
</tr>
<tr>
<td>Panicle glabrous</td>
<td>(3) <strong>A. porphyrantheca</strong></td>
</tr>
<tr>
<td>Panicle red-scurfy</td>
<td>(4) <strong>A. alata</strong></td>
</tr>
<tr>
<td>Stem and branches winged</td>
<td></td>
</tr>
</tbody>
</table>

*FLM P.* i.


Half shrubby about 6 ft. tall, glabrous. Leaves ovate-acuminate, base round or very shortly narrow; nerves prominent beneath 5 from base, 10 in. long, 6 in. wide; petioles 3 to 4 in. long. Panicles 6 to 12 in. long, spreading. Flowers in small cymes, small, yellowish green or whitish. Calyx goblet-shaped, •1 in. long; lobes triangular. Petals oblong-ovate. Capsule urn-shaped, 8-ribbed. *Hab.* Common in woods in low country. Malacca. Negri Sembilan, Tampin. Selangor, Sungai Buluh; Sempang, Semangkok Pass. Perak, Tapah; Selama (Yapp, Kunstler). Penang Hill (Wallich 4048); (Curtis). *Distrib.* Sumatra. *Native names:* Kayu Kadok Gajah; Pakan Rimbah; Senduduk Gajah; S. hutan; Panghong; Kerukup Rimau; Endebi. *Use:* In leprosy (Hervey).

(2) **A. exigua** Bl. *Flora* 1831, ii. 523, *not of others.* Melastoma exigua *Jack. Trans. Linn. Soc.* ii. 10, l. i., fig. 2.

Glabrous shrublet about 2 ft. tall, slender. Leaves lanceolate acuminate, base rounded or cuneate, pale beneath; nerves 5 from base, 3½ to 6 in. long, 1·25 to 2·5 in. wide; petioles 1 to 2 in. long (there is a slight difference in the size of the leaves in pairs). Panicles 4 in. long, lax, slender branched 2·5 in. wide. Flowers 3 to 4 together, umbelld. Calyx •1 in. long; lobes short acute. Petals white, oblong-lanceolate, acute. Stamens pink, twice as long. Capsule urn-shaped •12 in. long, ribs 8 low. *Hab.* Rocky places in woods. Penang Hill (Wallich, Curtis, etc.).


More slender. Leaves almost caudate, sometimes long cuneate. Panicle very slender, pendulous, with very slender branches few-flowered. *Hab.* Dindings Brusas. Perak, Waterloo; Temengoh; Thaiping Hills (Kunstler 2302).


Slender low shrub, red-scurfy, papillose, glabrous. Leaves nearly equal, rather thin, ovate lanceolate, long acuminate, base round; nerves 5, 4 to 6 in. long, 1·25 to 2·25 in. wide; petiole 1 to 1·25 in. long. Panicles 2 to 2·5 in. long, red-scurfy. Cymes umbellate dense, few-flowered. Flowers •15 in. long. Calyx goblet-shaped, scabrid, lobes triangular, acute. Petals lanceolate acuminate. Stamens longer; anthers purple. Capsule obovoid, urn-shaped, glabrous, ribbed, •1 in. long. *Hab.* Perak, woods at Temengoh (Ridley).

(4) **A. alata** *Scort. in King, l.c.* 12.

Glabrous shrub 3 to 6 ft. tall. Branchlets winged. Leaves ovate or elliptic-ovate, short acuminate, base narrowed, edges
bristle-toothed, 5 to 10 in. long, 2.5 to 4.5 in. wide; petioles .75 to 4 in. long. Panicles 4 to 5 in. long, spreading; branches angled and winged, rusty. Flowers in small umbels. Calyx-tube cylindric, ovoid; teeth small. Petals white, twice as long. Stamens longer, violet. Capsule sub-globular, 8-ribbed, .1 in. long. *Hab.* In forests. Perak, Tapah; Goping (Wray, Kunstler). Kedah, Gunong Bintang (Kloss). Kelantan, Chaning; Kwali Lebir (Ridley).

**Dubia.**


Malacca (Griffith). The description by Griffith is too obscure to identify this plant.

**5. ORITREPHES,** Ridl.

Large branching shrubs. Leaves coriaceous, elliptic or lanceolate, large; nerves 3 to 5 from base; nervules horizontal, prominent. Inflorescence cymose, terminal of few large white flowers. Calyx obconic, sometimes angled; lobes 4, rounded. Petals 4. Stamens 8, similar, acuminate, occasionally with a dorsal process. Capsule obconic, dehiscing at the top by valves. Species 5, Malay Peninsula.

Calyx strongly angled obcuneate . . . . (1) **O. grandiflora**
Calyx funnel-shaped not angled; branches of panicles angled.
  Calyx .4 in. long . . . . . . . . . . . (2) **O. pulchra**
  Calyx .25 in. long . . . . . . . . . (3) **O. Barnesii**
  Branches terete; flowers .1 in. long . . . . . . . . (4) **O. albiflora**
  Calyx obovoid; branches terete . . . . . . . . (5) **O. Robinsonii**

(1) **O. grandiflora** Ridl. Anericleustus grandiflora *Ridl. Journ. Roy. As. Soc. S. Br.* 57, p. 45. (Fig. 64, p. 772.)

A shrub or treelet 12 ft. tall. Branches angled. Leaves equal, coriaceous, elliptic acuminate, base round or cuneate; nerves, 2 outer very fine from the base, inner pair rising from the base or from the midrib .1 in. above the base, .6 to 7 in. long, 3 in. wide; petioles .1 to 3 in. long. Cymes on peduncles 2 to 3 in. long, stout angled; branches stout, .1 to 3 in. long, bearing 3 flowers; pedicels .3 in. long. Calyx white, 4-angled, obconic .5 in. long and as wide at top; lobes subovate. Petals oblong, white. Capsule .75 in. long, valves broad, thick. *Hab.* Mountain woods. Selangor, Semangkok Pass; Gunong Mengkuang Lebah (Robinson).


Large shrub. Branches angled. Leaves lanceolate caudate-acuminate, base narrowed, outer pair of nerves slender from base, upper ones from midrib .5 in. above base, 7 in. long, .2 to .5 in. wide; petioles .1 in. long; peduncles angled .2 in. long. Flowers few, in cymes, .1 in. long. Calyx funnel-shaped terete, .25 in. long;
lobes hardly distinct. Petals white. Fruit obovoid 0.5 in. long. 
*Hab.* Mountains in thickets 4500 to 5000 ft. altitude. Pahang, 
Gunong Tahan (Robinson, Ridley).

Roy. As. Soc. S. Br.* 57, p. 47.

Shrub. Leaves coriaceous lanceolate acuminate, narrowed to 
base, 6 in. long, 2 in. wide; petioles 1.25 in. long. Cymes 1 to 3 
on peduncle 1.5 in. long, angled, stout. Calyx-tube 0.25 in. long,
scurfy, dilate upwards; lobes ovate, sub-acute. Petals ovate, 
round. Capsule 0.3 in. long, valves large. *Hab.* Mountains. 
Pahang, K’luang Terbang (Barnes).

F.M.S. Mus.* iv. 15.

Glabrous shrub. Branches terete. Leaves sub-coriaceous 
equal, lanceolate ovate acuminate; nerves 5 from base, 4 in. long, 
2 in. wide; petioles 0.5 to 1 in. long. Panicles terminal, 4 in. long, 
lax. Calyx funnel-shaped, 1 in. long; lobes 4 ovate. Petals 
oblong, obtuse, 1 in. long, white. Stamens 8, equal. Anthers 
with a small process at back. Capsule urn-shaped, ribbed, dehis-
cing longitudinally, 12 in. long. *Hab.* Perak, Gunong Berumbun near Telom (Ridley), at 5000 ft. altitude.


Big shrub. Branches terete. Leaves coriaceous, lanceolate acuminate, red-scurfy beneath; base shortly cuneate; nerves as in *O. grandiflora*: nervules prominent, 4 to 6 in. long, 1 to 2.25 in. wide; petioles 5 to 1 in. long. Peduncles axillary and terminal, 3-5 in. long with 2 or 3 terminal cymes. Flowers 5 in. long, white and pink. Calyx-tube obconic not angled, red-scurfy; lobes ovate, blunt. Petals ovate-oblong. Capsule 5 in. long not angled, conic. *Hab.* Mountain woods. Pahang, Gunong Tahan (Robinson, Ridley).


Much branched, branches black. Leaves 1.75 in. long, 2 to 3 in. wide, acuminate, blunt, winged to base. Peduncles 1 in. long, red; pedicels 15 in. long. Calyx red, cylindric, base dilate, 4-ridged 2 in. long; lobes linear, 2 in. long. Petals spreading, pinkish white. Stamens filaments 2 in. long; anthers yellow as long, acuminate. Capsule 2 in. long and as wide on a pedicel 3 in. long. *Hab.* On rocks in mountain streams. Pahang, Gunong Tahan (Robinson, Ridley).

This forms cushions about 12 in. tall in cracks of rocks in the streams.

7. **BLASTUS**, Lour.


Leaves lanceolate; flowers hardly 1 in. long . . . (1) **B. Cogniauxii**

Leaves ovate; flowers with stamens 5 in. long . . . (2) **B. pulverulentus**


A slender much-branched twiggy shrub 6 to 10 ft. tall, scaly or puberulous. Leaves oblong-lanceolate long-acuminate, base narrowed, thin glabrous scaly beneath; nerves 5 with nervules conspicuous scurfy, 4 to 7 in. long, 1 to 2.25 in. wide; petioles


Branchlets scurfy, tomentose. Leaves ovate acuminate, base cuneate, glabrous above, scaly beneath; nerves tomentose, 5 in. long, 2.5 in. wide; petioles 1.25 in. long. Cymes axillary and sub-terminal, scurfy tomentose, few-flowered 1.5 in. long. Flowers .5 in. long. Calyx sub-globose, tomentose, lobes 4. Petals 4, ovate. Stamens 4, equal; anthers with short processes at base in front; filaments glandular. Hab. Selangor, Ulu Langat (Kloss).

### 8. OCHTHOCHARIS, Bl.

Small, little-branched, wiry shrubs with ovate or lanceolate serrulate leaves and small pinkish white flowers in axillary clusters or terminal panicles. Calyx-tube ovoid, 5-toothed. Petals 5. Stamens 8 or 10; anthers oblong with 1 pore. Ovary 4- to 5-celled; style filiform. Capsule globose, dehiscing irregularly. Seeds very numerous. Species about 8, Malayan.

- Panicle terminal; stamens 10 inappendiculate... (1) **O. paniculata**
- Panicle terminal; stamens 8 with a glandular boss on back...
- Flowers in axillary fasciciles; petals 4; stamens 8...
- Anthers inappendiculate...
- Anthers with a boss on the back...
- Leaves elliptic lanceolate...
- Leaves ovate lanceolate...
- Petals 5; stamens 5...


Low shrub about 3 ft. tall, branched, angled, pubescent at tip. Leaves membranous, elliptic-lanceolate, tapering at both ends, serrulate, 5- to 7-nerved, nearly glabrous, 2.5 to 6 in. long, 1.25 to 2 in. wide; petioles 3 to 1.25 in. long. Panicles terminal, spreading, 1.5 to 2 in. long. Flowers .2 in. long. Calyx cup-shaped. Petals acute, 5. Stamens 10, muticous. Capsule depressed, globular, .2 in. through. Hab. Rare in wet river forest. Singapore (Wallich 4083). Not seen again in the Malay Peninsula. Distrib. Borneo, Sumatra.


Shrublet branched. Young parts red-hairy. Leaves ovate acute, base round, edge crenulate setulose, glabrous, except midrib,
base above and nerves and reticulations beneath red woolly, 1·5 to 2·5 in. long, 1·25 in. wide; petioles ·5 in. long, woolly. Panicles terminal, short, nodes woolly. Bracts oblong, ·1 in. long, hairy. Calyx ·12 in. long, campanulate; lobes lanceolate, edged with gland-tipped hairs. Petals 5, lanceolate-acuminate. Stamens 8 similar; anthers linear-oblong with a glandular boss on back. Capsule sub-globose, dehiscence irregular. Hab. Dense swampy woods. Johor, Sedenah (Ridley).


A slender shrub 3 to 4 ft. tall. Leaves membranous elliptic lanceolate acuminate, base slightly narrowed, 5-nerved (3 conspicuous), edge dentate, glabrous except nerves beneath, sometimes scurfy hairy, 3 to 4·25 in. long, 1·25 to 1·75 in. wide; petioles ·3 to 1·8 in. long. Flowers in fascicles of 4 to 7 below the leaves, ·1 in. long; pedicels ·25 to ·3 in. long. Calyx urceolate. Petals 4, ovate-acuminate, white. Stamens 8; anthers oblong muticous. Capsule depressed globular, 5-grooved, ·2 in. long. Hab. Tidal mud. Not rare in the south. Singapore, Selitar. Johor, Sem-pang Kanan; Kota Tinggi. Distrib. Borneo, Buru. Native name: Sakalan.

(4) **O. decumbens** King, l.c. 15.

Erect slender little or not branched shrub 3 to 5 ft. tall. Leaves thinly coriaceous, elliptic lanceolate to ovate acuminate, base round or shortly cuneate, edges occasionally minutely serrate, 5-to 7-nerved, glabrous, 5 to 8 in. long, 1·75 to 3·5 in. wide; petioles 1 to 2·5 in. long. Cymes axillary, ·2 to ·3 in. long; pedicels short. Calyx urceolate ·1 in. long or less; teeth 4. Petals 4, ovate, pinkish white. Stamens 8; anthers with a minute tubercle behind. Capsule depressed, globose, ·18 in. through. Hab. Damp spots in dense forest in the low country. Johor, Mt. Austen. Selangor, Sungei Buluh. Perak, Ulu Bubong (Kunstler).

(5) **O. sylvestris** Ridley Journ. Roy. As. Soc. S. Br. 61, p. 4.

Stems slender 2 ft. tall. Leaves ovate lanceolate or acuminate, glabrous except base, entire; nerves 5 from base, 7 in. long, 3 in. wide; petioles 1 to 2 in. long, upper edge hairy. Flowers in short axillary fascicles; pedicels short. Calyx glabrous, urn-shaped; lobes triangular, mucronate. Petals broad oblong. Stamens 8; anthers oblong obtuse all similar, tips divaricate, appendage one conic. Capsule ·13 in. long, globose. Hab. Wet spots in forests in the south. Johor, Tanjong Kupang; Mt. Austen. Malacca, Merlimau (Cantley).

(6) **O. javanica** Bl. Flor. 1831, p. 523; Clarke, l.c. ii. 528; King, l.c. 14.

Shrublet 2 to 3 ft. tall. Leaves sub-coriaceous, lanceolate or oblong-lanceolate acute, base cuneate; nerves 3, pale beneath, edges at tip distinctly serrate, 2 to 3 in. long, ·6 to ·1 in. wide;

9. ANERINCLEISTUS, Korth.

Small trees, more or less hairy. Leaves membranous; nerves 2 pairs, one from base, the other from some way above the base. Panicles axillary and terminal, short or long; bracts conspicuous large. Flowers small rose or white. Calyx-tube funnel-shaped or urceolate, hairy. Petals 4. Stamens 8; anthers with a short boss behind. Ovary 4-celled; style filiform. Capsule globose. Species 3, Malayan.

Nearly glabrous; flowers umbellate . . . . (r) A. macranthus
Nerves of leaf beneath, petiole, bract, calyx, fruit, hairy; flowers racemose . . . . . . . . . (2) A. pauciflora

(1) A. macranthus King, l.c. 15.
Small tree 12 to 20 ft. tall, glabrous. Leaves elliptic caudate, base narrowed equal; nerves prominent one pair from shortly above the base, the other very fine from base, 2·5 to 4 in. long, 8 to 1·5 in. wide; petioles ·4 to ·8 in. long. Umbels axillary and terminal of 7 or 8 flowers, ·25 in. long, with large lanceolate-acuminate caducous bracts 1 in. long, ·25 in. wide. Calyx-tube funnel-shaped, pilose, pedicelled; teeth triangular 4. Petals 4, ovate, white. Stamens 8, alternate ones shorter, with a short process behind. Capsule globose-ovoid ·25 to ·3 in. long, valves large. Hab. Mountains in forests. Perak, Gunong Batu Putih (Wray); Gunong Berumbun, Telom; Gunong Kerbau (Haniff).


10. PHAULANTHUS, Ridl.

Phaulanthus.]   LIX. MELASTOMACEÆ.  777

Exstipulate.  Peduncles very short; flowers in cymes of 3; leaf base cuneate.  (1) P. Helferi

Peduncles very short; flowers umbellate 4; leaf base cordate.  (2) P. rudis

Peduncles slender, long.  (3) P. Curtisii

Stipulate.  Leaves narrowed acuminate.  (4) P. stipularis


Branched shrub. Stem solid, hairy above. Leaves ovate or ovate-lanceolate, acuminate, base cuneate; nerves 5 to 7, slender, transverse nervules conspicuous, hairy on both sides, 7 to 12 in. long, 3-5 to 6 in. wide; petioles 1 to 3 in. long. Cymes 5 in. long of 3 or more hairy flowers. Calyx urceolate, lobes 4 sub-triangular, hairy. Petals very small. Capsule 25 in. long, urceolate, hairy, pink. Hab. Dense forests. Pahang, Khol River and Tahan woods (Ridley). Distrib. Mergui.

(2) P. rudis Ridl. l.c. 43.

Shrub 6 to 8 ft. tall. Stem woody 4 in. through. Young parts hairy above, more thickly hairy beneath; nerves 4 to 7, slender, more hairy, 8 in. long, 7-5 in. wide; petioles densely hairy 2 to 3 in. long. Flowers 4, umbellate, pink on very short peduncle; pedicels 5 in. long. Calyx-tube urn-shaped; lobes 4, acute. Capsule urceolate, pink hairy, 12 in. long, valves smooth, triangular 4. Hab. Dense forests. Selangor, Ginting Bidai; Ginting Peras (Ridley).

(3) P. Curtisii Ridl. l.c. 44.  Anerincleistus Scortechinii King, l.c. 16.  A. Curtisii Staff, Kew Bulletin 1892, p. 196.

Slender branched hairy shrub 3 to 4 ft. tall. Leaves thin, lanceolate-oblong acuminate, base narrowed blunt truncate, very unequal, glabrous or sparsely hairy, edges hairy; nerves hairy 3; larger leaf 2-5 to 4 in. long, 8 to 1-4 in. wide, smaller, one-fourth to one-half as long. Flowers very small, 6 to 10, green, umbellate, cymose on a slender peduncle 1 in. long. Calyx globose, campanulate, tomentose or hairy; teeth 4, hairy. Petals 4, ovate, shorter. Capsule nearly 1 in. long, sub-globose, more or less hairy. Hab. Dense forests. Perak, Bukit Kapayung, Sungei Siput; Thaiping Hills; Temengoh. Province Wellesley, Tasek Gelugur (Curtis).

(4) P. stipularis Ridl. l.c. 43.

Shrub. Stem hairy. Leaves ovate-lanceolate or oblanceolate narrowed to base, acuminate, young ones golden-velvety, adult sparsely hairy; nerves 5, lowest from base and upper 2 from the midrib, all densely hairy, 5 to 7 in. long, 2 in. wide; petioles 5 to 1.5 in. long. Stipules 25 in. long, orbicular. Cymes of 2 to 3; peduncle very short. Capsule urceolate, hairy; valves oblong, on pedicel 1 in. long. Hab. Tringganu, Bundi (Rostado).


Shrub 2 to 4 ft. tall. Leaves glabrous, acuminate, base shortly cuneate, thin, nerves 7, margin ciliate; 7 in. long, 3·5 to 5 in. long; petioles 2·5 in. long, hairy along upper edge. Panicles 1·5 to 4 in. long, few and short-branched. Flowers small, secund. Petals ovate. Stamens similar; anthers short, oblong, process large, spathulate. Capsule cup-shaped, 1· in. long, narrowed to thick pedicel, smooth. *Hab.* Mountain forests, local. Perak, Thaiping Hills at 1000 to 2000 ft. altitude (Wray, Ridley).


Low herbs, more rarely shrubby. Leaves membranous or fleshy, opposite, similar in shape and size, or unequal in size, much smaller and different in shape, usually slightly oblique, 3- to 7-nerved from base. Flowers pink or white in scorpioid simple or false-umbelied cymes, Calyx sub-cylindric or turbinate, 3-toothed. Petals 3, ovate or oblong acute. Stamens 3 (in one species 6); anthers linear-oblong, blunt or lanceolate acuminate, base lobed dehiscing with apical pores. Style filiform; ovary 3-celled. Fruit trigonous, turbinate, smooth or muricate, dehiscing at the top. Seeds minute. Species over 100, tropical Asiatic. (Stapf, in *Journ. As. Soc. Beng.* lxxix. (2), 18.)

**A. Eu-Sonerila.** Stamens 3; leaves similar in each pair.

i. **Erectæ.** Ascending wiry herbs, branched.

Calyx and fruit narrow, cylindric.

Leaves linear, spathulate . . .
Leaves lanceolate . . .
Leaves oblong, toothed, very diffuse plant.
Leaves ovate, fleshy, 7 to 9 in. across .
Erect wiry little-branched herbs with turbinate fruit.

Leaves ovate, toothed, sparsely hairy; flowers small .
Leaves ovate, toothed, densely hairy; flowers large . . .
Slender prostrate plant with minute flowers .

ii. **Validulæ.** Branched shrubby hairy plants; leaves similar but unequal; fruit turbinate.

Capsule smooth; flowers small, white in cymes of 3 or 4.
Leaves lanceolate, narrow 4 to 5 in. wide . . .

**B. Prostrate.**

(1) **S. linearis**
(2) **S. erecta**
(3) **S. calaminthifolia**
(4) **S. tenera**
(5) **S. tenuifolia**
(6) **S. hirsuta**
(7) **S. prostrata**
(8) **S. patula**
Leaves elliptic, acute, 1 to 1.5 in. wide.
Capsule muricate; leaves lanceolate.
Flowers solitary axillary large, white.
Flowers in cymes of 3 or 4 in lower axils
Flowers in terminal axils only; leaves broad ovate.
Leaves hairy above; flowers large, rose.
Leaves glabrous above; capsule smooth.
Flowers in terminal axils; leaves lanceolate acuminate.

Succulent little herbs, glabrous or nearly so, little or not branched; leaves similar and nearly or quite equal; stamens 3.
Leaves 3-nerved from the base, not congested at the top of the stem.
Leaves sub-peltate, base unequal.
Leaves sub-peltate, base equal.
Leaves 3- to 7-nerved from base, succulent; flowers white.
Leaves large; peduncle with several erect branches.
Leaves smaller; peduncles 1 or 2 not branched.
Leaves 3-nerved, lanceolate acuminate; stem nodose, hairy.
Leaves pinnate-nerved, not congested; flowers pink.

Plant branched, glabrous.
Plant simple, hairy.
Leaves congested at the top of the stem; small delicate plants; flowers pink.
Leaf base broad, rounded.
Leaves ovate 1.25 in. wide, glabrous.
Leaves lanceolate, ovate, variegated, often hairy.
Leaves oblong, edge spinulose.
Leaf base narrowed.
Leaves ovate, setose, denticulate.
Leaves lanceolate, '5 in. wide.
Leaves lanceolate, '25 in. wide.

Herb. Leaves ovate acuminate; flowers pink.

C. Hexodon. Stamens 3; leaves of each pair very dissimilar, one very small and round; cymes from axils of the small leaves; fruit turbinate; valves always splitting into 3.

Cymes with rather large persistent bracts.
Fruit glabrous.
Fruit muricate.
Leaves broad, oblique ovate; petiole long.
Leaves acuminate.
Leaves round, blunt at tip.
Leaves oblong, petiole short; peduncle long.

Cymes with minute caducous bracts.
Leaves quite glabrous, base narrow.

(9) S. albiflora
(10) S. ramosa
(11) S. suffruticosa
(12) S. rudis
(13) S. mollis
(14) S. pallida
(15) S. populifolia
(16) S. elliptica
(17) S. succulenta
(18) S. repens
(19) S. nodosa
(20) S. picta
(21) S. muscicola
(22) S. congesta
(23) S. cyclaminellia
(24) S. calophylla
(25) S. Griffithii
(26) S. saxosa
(27) S. bellula
(28) S. heterostemon
(29) S. glabriflora
(30) S. capitata
(31) S. cæsia
(32) S. bracteata
(33) S. integrifolia
Leaves quite glabrous, base unequally lobed. (34) *S. barbata*
Leaves glabrous above, nerves beneath hairy.
  Fruit muricate ...... (35) *S. nidularia*
  Fruit smooth, few-flowered ...... (36) *S. calycula*
  Fruit smooth; flowers many; petiole winged ...... (37) *Gimlettei*
Leaves hairy on both sides, oblong, sparsely hairy above.
Tall, with dense setose axillary cymes; flowers small ...... (38) *S. setosa*
Dwarf; cymes terminal.
  Petioles long ...... (39) *S. costulata*
  Petioles short ...... (40) *S. microcarpa*
Leaves ovate oblique, sparsely hairy above; dwarf plants.
  Stem short; cymes long peduncled ...... (41) *S. begoniæfolia*
  Stem long.
Cymes terminal, sessile ...... (42) *S. macrophylla*
Cymes sessile or nearly axillary ...... (43) *S. brachyantha*
Leaves velvety, hairy above.
  Stem elongate; leaves ovate ...... (44) *S. elatostemoides*
  Dwarf; leaves oblong acuminate ...... (45) *S. bicolor*

(1) *S. linearis* Hook fil.; Triana, Trans. Linn. Soc. xxviii. 76; Clarke, in Hook fil. F.B.I. ii. 536.
Slender wiry glabrous herb, 6 to 14 in. tall. Leaves linear, spathulate, sessile, minutely toothed or entire, 1 in. long, 0.5 to 1 in. wide. Racemes terminal, few-flowered. Calyx-tube cylindric, campanulate 2 in. long. Petals 0.25 in. long, 1 in. wide, mauve pink; anthers orange, long acuminate, shorter than petals. Fruit cylindric oblong smooth, narrow at base, 3 in. long. *Hab.* Kedah Peak, Gunong Jerai (Lobb; at 3000 ft. altitude, Robinson).

(2) *S. erecta* Jack, Mal. Misc. i. 7; Stapf and King, l.c. 23.
Wiry herb, usually widely branched, upper parts hairy, 3 to 18 in. tall. Leaves similar, ovate or lanceolate, hairy, 4 to 12 in. long, 2 to 4 in. wide, faintly 3-nerved; petioles 0 to 3 in. long. Cymes 2- to 9-flowered, glabrous, elongating peduncles 4 to 2 in. long slender; pedicels 0.4 in. long. Calyx sub-cylindric, 15 to 2 in. long; teeth short. Petals elliptic cuspidate, pink, 15 in. long. Anthers ovate lanceolate. Capsule sub-cylindric, 3 to 4.5 in. long, 0.6 to 0.8 in. wide. *Hab.* On rocks and stony paths or mossy banks on mountains. Local, but abundant where it occurs, variable in size, Perak, Thaiping Hills (all collectors), Penang Hill (all collectors). *Distrib.* Mountains.

The varieties flexuosa and discolor Stapf, are merely large fully grown forms, not worth keeping up. *S. hyssopifolia* Stapf, l.c., from Gunong Hijau, the top of the Thaiping Hills, appears to be a state with rather larger fruits, much like the form discolor, probably a wet-wood form.

(3) *S. calaminthifolia* Stapf and King, l.c. 23.
Wiry branched ascending herb up to 12 in. tall, hairy. Stem 4-angled above, crimson. Leaves equal, oblong or elliptic toothed,
thick membranous, pale green, midrib purple, 1- to 3-nerved, 3 to 5 in. long; 1 to 2 in. wide; petioles 0.08 to 0.12 in. long or less. Cymes 2- to 5-flowered; peduncle filiform 0.4 to 0.8 in. long. Calyx slender, obconic, oblong 0.15 to 0.2 in. long; teeth triangular, acute. Petals elliptic cuspidate, 0.33 in. long, pink. Capsule oblong, sub-trigonal, smooth, 0.25 to 0.3 in. wide. Hab. Perak, Gunong Batu Putih at 4300 ft. altitude (Wray).

(4) S. tenera Royle, Ill. 215, t. 45, var robustior Guill. S. epilobioides Stapf, l.c. 22.

A glabrous herb 6 in. tall. Leaves similar sub-equal ovate acute, base narrowed, denticulate, thin membranous, glabrous or sparsely hairy, 5-nerved from base, 1 to 1.75 in. long, 7 to 9 in. wide; petioles 0.4 to 0.5 in. long. Cymes 5- or 6-flowered; peduncles 0.6 to 0.8 in. long; pedicels 0.2 in. long, very slender. Calyx very slender, obconic, 0.25 to 0.3 in. long; teeth triangular, broad. Petals elliptic acuminate, 0.2 in. long, pink. Anthers 0.12 in. long, lanceolate, much shorter than the long filament. Hab. Lankawi islands; Terutau (Curtis). Distrib. Cochin-China, the typical form from India and Siam.

(5) S. tenuifolia Bl. Flora 1831, p. 491; Benn. Pl. Jav. Rar. 211, t. 44; Clarke, l.c. ii. 536.

Erect or decumbent wiry herb 6 to 12 in. tall, base bare, branched above, more or less hairy above and on the leaves. Leaves membranous very unequal, ovate to lanceolate, base round, tip acute, edge dentate 3-(rarely 5-)nerved from base, 1 to 2 in. long, 0.4 to 1 in. wide; petioles slender, 1 to 1.5 in. long. Cymes 1- to 6-flowered, sub-umbelled; peduncles 0.5 to 1 in. long, purple; pedicels 0.25 to 0.3 in. long. Calyx campanulate, oblong, 0.15 in. long; teeth triangular. Petals elliptic apiculate, rose pink, 0.3 in. long. Anthers lanceolate. Capsule obconic, 3-angled, 0.23 to 0.27 in. long, 0.23 in. wide. Hab. Damp rocks in mountain forest. Pahang, Telom. Malacca, Mt. Ophir (Maingay), Perak, Gunong Kerbau (Robinson). Distrib. Java and Borneo.


Herb decumbent erect 6 in. tall, densely hairy, hairs often with swollen bases. Leaves crowded, 1 to 1.5 in. long, 0.5 in. wide, strongly toothed ovate lanceolate, densely hairy with long hairs. Flowers solitary rarely 3, terminal and axillary; pedicels short. Calyx cylindric. Petals often 0.5 in. long, rose pink. Fruit small 0.15 to 2 in. long; pedicel 0.2 in. long. Hab. Mossy spots on mountains from 3000 to 3600 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson). Pahang, Gunong Tahan. Malacca, Mt. Ophir (Lobb). Perak, Gunong Bubu (Wray); Gunong Berumbun (Ridley).

This differs from S. tenuifolia in its smaller size, densely hairy leaves and stem, solitary larger flowers, often axillary and smaller capsule on a shorter pedicel, but it might be considered a mountain variety.
(7) **S. prostrata** Ridl.

Stem branched widely from near the base woody red-hairy, about 12 in. tall. Leaves lanceolate acute, base acute, appressed hairy all over, equal; nerves 3, 1-75 to 2.5 in. long, 3 to 5 in. wide; petioles 1 in. long. Cymes axillary and terminal; peduncle 1 in. long. Flowers small, white, 2 to 5 in a cyme. Calyx 15 in. long, campanulate; lobes lanceolate, subulate. Petals triangular lanceolate, acuminate 1 in. long. Stamens elliptic, blunt. Capsule trigonous obconic, smooth, 2 in. long; pedicel stout, 4 in. long. *Hab.* Rare. Forests in mountainous regions. Pahang, Tahan woods, below Wray’s Camp, 3000 ft. altitude (Ridley).

(9) **S. albiflora** Stapf, l.c. 28.
Woody shrublet ascending or erect branched, 18 in. tall, appressed bristly. Leaves sub-equal or quite unequal, lanceolate or ovate lanceolate acute, dark green, glabrous above, pale beneath and appressed-hairy or glabrous; nerves 1 to 2 pairs, appressed hairy beneath, 1 to 3.5 in. long, 5 to 1.25 in. wide; petioles 2 to 4 in. long. Flowers axillary and terminal, solitary or paired or 5 in a cyme, small, white; pedicels very slender. Calyx small, obconic, glabrous, 0.8 in. long. Petals oblong, apiculate, 1 to 1.5 in. long. Anthers oblong, blunt. Capsule obconic, scantily muricate, 2 in. long. *Hab.* Mountain woods. Selangor, Semangkok, 3000 to 4000 ft. altitude. Perak, Gunong Keledang; Bujong Malacca (Curtis, Goldham, Kunstler).

Slender woody lax-branched bristly shrub, over a foot tall. Leaves unequal narrow lanceolate, acuminate, narrow at base, hairy 2.5 in. long, 3 in. wide, small leaves linear-lanceolate, 4 by 1 in. long. Flowers solitary axillary sub-sessile. Calyx narrow, cylindric; teeth lanceolate setaceous, hairy, 3 in. long. Petals white, obovate rounded, sparsely hairy, 5 in. long, 4 in. wide. Stamens 3, about half as long; anthers orange, curved acuminate. Capsule sub-sessile obconic, sparsely hairy, lobes lanceolate; valves large. *Hab.* Selangor, Gunong Mengkuang Lebah (Robinson).
(11) **S. suffruticosa** Staf.*, l.c. 29.

A shrublet over 12 in. tall, hairy all over with dense crimson hairs. Leaves crowded at branch-tips unequal oblong or oblong-ovate acute, asymmetric toothed, 3- to 5-nerved from near the base, larger leaves 1 to 1-4 in. long, 4 to 6 in. wide; petioles 25 in. long or less. Flowers white axillary in pairs, small. Capsule obconic, 2 in. long, strigose muricate. *Hab.* Perak, Gunong Bubu at 5000 ft. altitude (Wray).

var. *lasiantha* Ridl. S. lasiantha Staf.*, l.c.c.

Leaves larger lanceolate, 1-5 to 3 in. long, 6 to 8 in. wide; petioles 3 to 6 in. long. Capsule hairy, 15 to 18 in. long. Petals oblong, cuspitate. This came from the same gathering as *S. suffruticosa*, and is probably a fully evolved state of this little known plant.

(12) **S. rudis** Staf., l.c. 27. S. velutina Ridl. *Journ. F.M.S. Mus.* iv. 18.

A decumbent rarely branched herb 12 in. tall, densely hairy with red hairs (when dry). Leaves similar or very unequal, ovate to elliptic acute, base round entire, pale beneath, glabrous or hairy above; nerves hairy on both sides, 7-nerved, 1 to 3-5 in. long, 4 to 2-5 in. wide; petioles 75 in. long. Cymes 2- to 6-flowered, sub-terminal; peduncles 5 to 1 in. long. Calyx slender, narrow, funnel-shaped, 12 to 15 in. long. Petals elliptic to obovoid, pink, a line of hairs on the back, 4 in. long. Capsule obconic, muricate. *Hab.* Mountain forests, Selangor, Semangkok. Pahang, Telom and Gunong Berumbun. Perak, Tumbung Parhat (Scortechini); Gunong Kerbau (Robinson); Bujong Malacca (Curtis).

My *S. velutina* seems to be a more densely hairy form than the typical plant. *S. mollis* Staf., is also very closely allied, but is taller, with red velvety leaves and smooth fruit.

(13) **S. mollis** Staf., l.c. 28.

Decumbent with erect red velvety stems, little or not branched, 12 to 18 in. tall. Leaves unequal elliptic sub-acute, base round or blunt; nerves 2 to 3 pairs from lower part of midrib red velvety, otherwise leaf is glabrous, rarely hairy on upper surface and midrib, often asymmetric, 2 to 3 in. long, 1 to 2 in. wide (small leaf 1 in. long); petioles red-hairy, 4 to 1 in. long. Cymes 1- to 2-flowered, terminal, glabrous. Calyx narrow, cylindric. Petals 4 in. long, elliptic oblong. Capsule obconic, 2 in. long, glabrous, smooth. *Hab.* Perak, Gunong Batu Putih 6700 ft. altitude (Wray).

(14) **S. pallida** Staf., l.c. 27.

Ascending hairy herb, base woody branched. Leaves oblong or ovate acute, base narrowed, densely hairy especially on edge; nerves 3 pairs, 1 or 2 from the base, very hairy, 1-5 to 4 in. long, 8 to 1-8 in. wide, often asymmetrical; petioles 6 to 75 in. long. Cymes axillary terminal on 1 to 2 in. peduncles, 3- to 8-flowered. Calyx hairy, slender, obconic, campanulate, 15 to 2 in. long.
Petals elliptic, oblong, acute, to '45 in. long, on back, pale pink. Capsule obconic, puberulous, to '25 in. long. *Hab.* Mountain forests, Selangor, Bukit Hitam (Kelsall). Perak, Gunong Inas (Wray); Bujong Malacca (Curtis).

(15) *S. populifolia* Stapf, l.c. 26.

Erect or ascending herb, 6 to 9 in. tall, shortly puberulous with longer curved hairs, mixed in. Leaves unequal, ovate sub-acuminate, base minutely cordate, sub-entire or toothed, membranous; nerves 2 pairs from base, 1 pair from midrib, 1·5 to 3 in. long, 1·2 to 1·75 in. wide; petioles slender, 1 to 2 in. long, puberulous. Cymes terminal to 12-flowered umbelliform; peduncles 5 to 1·2 in. long. Calyx cylindric, 2 in. long, pubescent. Petals elliptic, pink, 3 to 4 in. long. Fruit oblong, obconic, 2 to 2·5 in. long, pubescent; pedicels 2 in. long. *Hab.* Forests, Perak, Chanderiang (Kunstler); Tapah (Curtis); Briah (Wray). *Distrib.* Sumatra.

(16) *S. elliptica* Stapf, l.c. 30.

A fleshy herb 6 to 9 in. tall, scurfy puberulous above. Leaves unequal, elliptic to nearly orbicular, tip and base round; nerves 5 from base, glabrous deep green paler beneath, 1 to 2·5 in. long, 7·2 to 2 in. wide; petioles 1 to 2 in. long. Cymes many-flowered, dense, 7·5 in. long; peduncles 1 to 2·5 in. long; pedicels 2 in. long. Calyx obconic, 12 in. long; teeth triangular. Petals oblong, apiculate, 2 to 2·3 in. long, pinkish white; anthers oblong. Capsule obconic, 15 in. long, smooth. *Hab.* Limestone rocks, local. Perak, Kinta district, Gunong Malacca (Kunstler); Sungei Siput (Curtis).

(17) *S. succulenta* Stapf, l.c. 30.

A succulent herb with thick stems, glabrous. Leaves equal, symmetric elliptic to ovate, sub-acute, base round; nerves 7 from base, transverse nervules conspicuous when dry, 6 to 7 in. long, 3 to 4 in. wide; petioles thick 2 to 4 in. long. Cymes 2, 3 or 4 on a common peduncle, 3 in. long, secondary peduncles as long. Flowers white. Calyx oblong campanulate, 25 in. long; teeth short. Petals oblong, cuspidate, 18 in. long. Anthers long-acuminate. Fruit obconic trigonous smooth, 25 in. long. *Hab.* Mountain forests on banks, Perak, Thaiping Hills at 3000 ft. altitude (Scortechini and other collectors).

(18) *S. repens* Stapf, l.c. 30.

Fleshy herb with creeping rhizome. Stem erect 2 to 3 in. long, sparsely hairy. Leaves usually unequal, ovate long acuminate acute, base round, sparsely hairy both sides, 7-nerved from base, 3 to 7 in. long, 2 to 4·5 in. wide; petioles 1 to 2·5 in. long. Cymes glabrous, 2 to 3 terminal on peduncles 4 to 6 in. long. Calyx narrow, obconic, 23 in. long; teeth triangular. Petals elliptic acute, white, 2 to 2·5 in. long. Anthers slender acuminate. Fruit obconic smooth, trigonous, 3 in. long. *Hab.* Banks in forests,
at 1500 to 2000 ft. altitude. Perak. Thaiping Hills (all collectors), Bujong Malacca (Curtis).


Stem slender fleshy, red, 3 in. tall, swollen at the nodes, sparsely hairy. Leaves unequal or nearly equal lanceolate, long acuminate, base round oblique, edge spine-toothed, fleshy sparsely hairy above; nerves 3 from the base, 3.5 in. long or less, 75 in. wide; petioles 1 in. long. Small leaves '25 to '5 in. long. Cymes in upper axils; pedicels '25 in. long. Flowers white. Calyx '1 in. long; lobes acute. Fruit campanulate, smooth, base broad, 12 in. long. *Hab.* Mountain forests, rare. Perak, Bujong Malacca (Ridley).


A succulent ascending herb 3 to 12 in. tall, scurfy above. Leaves lanceolate to ovate, narrowed to base, tip acute, unequal, edge serrate dark green above, marbled, spotted, or veined with white or plain green glaucous beneath; nerves 3 pairs, fine, alternate from midrib, 1-25 to 4 in. long, 75 to 1-75 in. wide; petioles 5 to 1-5 in. long. Cymes axillary and terminal; peduncles 1 to 1-5 in. long. Flowers 6 or 7; pedicels 0-8 to 1 in. long. Calyx narrow, cylindric; teeth triangular acuminate. Petals 15 in. long, rose pink. Capsule obconic trigonous smooth, 2 in. long, 1 in. wide. *Hab.* Damp lowland forests up to about 3000 ft. altitude.

var. *a. concolor* Ridl.


(21) **S. muscicola** Stapf, *l.c.* 31.

Flaccid unbranched herb 4 to 6 in. tall, rhizome creeping, all hairy. Leaves similar oblong to lanceolate-oblong, acute both ends, minutely toothed, pale green, thin, 2 to 3.7 in. long, 8 to 1.4 in. wide; nerves pinnate 3 to 4 pairs, fine; petioles 3 to 8 in. long. Cyme terminal; peduncle slender, 1-5 in. long. Flowers 3 to 4. Calyx cylindric-campanulate; teeth short. Petals 4 in. long, pink. Stamens long acuminate, orange. *Hab.* On mossy trees. Lankawi, Gunong Raya (Curtis).

(22) **S. congesta** Stapf, *l.c.* 31.

A delicate unbranched herb 3 in. tall, glabrous. Stem 1 to 1-5 in. tall. Leaves crowded at top about 6, similar, ovate to elliptic blunt, base round, membranous, 9 to 1-7 in. long, 6 to 1-12 in. wide; nerves 3 pairs (2 pairs from base); petioles 6 to 7 in. long. Peduncle 2-5 in. long. Cyme of about 10 flowers, pink, quite resembling those of *S. muscicola*, but glabrous. Fruit

Fl.M.P., 1.
obovoid-oblong.  *Hab.* Lankawi, Gunong Chinchang at 1000 ft. altitude (Curtis).

(23) *S. cyclaminella* Stapf, *l.c.* 33.

A delicate erect unbranched herb. Stem 1 in. tall or less. Leaves 4 pairs, crowded, similar, ovate or oblong blunt, base blunt, undulate or entire, light or dark green with silver veins, purple beneath, glabrous (except in *var. canescens*) 8 to 14 in. long, 4 to 6 in. wide, 5- to 7-nerved; petiole 4 to 1 in. long. Cymes 1 or 2; peduncle 2 to 5 in. long. Calyx slender campanulate, 12 to 15 in. long; teeth triangular. Petals elliptic-cuspidate, 25 in. long, pink. Anthers acuminate. Fruit obconic angled, smooth, 12 in. long. *Hab.* Mountains at 1000 to 3000 ft. altitude. Perak, Ulu Bubong (Kunstler).

*var. canescens* Stapf, *l.c.*

Leaves hairy, more lanceolate up to 3 in. long. *Hab.* Selangor, Bukit Kutu (Ridley). Perak, Ulu Bubong (Kunstler).


Tuberous, succulent simple or branched 2 to 8 in. long, glabrous. Leaves congested at top, green or brown, marbled white, oblong to ovate-oblong blunt, base round, edge spinulose, 2 to 3 in. long, 1 in. wide; petioles 5 in. long. Flowers 3 to 4 in a cyme; peduncle 1 to 2 in. long. Calyx sub-cylindric, 25 in. long; teeth acute. Petals oblong-lanceolate cuspidate, 25 in. long, rose or white. Capsule funnel-shaped, smooth 25 in. long. *Hab.* Kedah Peak, (Ridley).

(25) *S. Griffithii* Clarke, in *Hook.* fil. *F.B.I.* ii. 539; *Stapf*, *l.c.* 32.

Slender fleshy herb, 3 to 6 in. tall, rhizome thick. Stem 1 to 4 in. tall, fleshy. Leaves crowded at top, ovate or round elliptic blunt, membranous, edge and upper surface sparsely hairy, 4 to 8 in. long and nearly as wide; nerves 5; petioles 3 to 5 in. long. Peduncles 1 or 2, erect 2 to 3 in. long. Cymes 3- to 6-flowered. Calyx slender, cylindric, lobes ovate, glabrous. Petals elliptic cuspidate, dark mauve, 25 in. long. Fruit obovoid-oblong smooth, 23 in. long. *Hab.* Malacca, Mt. Ophir at 3000 ft. altitude in damp spots, not rare, but local. (All collectors.)


Erect delicate herb 3 to 6 in. tall, base creeping. Stem slender unbranched. Leaves lanceolate sub-acute or obtuse, sparsely hairy above and on edge glabrous, purple beneath, pairs equal, 5- to 7-nerved, 8 to 17 in. long, 3 to 6 in. wide; petioles 2 to 3 in. long. Peduncle 1 in. tall; flowers 1 to 3, pink. Calyx slender. Petals 3 in. long; anthers orange, acuminate. Capsule 2 in. long; pedicel 1 in. long, obconic angled smooth. *Hab.* Penang Hill at 2500 ft. altitude, rare on rocks in shady ravines (Curtis).

Delicate unbranched herb, 2 to 4 in. tall, base creeping quite glabrous. Leaves crowded, narrow lanceolate, narrowed to base sub-acute, spine-toothed, pale beneath, .75 to 1.25 in. long, .2 in. across; petioles .3 in. long or less, slender. Peduncles terminal axillary 1 or 2, .75 in. to 1.25 in. long. Cymes 5-flowered. Calyx slender, cylindric-campanulate, teeth short triangular. Petals pink, oblong cuspidate, .2 in. long; anthers short acuminate. Capsule obconic, smooth .2 in. long. *Hab.* On rocks in forest, rare. Johor, Gunong Banang near Batu Pahat (Ridley).


A glabrous herb, 3 to 18 in. tall. Stem angled, branched. Leaves unequal, oblique ovate acuminate, base cuneate asymmetric, pale green, when young spotted white; nerves 5 or 6, transverse; nervules conspicuous, 1.5 to 4.5 in. long, 1 to 2.3 in. wide; petioles .5 to 2 in. long. Cymes axillary and terminal. Flowers up to 16 or even more, sessile; peduncles .6 to 1.25 in. long. Bracts spathulate, persistent. Calyx obconic, .15 in. long; teeth obtuse. Petals elliptic, .15 in. long, bright pink. Stamens 6, 3 curved purple, 3 straight yellow. Capsule sessile turbinate .25 in. long, smooth. *Hab.* On rocks and banks in forests from Singapore to Selangor and Perak, Pahang and Tringganu. The commonest species. *Distrib.* Sumatra, Borneo. *Native names:* Ati-Ati Gajah; Ati-Ati hutan; Kerukap Ayer.

(29) **S. glabriflora** *Stapf, l.c.* 42.

Ascending herb, 6 in. tall. Stem, petioles, nerves beneath appressed hairy. Leaves dissimilar, large one oblique elliptic, blunt or sub-acute, unequally cordate, glabrous, green, above pale; nerves purple beneath, 3 to 6 in. long, 2 to 3.5 in. wide; petioles 1 to 2.5 in. long, small leaves sessile reniform, .25 in. wide. Cymes terminal, axillary; peduncles 1 to 2 in. long. Calyx campanulate-ovoid, glabrous, .15 in. long. Petals elliptic acute .25 in. long, white or pinkish; anthers linear-oblong, blunt. Capsule quite smooth, campanulate, .16 in. long. *Hab.* Perak, Larut (Kunstler).

(30) **S. capitata** *Stapf, l.c.* 35.

Ascending, simple, bristly stemmed herb about 12 in. tall, base nude. Leaves dissimilar, larger obliquely obovate, abruptly cuspidate, base oblique cordate, sparsely bristly above, densely on the nerves beneath, 4 to 6 in. long, 1.75 to 3 in. wide; nerves 5 to 8; nervules oblique conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long. Small leaves orbicular conspicuous; petioles thick, .5 to 1.5 in. long.

var. *longipetiolata* Ridl. in *Journ. F.M.S. Mus.* iv. 18.

Leaves ovate with rounded oblique base; petioles 2-5 in. long, sometimes covered with long crimson hair. Peduncles longer, slender hairy or glabrous. *Hab.* Pahang, Telom. Kedah, Gunong Bintang (Kloss). This form has even longer peduncles, 4 in. long and quite glabrous and slender.

(31) *S. caesia* *Stapf*, l.c. 36.

Ascending herb. Stem 3 in. long, densely hairy as are petioles; nerves beneath and inflorescence. Leaves dissimilar, large ones oblique elliptic blunt, base unequally cordate, fleshy blue green above; nerves 6 to 7 from near base, red beneath, 3 to 5 in. long, 1·75 to 2·75 in. wide; petioles 1 to 3·5 in. long. Small leaves minute ovate cordate. Cymes axillary, terminal 2 to 3 in umbel; peduncle 2-5 in. long. Flowers few or many, pink or white. Bracts oblong, blunt. Calyx obconic, scabrid, crimson, 12 in. long; teeth triangular acute. Petals oblong, cuspidate, 22 in. long. Capsule campanulate, tubercled. *Hab.* Perak, Gunong Batu Putih (Wray); Temengoh (Ridley).

(32) *S. bracteata* *Stapf*, l.c. 35.

Erect hairy, unbranched herb, 6 to 18 in. tall, densely hirsute. Leaves very unlike, large ones ob lanceolate-acuminate, base cordate asymmetric, sub-glabrous above, hairy beneath on the nerves, 3 to 7 in. long, 1 to 7 in. long, 1 to 1·7 in. wide, 5-nerved; petioles 2 to 4 in. long. Small leaves reniform, minute. Cymes axillary and terminal; peduncle 2 in. long, hairy. Flowers numerous. Bracts lanceolate, hairy, 1 in. long. Calyx short, campanulate, hairy; teeth lanceolate, narrow. Petals oblong cuspidate, white. Fruit turbinate, muricate. *Hab.* Perak, Thaiping Hills (Kunstler).

(33) *S. integrifolia* *Stapf*, *Ann. Bot.* vi. 312; *Journ. As. Soc. Beng.* lxix. 34.

A simple, rarely branched erect herb with creeping base rather stout, appressed hairy. Leaves very unequal and unlike, the larger ones oblong lanceolate inaequilateral, acuminate base narrowed cordate or acute, glabrous, plain dull green or with 2 or 4 rows of white spots, 3·5 in. long, 1 to 1·5 in. wide, 3- to 5-nerved, transverse nervules ascending; petioles 1 in. long. Small leaf minute ovate. Cymes axillary several 5 in. long with 4 or more flowers, hairy. Calyx hairy 2 in. long. Petals oblong acute, 15 in. long, pink or white. Capsule campanulate muricate, sub-sessile, 2 in. long. *Hab.* Dense hill jungle, common on the main mountain range. Selangor, Ginting Peras; Dusun Tua; Batu Caves. Perak, Changkat Serdang (Wray); Thaiping Hills.

Stapf's var. *acuminatissima*, l.c., is a narrow-leaved acuminate form with wavy leaf-edges. It occurs in the Thaiping Hills.
(34) **S. barbata** Ridl. *Journ. F.M.S. Mus.* x. 135.

Stem woody 6 to 14 in. tall, densely covered with rough brown hair. Leaves oblique, oblanceolate or obovate sub-acute, base unequally bilobed, membranous; nerves from base 5, glabrous, 6 to 8 in. long, 2·75 to 3 in. wide; petioles 1 in. long, thickly brown-hairy. Cymes in upper axils 1·75 to 3 in. long; peduncle slender, hairy. Flowers about 15 secund, mauve. Capsule campanulate pustular, 25 in. long; pedicel densely hairy, 12 in. long. *Hab.* Kelantan, Chaning and Kwala Lebir Woods; abundant (Ridley).

(35) **S. nidularia** Stapf, *l.c.* 37.

Ascending simple herb. Stem stout, tomentose, about 6 in. tall (erect part). Leaves very dissimilar, larger ones oblong or ovate-oblong sub-acute, base unequally cordate, inæquilateral rather fleshy, deep green, often with two large rows of white spots, glabrous except nerves 5, beneath, 3 to 4·5 in. long, 1 to 2 in. wide; petioles stout, tomentose, 15 to 6 in. long. Small leaves orbicular reniform 2 in. across. Cymes sessile terminal and axillary; bracts minute; flowers few or many; pedicels 1 to 3 in. long. Calyx campanulate, obconic, 12 in. long; teeth acuminate. Petals obovate, elliptic cuspitate, 25 in. long, dark mauve. Anthers oblong. Capsule turbinate muricate, 25 in. long. *Hab.* Mountain forests. Perak, Thaiping Hills; Waterloo (Curtis); Chanderiang (Kunstler).

(36) **S. calycula** Stapf, *l.c.* 43.

An ascending herb 4 in. long, tomentose on the stem, petioles and peduncles. Leaves very dissimilar, large ones nearly symmetric lanceolate, tapering to both ends, somewhat fleshy, 5-nerved from base pubescent beneath, 3·5 to 5·5 in. long, 8 to 1·25 in. wide; petioles 3·5 to 4 in. long; small leaves reniform, 0·5 in. long or less. Cymes terminal and axillary; pedicels filiform, 4 to 5 in. wide. Capsule semi-globose, smooth, 0·8 to 1 in. long, 1·2 in. wide; teeth of calyx margin triangular cuspitate. *Hab.* Dense woods. Pahang, Tahan River (Ridley). Flowers not seen.


Stem woody 6 in. tall, smooth. Leaves unequal, large ones ovoid lanceolate acuminate glabrous, winged to base of hairy petioles, midrib hairy; nerves 5 from base, 6 to 8 in. long, 3 in. wide; smaller leaves 4 in. long, 2 in. wide. Cymes scorpionid, many-flowered; peduncles hairy 1·5 to 2 in. long. Capsule smooth with faint traces of warts, 12 in. long; pedicel as long, ribbed. *Hab.* Forests, local. Kelantan, Kwala Lebir (Gimlette).


Stem over 8 in. tall, densely bristly-hairy as are the petioles; nerves beneath, in florescence and calyx. Leaves very dissimilar, large ones elliptic-oblong acuminate, base unequal cordate, sprinkled with coarse hairs above, membranous, 4·5 to 5 in. long, 1·5 to 2 in. wide; petioles 1 to 1·5 in. long; small leaves orbicular 1 in. long.
Cymes dense, many-flowered axillary; peduncles 2 in. long. Calyx 1 in. long, bristly cylindric-campanulate, red. Petals small, linear-oblong acute, white, bristly on back. Stamens 3; anthers oblong, blunt. Capsule campanulate muricate bristly narrowed to a short thick peduncle 2 in. long. Hab. Damp muddy spots at 4000 ft. altitude. Pahang, Gunong Tahan, in the Gully below the Plateau (Ridley).

(39) **S. costulata** Stapf, l.c. 39.
Dwarf herb. Stem 1 to 2 in. tall, hairy. Leaves large ones obliquely obovate-oblong sub-acute, base unequally cordate, dark green often red beneath, above sparsely bristly, margins ciliate beneath, hairy on the nerves; nerves 7, prominent beneath, 3 to 6 in. long, 1:3 to 2:5 in. wide; petioles hairy, 3 to 5 in. long; small leaves ovate cordate or reniform. Cymes terminal and in upper axils solitary or 2 on a short common peduncle ebracteate. Fruit semi-globose muricate, 15 to 18 in. wide. Hab. Local in lowland forests. Johor, woods at the foot of Gunong Pantai (Kunstler, Ridley).

This is really near *S. begoniæfolia*, but the leaves are stiffer, nerves more prominent and the cyme-peduncle very short.

(40) **S. microcarpa** Stapf, l.c. 38.
Habit of *S. brachyantha*, but hardly 6 in. tall. Stem hairy. Leaves dissimilar, large ones oblong to lanceolate acuminate, base unequally cordate, above sparsely hairy, dark, often with 4 or more rows of small white spots, beneath soft hairy, 2:5 to 4 in. long, 1 to 1:5 in. wide; petioles 15 to 4 in. long; small leaves reniform sessile, 2 in. long. Cymes axillary terminal, sub-sessile or peduncled up to 5 in. long. Calyx campanulate short-toothed, hairy; teeth triangular. Petals oblong acute 25 in. long, pink. Anthers oblong blunt. Capsule pink turbinate, minutely muricate 11 in. long. Hab. Perak; upper, at 300 ft. altitude (Wray).


An ascending herb 6 in. tall, seldom branched, softly hairy all over or the leaves glabrous above. Leaves very dissimilar, large ones obliquely oblong acuminate, unequally cordate, 3 to 6 in. long, 1:2 to 2:5 in. wide; nerves 6 to 8; petioles 4 to 2 in. long; small leaves round cordate, petioled, 4 in. long. Cymes terminal axillary 1 to 4, dense; peduncles 5 to 2 in. long. Calyx cylindric-campanulate, 15 in. long, hairy. Petals oblong acute, white or pink. Stamens 3, oblong. Capsule turbinate, 15 in. long, muricate, hairy. Hab. Lowland and low hill woods, usually sporadic, variable in hairiness, Singapore, Bukit Timah; Chanchu Kang. Johor, Gunong Pantai. Pahang, Tahan River; Gunong Tahan (Robinson), Negri Sembilan Seremban (Napier); Bukit Tumiang (Cantley). Selangor, Bukit Hitam. Perak, Keledang; Bujong Malacca. Dindings, Lumut.

The Penang Hill plant is more softly-hairy and has longer peduncles. It is the *S. moluccana* of Jack and Wallich, and is separated by Stapf as *S. paradoxa*. Roxburgh’s description of *S. moluccana* is too short, and no specimens of his type are to be seen. I have seen no species of *Sonerila* from the Moluccas at all, and it seems quite likely that Roxburgh got it from Penang and localised it wrongly.

(42) **S. macrophylla** Stapf, *l.c.* 39.

Ascending herb 3 to 8 in. tall, internodes 1·5 in. long, hairy. Leaves unequal asymmetric, oblique elliptic acuminate unequally cordate, thickly hairy all over, 4 to 6 in. long, 1·5 to 2·3 in. wide; petioles 1 in. long; small leaf ovate cordate, 2 in. wide. Cymes dense, terminal-axillary, 1 or 2 on a peduncle many-flowered, densely hairy. Calyx narrow cylindric, densely long-hairy ·14 in. long. Petals oblong, acute, ·3 to ·35 in. long. Fruit turbinate muricate ·2 in. long and wide. *Hab.* Perak, locality unknown (Scortechini). var. *laxipilosa* Stapf, *l.c.*

All parts hairy. Leaves to 6 in. long, ·3 to ·5 in. wide. Peduncles to 3 in. long. *Hab.* Perak, Ipoh (Curtis). Penang, Pulau Betong (Curtis).

(43) **S. brachyantha** Stapf, *l.c.* 37. *S. trachyantha*, *Stapf*, in *Herb. Kew*.

An ascending simple or sparse-branched herb about 8 in. tall, entirely softly crimson-hairy. Leaves very dissimilar, larger oblique ovate cordate acuminate, inaequilateral, membranous, dark green above, red beneath, 2 to 4 in. long, 1 to 1·5 in. wide, 5-nerved; petioles ·5 in. long to none; small leaves ovate cordate reniform ·15 in. long. Cymes axillary, terminal, 1 to 3 together, sub-sessile, dense; bracts small filiform. Calyx narrow, campanulate, ·12 to ·15 in. long; teeth lancelate. Petals oblong acute, ·25 in. long, pinkish white or pink, a line of hair on back; anthers oblong blunt. Capsule campanulate closely tubercled hairy, ·2 in. long. *Hab.* Mountains, not rare, Pahang, Wray’s Camp, Tahan. Selangor, Gunong Mengkuang Lebah (Robinson); Perak, Gunong Kerbau at 4500 ft. altitude (Robinson); Gunong Inas 5000 ft. altitude (Wray); Goping (Kunstler); Chanderiang (Kunstler).

(44) **S. elatostemoides** Stapf, *l.c.* 42.

An ascending, unbranched herb 12 in. tall or less, softly tomentose all over. Leaves dissimilar, larger one asymmetric, oblique obovate or elliptic acute, unequally cordate 2·2 to 2·8 in. long, 1 to 1·2 in. wide, 6- to 7-nerved from the base; petioles ·18 to ·4 in. long; small leaf reniform, ·15 in. wide. Cymes terminal axillary, few-flowered; peduncles ·6 to 1 in. long. Calyx oblong campanulate, ·08 in. long. Petals oblong, acute, hairy on the back; anthers oblong. Fruit semi-globose muricate ·12 in. long. *Hab.* Mountains, rare, Perak, Gunong Bubu at 5000 ft. altitude (Wray).
(45) *S. bicolor* Staff, l.c. 43.

Ascending herb, 3 to 9 in. tall, softly hairy all over. Leaves, larger one oblique-oblong to lanceolate-oblong acuminate unequally cordate, membranous, dark green or purple with light green central band above, purple beneath; nerves 5 from near base, 3 to 6 in. long, 1 to 5 in. wide; petioles 2 to 6 in. long; small leaves ovate-cordate, 4 in. long or less. Cymes terminal axillary, few to 10-flowered; peduncles 4 to 2 in. long. Calyx oblong-campanulate, 12 in. long. Petals elliptic-oblong, acute, pink, 35 in. long. Anthers linear-oblong. Fruit 12 to 15 in. long, semi-globose, muricate. *Hab.* Woods, Selangor, Gombak (Ridley). Perak, Ulu Selama (Wray); Chanderiang (Kunstler); Tapah (Baldwin).

13. **Sarcopyramis**, Wall.

Weak herb. Leaves ovate or lanceolate, serrulate, 3-nerved, equal, similar, membranous. Flowers in a terminal cluster, short peduncled, pink, surrounded by leaf-like bracts. Calyx obpyramidal 4-winged, 4-toothed. Petals 4, ovate. Stamens 8 equal; anther oblong, spurred at back. Capsule crowned with 4 long scales, 4-valved. Species 2 to 3, India, Philippines, China.


Stem 2 to 6 in. long, rarely more. Leaves 2 to 4 in. long, 1 in. wide, glabrous, thin, ovate-lanceolate acuminate; petioles 25 to 5 in. long. Petals hardly 25 in. long. Fruit 4-angled, campanulate, smooth; scales large veined. *Hab.* Rare in mountain woods, Pahang, Telom (Ridley). *Distrib.* India, Burma, China.


Herbs creeping or rarely erect shrubby. Leaves large orbicular, rarely ob lanceolate, 7- to 9-nerved. Flowers umbellate or in a dense head or panicked, magenta, rose or white, showy. Calyx-tube campanulate; teeth 4 or 5, setose. Petals 4 or 5, ovate acute. Stamens 5 or 8, equal; anthers elongate not appended. Ovary 4-celled, glabrous. Capsule funnel-shaped opening by 4 valves at the tip.

An erect shrub; leaves ob lanceolate.

Flowers in compound umbels

Herbs creeping; leaves orbicular or ovate.

Flowers panicked or racemose, small, white.

Plant glabrous; leaves round, cordate entire

Stem and petioles red hairy; leaves ovate toothed

(1) *P. tuberculata*

Flowers large umbellate, pink.

Plant glabrous

Plant hairy

Flowers magenta in an involucrate head

(6) *P. rotundifolia*

(1) *P. tuberculata* King, l.c. 44.

Stem woody, 2 to 3 ft. tall, stout. Leaves in a whorl at the
top, several oblanceolate gradually narrowed to the base, cuspidate, hairy on both sides especially on the 9 slender nerves and nervules beneath and on the edge, 10 to 16 in. long, 3 to 6 in. wide; petioles hairy winged to base or nude for an inch. Umbellules umbellate in several terminal umbels (11 or more) on a peduncle 8 in. long, hairy. Bracts to umbel oblong, blunt ·2 in. long. Peduncles of umbellules 1 in. long, with bracts ·2 in. long. Flowers in umbellule 3 or 4; pedicels ·2 in. long. Calyx cylindric ·2 in. long with numerous fleshy stalked glands. Petals oblong acuminate; deep magenta ·25 in. long. Stamens 8; filaments bright pink. Capsule trigonous, obvoid ·3 in. long. Hab. Mountain forests on damp rocks, 2000 to 5000 ft. altitude. Selangor, Gunong Mengkuang Lebah (Robinson); Perak, Bujong Malacca (Curtis).

This very remarkable and handsome plant differs entirely from the rest of the genus in its habit, compound umbels and the curious stalked glands on the calyx.

(2) P. Griffithii King, l.c. 45. Allomorpha Griffithii Hook. fil. F.B.I. ii. 527; Bot. Mag. t. 7334.

Stem woody, creeping slender, 2 in. long. Leaves 2 to 3, round, cordate, entire, glabrous; nerves 7, from base transverse, numerous conspicuous; nervules horizontal; 5 to 8 in. long, 4-8 to 8 in. wide, dull green above, red beneath; petioles 4 to 8 in. long. Panicles sub-terminal, slender 8 to 9 in. long, with 5 or 6 distant clusters of small white flowers; pedicels ·2 in. long, slender pubescent. Calyx cylindric as long. Petals 4, small oblong. Stamens 8, yellow. Hab. Common in low country woods. Malacca (Griffith); Ayer Panas (Hullett); Jasin; Bukit Sadanen (Derry). Negri Sembilan, Sulu (Cantley). Selangor, Rantau Panjang (Kloss); Kwang; Kwalal Lumpur. Perak, Goping (Kunstler); Thaiping Hills; Changkat Mentri (Kloss). Native names: Kapo-Kapo; Kurukap Rimbah; Tutup Bumi Rimbah.


Stem hairy. Leaves ovate cordate, abruptly acuminate, edge crenate-dentate, teeth with one long red hair; nerves 9 from base with transverse nervules prominent, hairy beneath, above glabrous, 9 in. long, 7 in. wide; petioles stout, 6 in. long, red-hairy. Panicle 4 to 5 in. long on peduncle 12 in. long; branches at base few, short, above racemose. Flowers 3 on a branch, glabrous, small. Bracts minute, lanceolate. Calyx ·25 in. long, cylindric; teeth 5. Petals lanceolate. Stamens 5, similar; anthers muticous. Capsule sub-globose, base truncate, valves broad; pedicels ·5 in. long. Hab. Johor, Gunong Janeng (Kelsall). Native name: Kaka pullum.

(4) P. Scortechinii King, l.c. 45.

Glabrous. Stem short stout, woody. Leaves orbicular-ovate cordate apiculate, glabrous; nerves 9, and nervules prominent beneath, 5 to 10 in. long, 5 to 9 in. wide; petioles 4 to 9 in. long. Peduncles 10 to 12 in. long; umbel of about 16 flowers, ebracteate;

(5) P. hispida King, l.c. 46.
Stem short woody hispid. Leaves 2 to 3, ovate cordate acuminate dentate, glabrous or nerves and nervules beneath hairy, 5 to 10 in. long, 3 to 7 in. wide; petioles hispid 4 to 12 in. long. Peduncle 6 to 9 in. long, glabrous or hispid, red; umbel 7-flowered; pedicels slender 2 in. long; bracts none. Calyx cylindric, red glabrescent. Petals ovate acute 5 in. long, rose pink. Stamens 8, base yellow, above violet. Capsule bristly semi-globose. Hab. Common in mountain woods, Pahang, Tahan River and Telom. Selangor, Semangkok Pass. Perak, Ulu Batang Padang; Thaiping Hills; Temengoh. Kedah, Gunong Bintang (Kloss). Tomoh (Machado).

Stem creeping short. Leaves orbicular or obovate cordate, shining dark green above, red, beneath 7-nerved transverse; nervules conspicuous, glabrous or sparsely hairy above, glabrous beneath, 3 to 6 in. long, 2.5 to 4.5 in. wide; petioles 2 to 4 in. long, red bristly along upper edge. Capitulum dense, 1 in. through; peduncle 1 to 3 in. long. Bracts 5 in. wide, ovate, magenta. Flowers 12 to 20 in the head; pedicels 1 in. long, magenta. Calyx campanulate; teeth bristly 2 in. long. Capsule cupular quadrangular 2 in. long; pedicel 2 in. long smooth. Hab. Common in woods, whole peninsula, from Johor Ulu Batu Pahat (Kelsall) to Perak and Kedah, Gurun (Robinson). Distrib. Sumatra. Native names: Banau or Banal Hutan; Poko Fatimah. Uses: A decoction of the leaves used in fever.

15. MARUMIA, Bl.
Twining shrubs. Stems rather slender and long. Leaves coriaceous, cordate 5-nerved, stellate tomentose beneath. Cymes axillary. Flowers few, white or rose-coloured. Calyx narrow campanulate, tomentose bristly or stellate-hairy, 4-lobed. Petals 4, obovate. Stamens 8, unequal; anthers elongate with 1 pore, connective of the larger ones with 2 bristles in front and 1 or 2 spurs or twisted bristles behind. Ovary 4-celled, tip hairy. Berry ellipsoid, limb persistent. Species 10, Malayan.

Calyx-tube without bristles; petals pink . . . . (1) M. nemorosa
Calyx-tube bristly.
Flowers solitary axillary white . . . . . (2) M. rhodocarpa
Flowers in axillary and terminal cymes of 2 and 3, peduncled . . . . . . . . . . (3) M. reticulata
(1) **M. nemorosa** Bl. Flor. xiv. 505; *Clarke, in Hook. fil. F.B.I. ii. 542; King, l.c. 47.*

A tall slender climber covered entirely except upper side of leaves, petals and stamens with dense reddish tomentum, no bristles. Leaves oblong-lanceolate sub-cordate, 3 to 6 in. long, 1-35 to 2-75 in. wide; petioles 2 to 4 in. long. Flowers 1 to 3 in a cyme, 1-75 in. wide. Calyx-tube 1.75 in. long, constrict below the lobes, narrowed at base, lobes long triangular. Petals rose pink. Fruit 1 in. long, stellate-tomentose. *Hab.* Common on borders of forests. Johor, Kwala Sembrong (Kelsall); Gunong Pantai. Malacca, Tebong (Griffith). Pahang, Kwala Tahan. Selangor, Rantau Panjang (Kloss); Bukit Kutu; Semangkok Pass. Negri Sembilan, Berum-bun (Cantley); Perhentian Tinggi. Perak, Jarah (Wray); Ipoh (Fox). Province Wellesley, Tasek Gelugur (Fox). Penang (all collectors). Tringganu, Bundi (Rostado). Kedah Peak, Semling (Haniff). *Distrib.* Sumatra, Borneo.


(2) **M. rhodocarpa** *Cogn. Mon. Phan.* vii. 550; *King, l.c. 48.*  

M. zeylanica *Clarke, in Hook. fil. F.B.I. ii. 542.* A tall slender climber entirely covered except the upper side of the leaves, petals and stamens with thin tomentum and stiff black bristles. Leaves oblong, apiculate, base round, glabrous above, light brown tomentose beneath, 3-5 to 5 in. long, 1 to 2 in. wide; petioles 15 to 2 in. long. Flowers in axillary cymes of 3 on peduncle 5 in. long, and pedicels as long or shorter, 2 in. across, Calyx 5 in. long, red-hairy. Petals white with a purple spot at the base. *Hab.* Edges of woods. Singapore (Wallich); Garden Jungle; Bukit Timah; Pulau Buru. Malacca (Cuming, Griffith).

Clarke's var. *subglabrata* is based on the leaves of a young plant, which are nearly glabrous.

(3) **M. reticulata** Bl. Ann. Mus. Bot. Lugd. Bat. i. 34; *King, l.c. 49.*  

Climber. Stem angled, rusty-tomentose with black hairs, as is the inflorescence and calyx. Leaves ovate lanceolate acuminate, cordate, above glabrous, beneath scurfy and stellate tomentose; nerves and transverse nervules strongly elevate, 2 to 3-5 in. long, 8 to 1.5 in. wide; petioles 1-1 in. long. Flowers 1-25 in. across, solitary or in peduncled cymes of 3. Calyx .5 in. long, densely covered with long bristly hairs. Petals ovate-oblong, pink. Stamens lilac, the shorter ones white. *Hab.* Malacca, Kesang (Griffith, Maingay). *Distrib.* Sumatra, Java.

Owing to the suppression of the leaves at the ends of the shoots, the inflorescence is often practically a terminal panicle, as in *Dissocheta.*
16. **DISSOCHÆTA, Bl.**

Slender, twining tall shrubs. Leaves elliptic or oblanceolate, base round, 5-nerved from base. Panicles terminal. Flowers rather small, rosy or white. Bracts sometimes large. Calyx campanulate or funnel-shaped, tomentose, pubescent or glabrous, 4-toothed. Petals 4. Stamens 8, 4 of which are sometimes imperfect, shorter or suppressed, the four longer ones have 2 long bristles in front from the base. Ovary 4-celled. Berry ovoid or elliptic. Species 25, Malayan.

Stamens 8 (4 sometimes imperfect).
Young parts and underside of leaf persistently tomentose.

- Plants not bristly.
  - Flowers large, 1.5 in. long . . . . . (i) **D. annulata**
  - Flowers smaller, 75 in. long . . . . . (2) **D. punctulata**
  - Plants covered with long bristles . . . (3) **D. hirsuta**
Young parts deciduously tomentose.
  - Bracts large, ovate . . . . . (4) **D. bracteata**
  - Bracts small, linear . . . . . (5) **D. pallida**
  - Young parts scaly, not tomentose . . . (6) **D. gracilis**

Stamens 4 only.

- Bracts caducous or o.
  - Leaves rufous beneath; petals oblong blunt . . (7) **D. celebica**
  - Leaves hardly rufous; petals ovate acute . . . (8) **D. intermedia**
  - Bracts oblong persistent.
    - Panicle spreading . . . . . (9) **D. anomala**
    - Panicle dense . . . . . . . . . . . (10) **D. Scortechnii**

(1) **D. annulata** Hook. fil. Triana. Trans. Linn. Soc. xxviii. 83; King, l.c. 50.


(2) **D. punctulata** Hook. fil. Triana l.c.; Clarke, in Hook. fil. F.B.1. ii. 543; King, l.c. 51.

Branchlets, nodes thickened, not annulate; with petioles, under-surface of leaves and inflorescence covered with rusty scales. Leaves oblong-ovate, base round, entire, acute, above glabrous, 3 to 4.5 in. long, 75 to 1.75 in. wide; petioles 25 to 4 in. long. Panicles 4 to 6 in. long; branches short. Flowers 7.5 in. long. Calyx funnel-shaped. Petals ovate; stamens 8. Fruit urceolate, sub-glabrous. **Hab.** Forest edges. Singapore, Pungul Road
(Murton); Bukit Timah. Johor, Pinerong (Cantley); Tana Runto; Gunong Pulai. Malacca, Sungei Hudang (Derry); Bukit Bruang. Selangor, Sempang. Penang, Balik Pulau (Foxworthy).  
Native name: Akar Meroyan Busuk.

3) **D. hirsuta** Hook. fil. Triana l.c.; King, l.c. 51.  
Plant covered except upper surface of leaves and petals with stellate hairs mixed with long stiff hairs. Leaves lanceolate or ovate lanceolate cordate acuminate 3 to 4.5 in. long, 1 to 1.75 in. wide; petioles 1.15 in. long. Panicles 5 to 6 in. long and as wide on peduncles 3 in. long. Flowers bright pink. Calyx 93 in. long, funnel-shaped on a pedicel as long. Petals lanceolate. Stamens 8. Fruit ovoid-globose. Hab. Thickets in lowlands, very local. Johor, open country towards Gunong Pantai (Kunstler, Ridley).  
Distrib. Borneo.

4) **D. bracteata** Bl. Flora 1831, p. 495; Clarke, l.c. ii. 543; King, l.c. 52.  

5) **D. pallida** Bl. Flora 1831, p. 500; Clarke, l.c. ii. 544.  

6) **D. gracilis** Bl. Flora 1831, 498; King, l.c. 53.  
A slender climber. Branches very slender, ringed at nodes, almost completely glabrous all over. Leaves lanceolate-acuminate, base rounded, 3 to 4.5 in. long, 1.5 to 1.8 in. wide; petioles 2 in. long. Panicles axillary and terminal, latter over a foot long, lax, slender, spreading. Flowers many, white, 925 in. long. Calyx campanulate, 91 in. long. Petals ovate to orbicular. Stamens 8, pink, 4 large and 4 small, imperfect. Fruit sub-globular, 915 in. long. Hab. Common on the edges of woods. Singapore, Bukit.

**Distrib.** Java, Borneo.

(7) **D. celebica** Bl. Ann. Mus. Bot. Lugd. Bat. i. 36; Clarke, l.c. ii. 544; *King, l.c. 54.*


(8) **D. intermedia** Bl. Flora 1831, p. 493; *King, l.c. 54.*


(9) **D. anomala** *King, l.c. 55.*

A rather slender, woody climber. Young branches sparsely hairy becoming glabrous. Leaves oblong-ovate, bluntly cuspidate, base round, broad, above glabrous, beneath sparsely stellate-hairy on the nerves, 3·5 to 6·5 in. long, 1·75 to 2·75 in. wide; petioles short, thick, bristly. Panicles numerous axillary, terminal, wide spreading 3 to 4 in. long, the branchlets ending in cymes of 3 small white flowers. Bracts to branches and cymes oblong blunt hairy, ·2 in. long. Calyx campanulate, tomentose, truncate. Petals ovate acuminate. Stamens 4, with filamentous appendages. Fruit campanulate, ·15 in. through, bluish black or purple. *Hab.* Forests, not common, Perak, Larut 500 to 800 ft. altitude (Kunstler). Kelantan, Chaning (Ridley).

(10) **D. Scortechinii** *King, l.c. 55.*

Branches thinly clothed with pale stellate hairs. Leaves ovate-lanceolate, base broad cordate, tip blunt acuminate, glabrous above, rusty and stellate hairy beneath, 2 to 3·75 in. long, 1·5 to
2 in. wide; petioles tomentose, 1 in. long. Panicles terminal, 2 in. long, dense, tomentose; bracts many, oblong or spatulate. Flowers 3 in. long, short pedicelled. Calyx narrow campanulate truncate tomentose. Petals orbicular-ovate acuminate. Stamens 4, ovate with 2 long filiform appendages. *Hab.* Rare and seldom collected. Perak (Scortechini). Penang (Curtis).

17. *ANPECTRUM*, A. Gray.

Slender twining shrubs. Leaves sub-coriaceous, oblong-lanceolate, 3- to 5-nerved from base. Flowers white or pink in terminal panicles. Calyx-tube funnel-shaped or ovoid, limb shortly 4-lobed or truncate. Petals 4. Stamens 4 or 8, four perfect; anthers acuminate, opening by one pore; connective shortly appendaged, rarely with a long appendage, never with 2 long bristles in front. Ovary 4-celled. Berry ovoid or globose. Species about 18, Malayan.

Stamens 4, perfect.

- Nodes of branches and panicle bristly
- Calyx funnel-shaped; stamens 4 only
- Stamens 8, 4 smaller
- Stamens 8, all perfect
  - (1) *A. lepido-setosum*
  - (2) *A. glaucum*
  - (3) *A. pallens*
  - (4) *A. divaricatum*
  - (5) *A. anomalum*

(1) *A. lepido-setosum* King, *l.c.* 56.

Branches strongly ringed at nodes, stiff, bristly. Leaves oblong-lanceolate, caudate acuminate, base cordate, glabrous except a few hairs at base, 4-5 to 6 in. long, 1-1 to 1-8 in. wide; petioles 1 in. long or more, very bristly. Panicles terminal, 3 to 4 in. long, bristly. Calyx-tube cylindric scaly, mouth bristly. Petals ovate. Stamens 4 large broad, 4 small linear. Capsule ovoid, globalar, 1-5 in. long. *Hab.* Perak (Scortechini). Penang Hill (Curtis). *Distrib.* Borneo.

(2) *A. glaucum* Triana, *Trans. Linn. Soc.* xxviii. 84; *Clarke, in Hook.* fil. *F.B.I.* ii. 545; *King, l.c.* 57.

(3) **A. pallens** Bl. Ann. Mus. Bot. Lugd. Bat. i. 38; Clarke, l.c. ii. 545; *King, l.c. 57.*

Slender climber. Young parts rufous-tomentose. Leaves oblong caudate-acuminate, base round or cordate, 3 to 4 in. long, 1·5 in. wide; petioles 2 in. long, edge bristly. Panicles terminal with one or two smaller ones in upper axils, 3 to 6 in. long rufous-tomentose; flowers cymose 2 in. long, white. Bracts linear oblong, 3 in. long. Calyx pubescent when young, cylindric, 1 in. long. Bud acute. Anthers 4 large, curved, 4 small linear. Fruit globose, 15 in. through. *Hab.* Hill forests, scarce, Penang, West Hill (Curtis). Perak, Thaiping Hills (Derry).

var. b. **petiolare** Ridl. Melastoma petiolare Wall. Cat. 4053.

Leaves lanceolate acuminate, 2 in. long, 1·75 in. wide, base narrowed shortly or rounded, not cordate; petioles 1 to 2 in. long. Cymes axillary 1 in. long, numerous, terminal one, if present, small 3- to 4-flowered. Flowers white 1 in. long. Calyx cylindric, urn-shaped. Petals short. Fruit 1·2 in. long, globose, narrowed at top below the limb. *Hab.* Common in woods. Singapore, Pulau Ubin; Selitar. Johor, Tebing Tinggi. Malacca (Maingay). Perak, Thaiping Hills; Gunong Keledang; Ulu Bubong (Kunstler). Penang, West Hill. Province Wellesley, Batu Kawan (Curtis). *Distrib.* Borneo and Sumatra.

(4) **A. divaricatum** Triana, Trans. Linn. Soc. xxviii. 84, t. vii. f. 90b. Clarke, l.c. ii. 546; *King, l.c. 58.*

Climber. Branches slender covered, as are petioles; nerves of leaf and inflorescence with scaly scurf. Leaves lanceolate acuminate, base cordate, 2 to 3 in. long, 6 to 1·1 in. wide; petioles 1·5 to 2·5 in. long. Panicles terminal, 4 to 6 in. long; branchlets spreading with two ovate-lanceolate scurfy bracts at the base. Cymes 3-flowered. Flowers 4 in. long. Buds violet. Calyx obovoid, tomentose, violet. Petals oblong, acute, white; anthers 8, 4 large, thick, 4 narrow, smaller. Fruit globose-ovoid, 2 in. long. *Hab.* Edges of forests climbing on trees. Johor, Bukit Banang. Malacca, Merlimau and Sungei Hudang (Derry). Selangor, Rantau Panjang (Kloss); Kwala Lumpur; Dusan Tua. Negri Sembilan, Gunong Angsi; Perhentian Tinggi; Bukit Tangga, Seremban (Napier). Perak, Thaiping Hills; Kamuning. Province Wellesley, Permatang Bertam. Penang Waterfall. *Distrib.* Sumatra, Borneo, Java. *Native names:* Akar Kamunting; Akar Kamunting Bukit; Akar Chambai Hantu.

(5) **A. anomalum** *King, l.c. 58.*

A woody creeper 20 to 30 ft. long, epiphytic on tree-tops, roots encircling the branches. Young parts scurfy. Leaves small obovate, tip round, base narrowed, coriaceous, glabrous above, stellate hairy beneath; midrib strongly elevate beneath with a pair of nerves from the base, other nerves and reticulations invisible, 1 to 1·5 in. long, 6 to 9 in. wide; petioles 2 in. long. Panicles
3 to 6 in. long, lax, many-flowered. Bracts minute. Flowers about 0.5 in. long green with light pink petals. Calyx cylindric, campanulate truncate, 0.2 in. long. Petals oblong blunt, reflexed. Fruit small, globose crowned with the truncate calyx. Hab. Epiphytic, rare. Perak, Goping (Kunstler).

18. MEDINILLA, Gaud.

Epiphytic shrubs, rarely climbing. Leaves opposite or whorled (rarely alternate) fleshy 3- to 9-nerved from base. Flowers in lateral or terminal cymes or panicles, white or rose, 4- or 5- (rarely 6-) merous, often showy. Calyx-tube ovoid or cylindric, limb truncate or teeth obscure. Stamens 8 or 10; anthers opening by 1 pore; connective with 2 tubercles beneath and 1 spur behind. Ovary 4- to 6-celled. Fruit, a berry. Species 100, mostly Malayan, India, Ceylon, a few Polynesian and African.

Flowers 4-merous.
Leaves alternate, a creeper on trees
Leaves whorled, large, erect; shrubs with big panicle
Leaves opposite; compound cymes terminal.
Cymes axillary; flowers 1 in. wide; leaves elliptic
Cymes axillary; leaves lanceolate
Flowers small under 0.5 in. long.
Leaves petiolate, narrowed at base
Leaves petiolate, base round
Leaves sessile; panicles brilliant red
Leaves obovate, nerveless, "65 in. long

Flowers 5-merous.
Leaves small, obovate tip round.
Nerves 3, visible
Nerves invisible
Leaves large, coriaceous, elliptic-orbicular
Leaves lanceolate, petiolated; flowers large in fascicles
Leaves thin, elliptic-lanceolate, sessile; flowers in a long pendent cyme

(1) **M. scandens** King, l.c. 60.
A creeper on trees with many short roots. Leaves alternate, sub-coriaceous, glabrous, elliptic or ovate-oblong, shortly acuminate, base cuneate, 4 to 9 in. long, 2.5 to 6 in. wide; petioles 1.5 to 7 in. long. Flowers in dense fascicles in axils of fallen leaves. Calyx-tube campanulate 1.5 in. long, limb truncate. Petals 4, ovate oblong acute, dull pink. Stamens 8. Hab. Mountain woods. Perak, Bujong Malacca (Curtis); Tapah; Thaiping Hills.

(2) **M. speciosa** Bl. *Flora* 1831, p. 515; *Bot. Mag.* t. 4321; *Clarke, in Hook. fil.* F.B.I. ii. 540; *King, l.c. 60.
A big shrub about 5 ft. tall with thick 4-angled branches, nodes bristly. Leaves sub-coriaceous, whorled in threes, sessile or nearly so, light green, oblanceolate or obovate-oblong, base cuneate,

(3) **M. heteranthera** King, l.c. 61.

Shrubby epiphyte 3 to 6 ft. tall. Leaves ovate-lanceolate or lanceolate to elliptic cuspidate acuminate, base shortly narrowed, 2 to 5 in. long, 1 to 2 in. wide; petioles '3 to '8 in. long. Compound cymes terminal, '15 to 2 in. long. Flowers few, about 9, white tinted pink. Calyx cylindric, '2 in. long; teeth broad. Petals 4, ovate, lanceolate, acute. Stamens 8; anthers 4 large, 4 small, curved acuminate, base 2-tuberced. Fruit globose-ovoid, '35 in. long. Hab. Mountain forests. Perak, Thaiping Hills, 3500 to 4800 ft. altitude (Kunstler, Curtis); Batang Padang (Kunstler); Gunong Batu Putih (Wray).

var. *latifolia* King.

A form or state with leaves rather larger than in some specimens occurs in the same area.

(4) **M. venusta** King, l.c. 61.

A shrubby epiphyte 2 to 4 ft. long. Stems pale, tubercled. Leaves fleshy, coriaceous, sessile or very shortly petioled, elliptic acuminate, base narrowed; nerves one pair ascending to the leaf tip from the midrib 1 in. from the base, 6 to 9 in. long, 2·75 to 4 in. wide. Cymes axillary, 6-flowered, 1·5 in. long; pedicels slender. Flowers nearly 1 in. across, white. Calyx campanulate, hardly toothed, '35 in. long. Petals broad, ovate, blunt. Stamens 8, equal, white, connective and appendages yellow. Hab. Mountain forests, 4000 to 5000 ft. altitude. Perak, Thaiping Hills (Kunstler). Pahang, Telom (Ridley).

var. *chionantha* Ridl. M. chionantha * Stapf, Kew Bulletin* 1906, p. 733, is a variety with 10 stamens sent home alive from Perak by Curtis and cultivated by Veitch.

(5) **M. Hasseltii** Bl. *Flora* 1831, p. 513; Clarke, in *Hook. fil. F.B.I.* ii. 62; King, l.c. 62 and var. *Griffithii* Clarke, l.c.c.

An epiphyte. Stems few, slender, 2 to 3 ft. tall, warted. Leaves coriaceous, oblong lanceolate acuminate, base narrowed, rounded, 4'5 to 5'5 in. long, 1·25 to 1·75 in. wide; petioles '25 in. long. Cymes axillary, below leaves, 1·3 to 2 in. long, 1 to 3 in. wide. Flowers 8 to 12, pinkish white, '35 in. long. Calyx cylindric, campanulate, 4-toothed. Petals 4, obovate. Stamens 8 equal, linear oblong, 2 short conic processes in front and one behind at base. Fruit '25 in. through, orange scarlet, as is the whole infrutescence. Hab. Low country in wet woods up to 4500 ft. altitude,


Stems 4 to 5 ft. long, pendulous, warted. Leaves sub-fleshy ovate acuminate, blunt, base broad, 4 in. long, 1.25 in. wide; petioles 12 in. long, stout. Cymes axillary, 1-25 in. long. Flowers 25 in. long. Calyx urn-shaped. Petals oblong-ovate, blunt 12 in. long, white. Stamens 7 (or 8?) violet; anther lanceolate-acuminate. **Hab.** Rare on trees overhanging river. Johor, Kota Tinggi (Ridley).

(7) **M. Scortechinii** King, l.c. 62.

Epiphyte. Stems warty, 3 to 4 ft. tall. Leaves coriaceous, sessile oblong-ovate short acuminate, sub-cordate, 4.5 to 6.5 in. long, 1.5 to 2.75 in. wide. Panicles cymose, lax, many-flowered, 4 in. long, entirely bright cherry red. Flowers 4 in. long; pedicels as long. Calyx campanulate; limb very short. Petals 4, acute, oblong. Stamens 8; anthers linear-lanceolate with a short spur at base and linear curved tubercle at base of each anther-cell. Fruit sub-globular, 2 in. long. **Hab.** On trees in dense forest on mountains at about 3000 to 4000 ft. altitude. Selangor, Bukit Hitam. Perak, Thaiping Hills (Scortechini, Kunstler); Gunong Batu Putih (Wray); Hermitage Hill (Curtis); Bujong Malacca.

(8) **M. Maingayi** Clarke, in Hook. fil. F.B.I. ii. 549; King, l.c. 63.


(9) **M. Clarkei** King, l.c. 63. M. rosea, Clarke, l.c. ii. 547 (not of Gaudichaud).

Bushy epiphyte about 2 ft. tall. Branches tubercled. Leaves in whorls of 3 to 4, coriaceous, elliptic to obovate, blunt or sub-acute; nerves 3, often invisible, 1 to 2.75 in. long, 75 to 1.8 in. wide; petioles 4 to 8 in. long. Cymes spreading, lax 1.5 to 3 in. long, in lower axils. Flowers 20 to 30 rosy white, 3 in. long. Calyx cupular. Petals 5, round or ovate blunt. Stamens 10;
anthers linear-lanceolate, 2 small tubercles in front, one small spur behind. Fruit globular truncate, 15 in. through. *Hab.* Mountains from 3000 to 5000 ft. altitude. Malacca, Mt. Ophir (Griffith). Pahang, Bukit Fraser (Foxworthy). Selangor, Gunong Semangkok; Menuang Gasing (Kloss); Mengkuang Lebah (Robinson); Bukit Kutu. Perak, Gunong Bubu (Kunstler); Gunong Inas (Wray); Gunong Batu Putih (Wray); Gunong Kerbau (Robinson). *Distrib.* Sumatra.

The Selangor plants have larger, thinner leaves with conspicuous nerves and larger cymes, those of Mt. Ophir, Gunong Kerbau, etc., have small fleshy leaves with no visible nerves except the midrib, and with dense cymes.


(11) *M. perakensis* King, l.c. 64.

A bushy epiphyte with tubercled branches. Leaves 3 or 4 in a whorl, coriaceous, elliptic round, base round sub-cordate, 2 to 5 in. long, 1.75 to 3.75 in. wide; petioles 6 to 1.2 in. long, red. Panicles axillary, cymose, 3 in. long, peduncled, 12- to 20-flowered. Flowers 5 in. long, pedicels 35 in. long, red in fruit. Calyx cupular, teeth 5, broad. Petals 5, oblong; anthers 10 with 2 yellow tubercles at base in front and a spur behind. Fruit 35 in. through, pink on dark pink stalks. *Hab.* Mountain forests. Selangor, Mengkuang Lebah (Robinson). Perak, Gunong Batu Putih 6000 ft. altitude (Wray).

(12) *M. crassinervia* Bl. *Flora* 1831, 510; King, l.c. 64. *M. macrocarpa* Clarke, l.c. ii. 547 (not of Blume).


Large shrub. Stems 4-angled, smooth. Leaves sessile, paired, fleshy ovate acuminate, 6 in. long, 2.5 in. wide. Inflorescence
pendulous; peduncles 6 to 8 in. long, cymose branched at top. Cymes nearly 3 in. across, spreading. Flowers 1 to 3 in cyme, white fragrant; pedicels ’5 in. long. Calyx cupular, edge undulate. Petals 5, obovate, rounded ’3 in. long. Stamens 10; anthers with blunt bilobed bases and a keeled point and a spur on back. Hab. Very rare on rocks in forest, a charming plant. Perak, Gunong Berumbun near Telom at 6000 ft. altitude (Ridley).

19. POGONANTHERA, Bl.

Shrubs, epiphytic or rock-growing. Leaves opposite oblong or ovate 3-nerved. Flowers small, white in red-branched terminal panicles. Calyx narrow, campanulate, 4-toothed. Petals 4. Stamens 8, equal; anthers oblong, acute, connective with a tuft of hairs at the base behind, not spurred. Ovary 4-celled with a tuft of hairs at top. Berry small, globose. Species 8, Malayan.

(1) **P. pulverulenta** Bl. Flora 1831, 521; Korth. Verh. Nat. Gesch. Bot. t. 65; Clarke, l.c. ii. 550; King, l.c. 65. P. reflexa Bl. l.c.c.

Spreading shrub about 4 ft. tall, scaly. Leaves coriaceous, ovate or oblong-lanceolate acute, dull green above, 3 to 6 in. long, 2:25 to 3 in. wide, base rounded, 2-tubercled, glabrous. Panicles terminal, spreading 2 to 3 in. long, red. Flowers numerous, small, ’1 in. long. Calyx very scaly, sub-cylindric 4-toothed. Petals 4, scaly outside, white. Stamens 8; anthers lanceolate connective with a tuft of hairs on the back. Fruit pea-shaped, ’15 in. long. Hab. Common on rocks on sea-coasts and on trees often high up. Singapore, Pulau Ubin (Hullett); Bukit Timah. Johor, Scudai River. Pahang, Pekan; Rumpin River (Evans). Malacca, Cape Rachado (Finlayson, Wall. Cat. 4086); Sungei Hudang. Selangor, Semangkok Pass. Perak, Goping (Kunstler); Taiping Hills. Dindings, Lumut. Penang, Batu Feringhi (Curtis). Kelantan, Gunong, Kota Bharu, on rocks. **Distrib.** Borneo, Java.

20. PACHYCENTRIA, Bl.


Flowers small, ’2 in. long in a spreading panicle . (1) **P. tuberculata**

Flowers showy, ’5 in. wide, in a short lax cyme . (2) **P. speciosa**


A glabrous shrub about 6 in. to 2 ft. tall. Roots tuberous, woody. Leaves fleshy coriaceous, elliptic-oblong sub-acute, base

(2) P. speciosa Ridl. Journ. F.M.S. Mus. vi. 149.

A viscid epiphyte woody, over 12 in. tall, branched. Leaves fleshy coriaceous, ovate-lanceolate, blunt acuminate, base cuneate, 2 to 3.75 in. long, 1 in. wide; petioles 3 in. long. Cymes umbellate, viscid 1.5 in. long. Calyx base globose, above tubular, 4-lobed, red. Petals rose pink, 2.5 in. long, ovate-cuspidate. Stamens unequal; anthers yellow; connective with a short linear spur. Hab. On palm trees, rare. Pahang at Wray's Camp, Gunong Tahan at 3300 ft. altitude (Ridley).

21. PLETHIANDRA, Hook. fil.

Epiphytic glabrous shrubs. Leaves sessile ovate stiff; nerves 3 pairs from midrib. Flowers axillary, fascicled or solitary, small. Calyx campanulate; limb truncate, 6-toothed. Petals 6, acute, ovate-lanceolate. Stamens 20 to 25; anthers linear with 1 pore, muticous. Ovary 3-locular; style filiform. Stigma minute. Berry oblong, globose. Seeds many minute, ovoid or oblong. Species 3 or 4, Borneo.


A spreading shrub about 2 ft. tall. Leaves 3 to 3.5 in. long, 2.5 in. wide, sessile, ovate blunt or elliptic, base round. Flowers solitary 3 in. long; buds acute; pedicel 1 in. long. Calyx urceolate entire. Petals ovate lanceolate, 24 in. long, outer ones waxy flushed pink, inner white. Anthers pink, 24. Fruit ovoid, pulpy red, 2 in. long. Hab. On mangrove trees. Singapore, Kranji; Toas; Selitar. Johor, Castlewood.

This genus is very near Medinilla in general habit, but has numerous stamens.

22. CLIDEMIA, Don.

Hairy shrubs. Leaves membranous, ovate or oblong crenulate or toothed. Flowers in axillary panicles or fascicled, small, white
Clidemia.

Lix. MelastomaceÆ. 807

(or pink) 4- to 5-merous. Calyx campanulate or urceolate truncate or lobed. Petals obovate. Stamens equal, double the number of the petals; anthers linear elongate. Berry small, globose. Species about 100, S. American. One species thoroughly established in the Malay Peninsula.


A shrubby weed about 2 to 6 ft. tall, very hairy. Leaves thin ovate-acuminate, denticulate; nerves 5 and transverse nervules prominent, 3½ in. long, 2½ in. wide; petioles ½ in. long. Cymes spreading 1 in. long. Calyx very hairy with subulate lobes. Petals small, white. Fruit ½ in. long, globose, black, pulpy. Hab. Abundant on roadsides, Singapore near town and in Reservoir woods. Negri Sembilan, Seremban. Distrib. S. America and an alien in Java and Fiji.

23. ASTRONIA, Bl.

Trees or shrubs. Leaves opposite, ovate or oblong. Flowers small, white (or purple) in terminal panicles. Calyx campanulate, truncate or lobed. Petals 4 or 5. Stamens 8, 10 or 12. Anthers short, dehiscing by slits down front; connective spurred or not. Ovary 2- to 5-celled; style short. Stigma capitellate. Capsule dehiscing irregularly. Seeds minute, copious, linear. Species 24, Malayan, Polynesian.

(i) A. smilacifolia Triana, Trans. Linn. Soc. xxvii. 152; King, l.c. 67.

Bushy tree about 30 ft. tall. Branches, petiole, underside of leaves red-scaly. Leaves oblong tapering to each end; nervules transverse, 3 to 5½ in. long, 1½ to 2½ in. wide; petioles ½ in. long. Panicles 1 to 2 in. long, dense. Flowers white, ½ in. long. Fruit rufous-scaly globose, truncate, ½ in. through. Hab. Mountain forests. Perak, Thaiping Hills. Penang Hill, on West Hill at 3000 ft. altitude. Distrib. Borneo.

24. PTERNANDRA, Jack.

Trees. Leaves sub-coriaceous or coriaceous sub-sessile, 3- to 5-nerved. Flowers solitary in short clustered cymes, small or moderate size, occasionally terminal panicled. Calyx-tube campanulate or hemispheric tessellate, warty or covered with appressed triangular processes; mouth truncate or 4-toothed. Petals 4, ovate or oblong, blue or white. Stamens 8, equal, but some anthers often imperfect; anthers broad, blunt, spurred behind dehiscing by slits; filaments short, thick often geniculate. Ovary 4-celled; style filiform. Stigma clubbed. Berry sub-globose, scaly or smooth. Seeds obovoid angled. Species about 12, Malayan.
i. **Eupternandra.** Calyx tessellate; flowers blue, small axillary.
   Leaves 5 to 6 in. long, 4 in. wide . . . (1) **P. capitellata**
   Leaves 2 to 4 in. long, 2 in. wide.
   Flowers in axillary and terminal cymes 1 to 2 in.
   long . . . . . . . . (2) **P. coerulescens**
   Flowers in axillary fascicles; leaves elliptic, thick . . . . . . . . (3) **P. Jackiana**
   Flowers in axillary fascicles; leaves ovate, thin . . . . . . . . (4) **P. galeata**

ii. **Kibessia.** Calyx covered with flat triangular processes.
   Flowers larger, bluish white axillary . . . . (5) **P. echinata**
   Flowers in a terminal panicle small . . . . (6) **P. paniculata**

(1) **P. capitellata** Jack, Mal. Misc. ii. 61; King, l.c. 68.
   Bushy tree about 60 ft. tall. Leaves coriaceous, dark shining green, ovate, elliptic or nearly lanceolate, narrowed at both ends, glabrous, strongly 3-nerved, 5 to 6 in. long, 3·5 to 4 in. wide; petioles 0·2 in. long. Cymes sessile axillary of 8 to 10 flowers, ½ in. long. Calyx cylindric-campanulate, ½ in. long, tessellate. Petals 0·05 in. long, blue, acute. Fruit dark blue. **Hab.** Woods, Perak (Scoerichini); Gunong Keledang. Dindings, Lumut. Penang, foot of hill (Wallich, Curtis). **Distrib.** Tenasserim. **Native name:** Kulit Nipis.

(2) **P. coerulescens** Jack, Mal. Misc. ii. 61; King, l.c. 68.
   A tree 15 to 30 ft. tall. Leaves elliptic shortly acuminate, base round, or narrowed, smooth dark green, coriaceous 2·5 to 4 in. long, 1·25 to 2·5 in. wide; petioles 0·2 in. long. Flowers 0·2 in. long in axillary cymes, 1·5 in. long and terminal ones 2·5 in. long. Calyx cup-shaped, tessellate. Petals oblong-ovate small, bright blue. **Hab.** Common in low country woods. Singapore, Changi; Chan Chu Kang. Johor, Kota Tinggi; road to Gunong Pulaí. Pahang, Pekan. Malacca, Chabau (Cantley). Selangor, Batu Tiga; Rawang, Perak, Blanda Mabok (Wray); Goping (Kunstler). Province Wellesley, Nibong Tebal (Curtis). Penang, Telok Bahang (Curtis). Lankawi islands (Haniff). **Native names:** Sial Munahon; Benut Paya; Bunyut Paya; Kelat Biru; Nipis Kulit.

**Ewyckia cyanea** Bl. of Borneo and Amboina is very near this, but its calyx is not tessellate.

(3) **P. Jackiana** Ridl. **P. coerulescens** var Jackiana Clarke, in Hook. fil. F.B.I. ii. 551.
   Tree about 30 ft. tall. Leaves stiffly coriaceous elliptic acuminate blunt, base narrowed, 2 to 4 in. long, 1·75 to 2·25 in. long; petioles 0·2 in. long. Flowers 4 to 7 in axillary fascicles; pedicels 0·05 in. long. Calyx tessellate, short, cup-shaped, ½ in. long. Petals light blue. **Hab.** Woods apparently rather scarce. Singapore (Kunstler). Malacca, Bukit China (Maingay).

   A tree about 25 to 30 ft. tall. Leaves ovate acuminate, base

(5) **P. echinata** Jack, Mal. Misc. ii. 9; King, l.c. 69.

A bushy tree about 40 ft. tall, more or less pubescent. Leaves sub-coriaceous, lanceolate or oblong-lanceolate, glabrous above, pubescent beneath, 2·5 to 4·5 in. long, 1 to 1·75 in. wide; petioles ·2 in. long. Flowers axillary solitary or in terminal cymes about 2 in. long and ·75 in. across. Calyx campanulate, covered with pubescent acuminate triangular scales, ·3 in. long. Petals ovate quadrate, white more or less deeply tinted with light blue or lilac; anthers oblong, blunt, orange. Fruit hemispheric echinate, green, ·35 in. through. Hab. A very common tree in secondary jungle, hedges and such places in the low country. Singapore, Changi; Bukit Timah. Johor, Castlewood; Batu Pahat. Pahang, Kwantan (Foxworthy). Malacca, Bukit Bruang; Batang Malacca (Goodenough). Selangor, Semangkok; Kwaia Lumpur; Bukit Kutu. Perak, Larut (Kunstler). Penang Hill. Kelantan, Channing.

var. **pubescens** King, l.c. 70.


(6) **P. paniculata** Benth. Wall. Cat. 4080; Clarke, l.c. ii. 551. P. Griffithii King, l.c. 70.


Bentham's *P. paniculata* seems to me the paniced form of King's *Griffithii*, in which the panicle is aborted or converted into a mass of small leaves, with a few abnormal flowers intermixed. This is the commonest state of the tree, and indeed good specimens with well-developed flowers are comparatively rare to find. In many trees the flowers are also axillary, and some of these specimens with the large, occasionally nearly cordate leaves form King's var. *cordata*. 
25. MEMECYLON, Linn.

Shrubs or small to moderate trees. Leaves opposite; petiole short coriaceous, pinnate-nerved (rarely 3-nerved). Flowers small in axillary simple or panicled cymes or umbels, rose or white or often blue. Calyx campanulate, limb dilate, truncate or 4-toothed. Petals 4. Stamens 8, equal; anthers opening in slits in front, connective with a horn behind. Ovary 1-celled with a depressed or convex disc on the top with 8 radiating grooves; ovules 6 to 12. Drupe globose or ellipsoid, pulpy, 1-seeded. Species about 100, Africa, tropical Asia and Australia.

Leaves triplinerved from base.
Leaves pinnate-nerved more or less conspicuously.
Cymes few-flowered on long slender peduncles
Cymes many- or few-flowered, dense short.
Branchlets winged or conspicuously angled.
Branchlets stout strongly winged; leaves coriaceous oblong lanceolate
Branchlets slender winged; leaves very thin, lanceolate.
Branchlets angled; cymes pedunced 1 in. long.
Branchlets angled; cymes sessile; flowers 3 or 4.
Branchlets not winged nor angled.
Leaves 6 to 8 in. long; nerves conspicuous inarching, sessile or nearly so.
Cymes on stout peduncles.
Peduncles slender with terminal umbel.
Cymes sessile or very shortly peduncled.
Leaves cordate; flowers 2 in. wide.
Leaves cordate; flowers 1 in. wide.
Leaves ovate, base narrowed not cordate.
Leaves oblong-lanceolate, base broad not cordate.
Leaves 4 in. long or less, petiolate.
Nerves slender visible; cymes peduncled elongate compound.
Cymes pubescent.
Cymes glabrous.
Nerves conspicuous.
Nerves obscure; cymes compound.
Leaf-base acuminate.
Leaf-base round.
Nerves invisible.
Leaves large over 4 in. long.
Leaves cordate amplexicaule.
Leaves not cordate; flowers large blue.
Leaves small, 2 in. long.
Leaves ovate sessile.
Leaves rhomboid petioloed.

(1) M. oligoneuron
(2) M. gracilipes
(3) M. epiphyticum
(4) M. tenuifolium
(5) M. fruticosum
(6) M. dichotomum
(7) M. caloneuron
(8) M. Hullettii
(9) M. Maingayi
(10) M. Wallichii
(11) M. heteropleurum
(12) M. longifolium
(13) M. pubescens
(14) M. Kunstleri
(15) M. oleæfolium
(16) M. laxiflorum
(17) M. amplexicaule
(18) M. cœruleum
(19) M. malaccense
(20) M. pauciflorum
Leaves narrow lanceolate. (21) *M. floridum*
Leaves ovate lanceolate; cymes short dense.

Calyx 4-toothed.
   Teeth long. (22) *M. myrsinoides*
   Teeth short; calyx campanulate. (23) *M. lævigatum*
   Calyx mouth undulate; teeth minute. (24) *M. cinereum*
   Calyx very short, edge undulate, no teeth. (25) *M. acuminatum*

Calyx mouth entire.
   Flowers small in sub-sessile cymes. (26) *M. minutiflorum*
   Flowers 1 in. wide; peduncle short stout. (27) *M. garcinioides*
   Flowers 2 in. wide; peduncle short. (28) *M. Cantleyi*
   Flowers fascicled. (29) *M. campanulatum*

Cymes longer than petiole; leaves thin coriaceous. (30) *M. intermedium*
Cymes longer than petiole several; leaves stiff coriaceous. (31) *M. edule*


Small tree about 25 to 50 ft. tall. Leaves ovate, abruptly blunt acuminate, base long narrowed; nerves 3 from base; nervules invisible, 2 to 4 in. long, .05 to .15 in. wide; petioles .05 to .1 in. long. Flowers white, .05 in. wide in dense axillary clusters .2 in. long. Calyx-tube cupular, teeth broad. Fruit globose or ovoid, .1 in. long on slender pedicel as long. *Hab.* Not common in forests, low country. Johor, Pulau Tuman (Burkill). Malacca, Ayer Keroh. Pahang, Sungei Cheka, Kwala Lipis (Foxworthy). Perak, Larut Hills and Ulu Bubong (Kunstler). Penang, Waterfall; Ayer Hitam (Curtis). *Distrib.* Java, Borneo.


Small tree. Leaves thinly coriaceous, sub-sessile, ovate cuspidate, base round; nerves 4 to 5 pairs, conspicuously elevate beneath, depressed above, inarching .25 in. from edge, 2.5 to 3 in. long, 1.5 in. wide. Cymes very slender, 1 to 1.5 in. long, little or not branched; pedicels very slender. Flowers umbelled in threes. Calyx pink, .1 in. long, base sub-globose, limb wide, saucer-shaped, .2 in. across. Petals ovate acute, white, .1 in. long. Fruit globose .5 in. through on a pedicel .45 in. long. *Hab.* Very rare, woods at 1000 ft. altitude. Perak, Waterloo (Curtis).

(3) *M. epiphyticum* King, l.c. 74.

Epiphytic shrubs 3 to 4 ft. tall. Branches winged with auricles beneath the nodes. Leaves oblong-lanceolate, light green, acute
or acuminate, base narrowed, rounded; nerves 9 to 10 pairs invisible above, 1·75 to 3 in. long, 6 to 1 in. wide; petioles 0·05 in. long. Cymes 3- to 4-flowered on pedicels 1 in. long. Calyx cupular, base round, mouth 0·05 in. across. Petals tinted blue. Fruit globular 25 in. long, green flushed red. Hab. Mountain forests. Perak, Larut Hills 800 to 1000 ft. altitude (Kunstler). Sungei Larut (Wray).

(4) **M. tenuifolium** Ridl. n.sp.
Branches slender, winged. Leaves thin, lanceolate-acuminate, base rounded, very shortly narrowed at the base; nerves 8 to 10 pairs, very slender and faint, 3 in. long, 6 in. wide; petioles under 1 in. long. Flowers small in short axillary cymes of 6; pedicels slender longer than calyx. Calyx saucer-shaped, ribbed inside, lobes round. Petals short, lanceolate. Stamens 8; filaments long, slender; anthers semi-lunar. Style slender, nearly as long as filaments. Hab. Pahang, Telok Mengkuang, Temerloh (Foxworthy).

(5) **M. fruticosum** King, l.c. 74.
Shrub 6 to 8 ft. tall. Branchlets winged and eared. Leaves chartaceous, ovate-lanceolate acuminate base round; nerves 7 to 9 pairs inarching within margin, conspicuous beneath, 3 to 4 in. long, 1·35 to 1·85 in. wide; petioles 0·05 in. long. Cymes paired, 8 to 10-flowered, 5 in. long. Calyx hemispheric 1 in. long, mouth 0·75 in. across. Petals bluish white. Fruit globose-ovoid, constricted below. Calyx-limb 35 in. long, 25 in. through. Hab. Open jungle, rare. Perak, Larut at 200 to 500 ft. altitude (Kunstler).

(6) **M. dichotomum** Clarke, in King, l.c. 75. M. elegans var. dichotomum Clarke, in Hook. fil. F.B.I. ii. 554.
A slender shrub 6 to 10 ft. tall. Branchlets angled. Leaves thin coriaceous, nearly sessile, lanceolate or ovate-acuminate caudate, base round; nerves 6 to 8 pairs, 2·5 to 4 in. long, 1 to 2 in. wide. Cymes 2- to 5-flowered, solitary, axillary; pedicels short. Calyx pyriform, narrowed to base; lobes 4, broad short when young, campanulate when adult, truncate, pink. Stamens white, spurs deep blue. Fruit globular, 5 in. through, yellow, flushed red. Hab. Hill forests, Malacca, Mt. Ophir (Maingay). Pahang, Tahan River woods. Selangor, Dusun Tua. Perak, Ulu Kal (Kunstler).


(7) **M. caloneuron** Miq. Fl. Ind. Bat. Supp. 321; King, l.c. 76.
Tree 40 to 50 ft. tall, 10 to 15 in. through. Leaves coriaceous, 4 to 9 in. long, 1·5 to 3·5 in. wide; nerves 14 pairs, prominent,
inarching into a nearly straight intramarginal line; petioles 1 in. long. Flowers pale yellow, crowded in heads on the tips of the branches of the cyme, which is peduncled and 1 to 2 in. long; branches several angled. Calyx short, cup-shaped. Fruit 5 in. through, globular, deep blue, on a stout panicle 3 in. long with a winged peduncle. Hab. Not common. Rocky woods to 3500 ft. altitude, Johor, Kota Tinggi. Dindings, Bruas (Burn-Murdoch). Perak, Thaiping 800 to 1000 ft. altitude (Kunstler). Lankawi, Gunong Maya (Curtis). Distrib. Java, Sumatra, Borneo. Native names: Kayu Kapas; Api-Api Bukit.

(8) **M. Hullettii** King, l.c. 76.

Shrub about 10 ft. tall. Leaves sessile chartaceous oblong, narrowed to tip, base broad cordate; nerves 15 pairs, horizontal, 6 to 8 in. long, 2.25 to 3 in. wide. Peduncle solitary, 2 in. long, slender, pendulous ending in a compound or simple umbel of few white flowers. Calyx campanulate, mouth truncate. Fruit globular, 25 in. through. Hab. Local in woods in the south. Johor, Gunong Pulai; Sedenah (Hullett, Kelsall). Native name: Jambu Kalada.

(9) **M. Maingayi** Clarke, in Hook. fil. F.B.I. ii. 557.

A tree 20 to 40 ft. tall. Leaves coriaceous nearly sessile elliptic-oblong sub-acute or obtuse, base rounded, 6 to 9 in. long, 2.5 to 4.25 in. wide; nerves strong elevate beneath, 10 to 15 pairs inarching within margin. Flowers in short fascicles below the leaves; peduncles 2 in. long, 3-flowered. Calyx wide, cupular, 15 in. long, truncate, white. Petals broad, blunt, 2 in. long, bright blue. Hab. Malacca (Maingay). Perak, Goping (Kunstler).

This has the largest and most coriaceous flowers in the genus here.


Small tree or shrub about 12 ft. tall. Branchlets angled. Leaves coriaceous, oblong-lanceolate rather narrow, acuminate, base minutely cordate, or ovate acuminate, nearly sessile; petioles minute; nerves 14 to 15 pairs, prominent, inarching 1 in. from edge, 7 to 8 in. long, 2.75 to 3 in. wide. Cymes globose, or dense of numerous flowers. Peduncle very short. Calyx cup-shaped, base blunt, truncate, 1 in. long. Petals short, broad, ovate, blunt, pinkish white. Fruit globose, black 2 in. through. Hab. Forests, usually at about 1000 ft. altitude in the north, Perak, Larut (Kunstler); Waterloo (Curtis). Penang Hill (Wallich 4101 c). Experimental Nursery (Curtis); Moniot's Road.


Shrub or small tree, about 12 ft. tall. Leaves coriaceous oblong or elliptic, short blunt acuminate, base narrowed blunt; nerves 18 to 20 pairs, 5 to 7 in. long, 2 to 3.5 in. wide; petioles 1 in. long. Flowers 25 in. across in dense cymes about half an inch across. Calyx wide, short, cupular, truncate, base narrowed. Petals acute

Tree. Leaves elliptic-lanceolate, long, blunt, cuspidate base round, not cordate; nerves 20 pairs, slender, conspicuous, thinly coriaceous, light green, 7 to 8 in. long, 2 to 2'25 in. wide; petioles very short, '05 in. long or less. Flowers in very short sessile fascicles, about 10 in a fascicle, pink and white. Calyx campanulate, truncate '1 in. long, pink. Petals pink or white, ovate-triangular sub-obtuse. Hab. Dindings at Lumut (Ridley).

(13) M. pubescens King, l.c. 74.
Tree about 30 ft. tall. Branchlets nearly terete. Leaves coriaceous elliptic, obtuse or acuminate, base round; nerves 7 to 10 pairs distinct beneath, 4 to 4'5 in. long, 3 in. wide; petioles '25 in. long. Cymes branched, umbellate, rusty-pubescent, '1'5 to 2'5 in. long; branches 4-angled. Flowers crowded at tips, cream colour. Calyx campanulate, base narrow, mouth 0'5 in. wide with 4 sharp teeth. Fruit globular, '1'5 in. wide. Hab. Forests, rare in collections, Singapore, Tanglin. Malacca (Griffith). Perak, Goping (Kunstler).

(14) M. Kunstleri King, l.c. 76.
Tree 40 to 60 ft. tall, 6 to 18 in. through. Leaves chartaceous elliptic-oblong blunt or acute acuminate, base round; nerves 7 to 8 pairs with secondary nerves visible as many, 2'75 to 4'5 in. long, 1 to 2 in. wide; petioles '05 to 1 in. long. Cymes from axils of fallen leaves, '35 to '6 in. long, umbellately panicled, 4 to 6 flowers in umbel, white; stamens brown. Calyx cup-shaped, shallow, '05 in. long. Fruit ellipsoid, '3 in. long. Hab. Not common. Dense jungle. Selangor, Labu woods. Perak, Ulu Bubong and on limestone hills, Gunong Dipang (Kunstler); Changkat Serdang (Wray).

Slender tree 20 to 30 ft. tall. Leaves coriaceous elliptic blunt cuneate-acuminate, base cuneate; nerves 8 to 10 very faint, 2'5 to 4'75 in. long, 1 to 2'25 in. wide; petioles '15 to '3 in. long. Cymes 1 to 3 in each axil, 1 in. long, compound with many cymes umbellate at the branch ends. Flowers numerous, blue. Calyx-tube small hemispheric, limb broad, longer, truncate. Petals ovate, small, sub-acute. Fruit ovoid-elliptic '4 in. long. Hab. In woods up to 1000 ft. altitude. A beautiful plant. Singapore, Garden
Memecylon.] 1. ix. Melastomaceae. 815

Jungle. Perak, Ulu Kerling; Goping (Kunstler); Penang Hill at 1000 ft. altitude. Distrib. Banka, Sumatra. Native name: Dulek or Dalek putih.

(16) **M. laxiflorum** Wall. Cat. 4472.
Large shrub. Leaves stiffly coriaceous ovate obtuse, base round; nerves very faint about 8 pairs, very slender, 4 to 4.5 in. long, 2 to 3 in. across; petioles '4 to '5 in. long, stout. Cymes 1 to 4 below the leaves; peduncles '3 in. long, bearing an umbel of cymules on short peduncles with longer, slender pedicels. Calyx campanulate, tube very small hemispheric, limb larger truncate. Petals short, sub-acute, blue. Fruit globose with very small trace of the limb, '25 in. through. Hab. Open country near sea, local. Singapore (Wallich 4472). Johor, Minyak Buku and Pinerong (Ridley).

(17) **M. amplexicaule** Roxb. Fl. Ind. ii. 260. M. microstomum Clarke, in Hook fil. F.B.I. ii. 557; King, l.c. 79.
Small tree about 40 ft. tall. Leaves very coriaceous, sessile, broadly elliptic blunt shortly cordate; nerves very indistinct, 3-25 to 5 in. long, 1-3 to 2 in. wide. Flowers small, under '1 in.

Fig. 65.—Memecylon amplexicaule.

(18) M. cœruleum Jack, Mal. Misc. i. 26; King, l.c. 80.


Probably a shrub. Leaves ovate-lanceolate, base rounded, tip acuminate blunt, fleshy coriaceous, opaque; nerves invisible, 2 to 2'75 in. long, 1 to 1'25 in. wide, sessile or minutely petioled. Cymes very short, '3 in. long. Flowers 4 to 5 umbelled on the top of the peduncle. Calyx cup-shaped truncate, fleshy, base broad. Petals forming a blunt cone in bud, ovate. Hab. Malacca (Maingay). Never collected again and very little known.


A bush 3 to 10 ft. tall, very floriferous. Leaves coriaceous rhomboid, tip blunt, base acute; nerves nearly invisible 6 to 7 pairs, 1 to 1'5 in. long, 25 to 1 in. wide; petioles under 1 in. long. Cymes of several bright azure flowers on a very short peduncle and longer pedicels, axillary. Calyx wide campanulate with 4 distinct short teeth. Petals ovate cuspidate, larger than calyx. Fruit globular, '2 in. long, crowned with the calyx-limb. Hab. Sea coasts in open ground. Penang (Kunstler). Kedah, Lankawi islands. Pulau Adang group, Rawei; Sarang. Terutau (Haniff). Distrib. Andamans, Tenasserim, Chittagong.


Tree 40 to 50 ft. tall. Leaves thinly coriaceous, lanceolate acuminate nearly equally at both ends; nerves very faint about 7, with a faint intramarginal one on each side close to edge, 3 to 4 in. long, 1'25 in. wide; petioles 3 in. long. Cymes 1 to 3 in each
leaf axil; peduncle thick, 3 in. long, with an umbel of three or more flowers. Calyx tube cylindric, obconic; limb broad, 1 in. across. Petals ovate in bud conic blunt. Hab. Perak, Larut at 500 to 1000 ft. altitude (Kunstler).

(22) **M. myrsinoides** Bl. Ann. Mus. Bot. Lugd. Bat. i. 356; King, l.c. 81, and var. lilacina King, l.c.

A shrub or tree up to about 30 ft. tall. Leaves thin coriaceous, elliptic to ovate-lanceolate acuminate often caudate, much narrowed to base; nerves invisible, 1.5 to 2.5 in. long, 9 to 1.25 in. wide; petioles 1 to 2.5 in. long. Flowers numerous in dense compound cymes about 2 in. through and as long, blue or rose pink. Calyx campanulate, tube narrowed, teeth 4, triangular acute, as long as tube. Petals acute, long. Style long and persistent. Fruit globular, 2 in. long. Hab. Common; especially near the sea, in woods and thickets. Singapore, Bajau. Johor, Tana Runto. Malacca, Jelutong (Goodenough). Selangor, Kwala Lumpur. Perak, Ulu Bubong and Ulu Kerling (Kunstler). Penang Hill (Curtis). Distrib. Borneo, Sumatra. Native names: Bala; Dalek putih; Kuku Baning; Nipis Kulit.

(23) **M. lavigatum** Bl. Ann. Mus. Bot. Lugd. Bat. i. 358; King, l.c. 82.

Large shrub or small tree with pale bark. Leaves thin, coriaceous, ovate or elliptic, caudate or acuminate or short acuminate; nerves invisible, 2 to 2.5 in. long, 1 to 1.75 in. wide; petioles 1 to 1.5 in. long. Cymes below the leaves, few-flowered; peduncles 1 in. long. Flowers small. Calyx campanulate, narrowed to base, teeth distinct acute. Fruit globular 3 in. long. Hab. Woods. Singapore, common, Kranji. Johor, Tana Runto; Tebrau. Malacca (Griffith). Selangor, Weld’s Hill (Burn-Murdoch); Bukit Kutu. Perak, Larut (Kunstler). Distrib. Burma, Banka, Java, Borneo. Native name: Dalek Tembaga.

(24) **M. cinereum** King, l.c. 82.

Shrub 6 to 8 ft. tall. Leaves thin coriaceous, drying blackish brown, lanceolate or ovate lanceolate, long acuminate, base cuneate or rarely rounded; nerves invisible, 2.8 to 5.5 in. long, 1 to 2.2 in. wide; petioles 1.5 to 3 in. long. Peduncles very short. Cymes 2 in. long, of about 12 flowers. Calyx cupular, base round, mouth wide, 1 in. wide, undulate, teeth minute. Style long persistent. Fruit globular 2.5 in. through. Hab. Selangor, Weld’s Hill, Kwala Lumpur (Cubitt). Perak, Selama (Kunstler, Scortechini) at 300 to 400 ft. altitude.

(25) **M. acuminatum** Sm. in Rees’ Cyclop. xxiii. 4; King, l.c. 84.

Tree about 30 to 50 ft. tall with slender branches. Leaves coriaceous ovate, long caudate, blunt, base cuneate; nerves invisible, 1.5 to 4 in. long, 7.5 to 1.5 in. wide; petioles 2 in. long. Cymes 1 or 2 axillary, short, peduncled of 8 or 10 flowers; peduncle

(26) **M. minutiflorum** Miq. Fl. Ind. Bat. Supp. 323; King, l.c. 81. M. acuminatum var. flavescens Clarke, l.c. ii. 562.

A tree 30 to 70 ft. tall. Stem to 15 in. through. Leaves thinly coriaceous, elliptic caudate-acuminate, base sharply narrowed acute; nerves very faint, 3'25 to 3'5 in. long, 1 in. wide; petioles 2 in. long. Cymes several branched on a peduncle, '1 in. long, whole inflorescence '4 in. long. Flowers numerous, crowded, very small. Calyx very short wide campanulate, glandular hairy when young. Petals blunt, dark blue. Fruit globose, '35 in. long, yellow. Hab. Dense, rocky jungle. Malacca (Griffith). Perak, Larut 2500 to 3000 ft. altitude, and Goping 300 to 800 ft. altitude (Kunstler). Penang at 1000 ft. altitude on the hill (Curtis); Lankawi, Sungai Batu Asap (Haniff).


Small tree up to about 40 ft. tall. Leaves thinly coriaceous, oblong-ovate or elliptic acuminate or cuspidate, blunt, base cuneate; nerves invisible, 3 to 5'5 in. long, 1'2 to 2'2 in. wide; petioles '05 to '1 in. long. Cymes short; peduncle thick, '2 in. long. Cymes umbel at top. Flowers small, greenish white. Calyx campanulate, mouth truncate, teeth short or none, '05 in. across. Petals small ovate. Fruit globose, smooth '2 in. long, dark blue. Hab. Not rare in lowland woods. Singapore, Selitar, Bukit Timah. Johor, Tebrau River; Kukub. Malacca (Maingay); Selangor, Rawang. Perak, base of Gunong Malacca (Kunstler). Pulau Adang. Distrib. Sumatra, Borneo. Native names: Bangas; Jenitan; Bangas Merah.


Large shrub. Leaves thinly coriaceous, elliptic acuminate to both ends; nerves 5 pairs, very faint, 3'5 to 4'5 in. long, '2 in. wide; petioles '4 in. long. Flowers few in simple cymes '3 in. long; peduncles '15 in. long, rather thick. Calyx wide-cupped, narrowed at base truncate, '1 in. long and '2 in. wide, white, tinted violet. Petals sub-quadrate apiculate, pale blue. Stamens deep violet. Hab. Forests, rare. Singapore, Garden Jungle. Malacca (Maingay).

(29) **M. campanulatum** Clarke, l.c. ii. 563; King, l.c. 80.

Tree. Leaves coriaceous elliptic acuminate, often caudate-acuminate, base narrowed to base of petiole; nerves invisible, 3 to 4'5 in. long, 1'25 to 2'2 in. wide; petioles winged, '1 in. long. Flowers on very short branched peduncles, '1 in. long; pedicels
slender, longer. Calyx sub-globose campanulate, narrowed at top, limb rather large. Petals ovate acute, short and broad. Hab. Rare in hill forests. Malacca (Griffith). Selangor, Rawang, forest reserve (Kloss); Ginting Bidai (Ridley).


Tree 20 to 40 ft. tall. Leaves thinly coriaceous, lanceolate to elliptic cupusidate (ovate fide King), base cuneate, 1.5 to 3.5 in. long, 1.25 to 2 in. wide; petioles 2.25 to 3.5 in. long. Cymes compound; peduncles slender, 1.5 in. long, secondary peduncles um- bellcd 1 in. long. Flowers numerous 1 in. long. Calyx broad, campanulate with minute teeth. Petals ovate, nearly blunt. Fruit globose. Hab. Perak: No locality (Scortechini). Very rare. I have seen no specimen from the Malay Peninsula, and have had to describe it from a Javanese specimen. Distrib. Java.

(31) M. edule Roxb. Corom. Pl. i. t. 82; King, l.c. 86.

Large shrub or small tree. Leaves coriaceous, elliptic or ovate, blunt acuminate, base narrowed or round (var. ovata); nerves very faint, 5 to 8 pairs, 2 to 4 in. long, 1 to 2.25 in. wide; petioles 1 to 3.5 in. long. Panicles sub-globose 1 or more in axils below leaves, 1 in. long and as wide or less. Flowers numerous, bright blue or lilac; peduncles stout. Calyx cupular, narrowed to base, limb truncate. Petals triangular, ovate broad. Style long exsert. Fruit olivaceous globose, 2.25 in. through. Hab. Near the sea, rather dry spots, in thickets and on sandy open heaths. A very handsome shrub. Singapore, Pulau Ubin (Hullet); Changi; Pulau Brani. Johor, near Pinerong; Minyak Buku, Batu Pahat. Pahang, Pekan heaths, abundant; Gunong Tahan at 3300 ft. altitude (Robinson). Malacca, Sungei Hudang (Derry). Dindings, Pangkor (Foxworthy). Perak, Larut near the sea (Kunstler). Penang, Batu Feringhi; Muka Head (Curtis). Lankawi, Kesap (Curtis); Terutau (Haniff); Pulau Adang. Distrib. Indo-Malaya. The form ovata of Clarke with rounded ovate leaves occurs with the narrow elliptic lanceolate form. Native names: Dalek Ayer; Dalek putih.

**Order LX. Lythraceae.**

Trees, shrubs and herbs. Leaves entire opposite (or alternate). Flowers bisexual (except Crypteronia). Calyx-tube free, persistent; lobes 3 to 6. Petals as many or absent, insert near mouth of the calyx-tube. Stamens numerous or definite, insert on tube. Ovary free in tube, rarely inferior, 2- to 6-celled; ovules numerous; style long. Stigma capitate. Fruit capsular (baccate in Sonneratia), free or adnate to calyx-tube at base, 2- to 6-celled. Seeds
numerous. Species 275, in the tropics chiefly in South America, and in temperate regions. (King, Journ. As. Soc. Beng. lxvii. i.)

The Pomegranate (Punica granatum L.) Delima of the Malays, often cultivated by the Chinese, belongs to this Order.

Herbs in wet spots with minute axillary flowers. 1. **Ammannia**

Trees or shrubs; flowers moderate or large (minute in Crypteronia).

Stamens not more than 12.

Shrub; calyx 6-toothed; petals 6; stamens 12. 2. **Pemphis**

Tree; calyx 5-toothed; petals 0; stamens 4 or 5;

flowers minute, unisexual. 3. **Crypteronia**

Stamens indefinite; trees.

Stamens in 2 or more rows; capsule 3- to 6-celled;

seed winged. 4. **Lagerstroemia**

Stamens in 1 row; capsule 4- to 8-celled; seeds minute. 5. **Duabanga**

Fruit baccate, 10- to 15-celled; sea trees. 6. **Sonneratia**

Ovary quite inferior; stamens 10; flowers small. 7. **Axinandra**

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### 1. **Ammannia**, Linn.

Annual glabrous herbs in wet spots. Leaves opposite or alternate, entire. Flowers very small axillary and sub-sessile or in small trichotomous cymes. Calyx campanulate, 3- to 5-toothed. Petals 3 to 5 or often none. Stamens 2 to 8 on the calyx-tube. Ovary enclosed in the tube, 1- to 5-celled. Capsule membranous, globose or ellipsoid, 2- to 3-valved, irregularly breaking up or circumscissile. Seeds many, minute. (Koehne, in *Pflanzenreich*, separates these two species into two genera *Rotala* and *Ammannia*, on what appears to be somewhat insufficient grounds.) Species 30, whole of the warmer parts of the world.

Flowers sessile; capsule ellipsoid; seed narrow, oblong. (1) **A. peploides**

Flowers pedicelled; capsule hemispheric; seed hemispheric. (2) **A. baccifera**


(2) **A. baccifera** Linn. Sp. Pl. 120; Clarke, l.c. ii. 569; King, l.c. 3.

A dull red herb. Stem erect 8 to 12 in. or more tall branched. Leaves opposite, linear-oblong sub-acute or blunt, narrowed at base 2 to 5 in. long, 2 in. or less wide, upper ones small. Flowers

2. PEMPHIS, Forst.

A sea-shore shrub. Leaves opposite, oblong, thick fleshy. Flowers solitary axillary; peduncles bibracteate. Calyx-tube campanulate, 12 or more ribbed, teeth 6 long, 6 short. Petals 6, white, inserted at the mouth of calyx-tube, obovate. Stamens 12 in 2 rows from the middle of the calyx-tube. Ovary free; ovules many; style long. Stigma capitate. Capsule coriaceous obovoid to globose enclosed in or half exserted from calyx-tube, circumscissile, 1-celled. Seeds many-angled obovoid. Species 1, Indo-Malaya, Polynesia.

(1) P. acidula Forst, Gen. t. 34; King, l.c. 4.

Shrub 5 ft. to a tree about 20 ft. tall. Young parts grey-silky. Leaves 5 to 1.5 in. long. Flowers 0.5 in. across. Capsule 4 in. long, 2 in. wide. Hab. Sea-shores, curiously rare in the Malay Peninsula. Singapore, mouth of Changi River.

3. CRYPTERONIA, Bl.

Trees. Leaves opposite, ovate or lanceolate. Racemes long, many-flowered, panicled. Flowers very small, greenish or white. Bracts short, linear. Calyx-tube short, saucer-shaped or half hemispheric; teeth 5 (or 4). Petals 0. Stamens as many as calyx-lobes insert in calyx mouth between them. Ovary free, 2-celled; ovules numerous axile; style long, filiform. Stigma capitate 3-lobed. Capsule globose, pubescent, 2-celled dehiscing through the style. Seeds many ellipsoid, winged on one side. Species 5, N. India to Philippines.

Leaves membranous, base narrowed; calyx less than 1 in. across .
Leaves coriaceous, base cordate; calyx more than 1 in. across .

(1) C. paniculata
(2) C. Griffithii


Tree 20 to 50 ft. tall. Leaves membranous to sub-coriaceous, oblong to oblong-lanceolate, blunt acuminate, base narrowed, glabrous, or pubescent beneath; nerves 5 to 6 pairs, 3 to 6 in. long, 1.25 to 2.5 in. wide. Racemes pubescent or glabrous, 5 in a panicle on a peduncle, 3 to 5 in. long. Flowers very numerous, greenish white. Calyx less than 1 in. across. Capsule globose-conic puberulous. Hab. Forests in the north chiefly. Negri Sembilan, Bukit

I cannot separate the hairy-leaved specimens from the glabrous ones. Both grow together on Penang Hill.

Fig. 66.—Crypteronia paniculata.

(2) C. Griffithii Clarke, l.c. ii. 574; King, l.c. 6.
Tree 40 to 60 ft. tall, glabrous. Leaves stiffly coriaceous, broad elliptic acute, base cordate; nerves 7 to 8 pairs, elevate beneath, 4 to 8 in. long, 2.25 to 35 in. wide. Racemes about 8 in a panicle, 9 in. long, pubescent. Flowers numerous, nearly sessile, greenish yellow. Calyx more than 1 in. across. Stamens exsert. Capsule less than 1 in. across. Hab. Open jungle. Pahang, Kwala Lipis (P. Philips). Malacca, Bukit Bruang (Derry); Merlimau (Cantley). Selangor, Sungei Buluh (Foxworthy). Perak, Larut (Kunstler). Penang Hill, Moniot's Road (Curtis). Native name: Kelat Tampoi.

4. LAGERSTROEMIA, Linn.

Trees or shrubs. Leaves opposite, distichous, oblong or ovate, coriaceous or membranous, caducous. Panicles axillary, terminal;
branchlets cymose, many-flowered. Flowers medium to large, showy. Calyx tube funnel-shaped, ridged or smooth; lobes 5 (to 9) ovate acute. Petals 6 (or 7 to 9) on the summit of calyx-tube, clawed, edge crisped or fimbriate. Stamens very many insert in several rows in tube; filaments exsert. Ovary at bottom of tube 3- to 6-celled; style long. Stigma capitate. Capsule adnate to calyx protruding, ellipsoid, 3- to 6-ovuled. Seeds many elongate.

Calyx red tomentose . . . . . . (1) L. floribunda
Calyx ashy-velvety.
Calyx 8- to 10-ribbed; leaves 2 to 3'25 in. long . (2) L. ovalifolia
Calyx 12- to 14-ribbed; leaves 3'5 to 8 in. long . (3) L. flos-reginæ
Calyx hardly ribbed at all; leaves large oblong round, stiff . . . . . . (4) L. macrocarpa

(1) L. floribunda Jack, Mal. Misc. i. 38; Clarke, in Hook. fil. F.B.I. ii. 577; King, l.c. 7. L. turbinata Koehne, Engl. Jahrb. iv. 34.


I am quite unable to separate Koehne’s turbinata from this species.

(2) L. ovalifolia Teysm. and Binn. Nat. Tijds. Ned. Ind. ii. 306; King, l.c. 3. L. hexapteria Miq. Fl. Ind. Bat. i. 623; Clarke, l.c. ii. 577.

Big tree. Leaves oblong or oblong-ovate acute, base narrowed, glabrous except minutely pubescent nerves, 2 to 3'25 in. long, 1-35 to 2 in. wide; petioles .25 in. long. Panicles puberulous 4 to 6 in. long. Flowers 1 in. across. Calyx turbinate, minutely velvety-grey, ridges stout 8 to 9, not passing into calyx-teeth, which are 8 to 9 acute triangular. Petals pale rose, .75 in. long. Capsule elliptic-ovoid blunt minutely velvety, .75 in. long. Hab. River-banks, open country, local. Malacca (Maingay); Brisu (Derry). Negri Sembilan, Linggi, coast (Foxworthy). Pahang, Kwala Tahan; Kwala Lipis (Foxworthy). Perak, Ulu Bubong (Kunstler). Distrib. Malay isles. Native name: Bunga Malukut.

(3) L. flos-reginæ Retz, Obs. v. 25; King, l.c. 8.

Tree 30 to 60 ft. tall, glabrous except inflorescence. Leaves oblong to elliptic-oblong, narrowed or blunt at base; nerves 10 to 12 pairs, 3'5 to 8 in. long, 1'75 to 3 in. wide; petioles .25 to

(4) L. macrocarpa Wall. 2114A.
Leaves stiff coriaceous, oblong, base broad, tip round; nerves prominent 9 pairs inarching near the edge 8 in. long, 3 in. wide; petioles thick, 0.25 in. long. Panicles rather large, about 12 in. long. Calyx hardly ribbed in flower, and not at all or very inconspicuously at the base in fruit. Petals pink, obovate clawed, 5 in. long or more. Fruit oblong ovoid 6 to 1 in. long; sepals acute recurved. Hab. Cultivated in gardens. Pahang, Kampang Tengah, Temerloh (Foxworthy). Negri Sembilan, Kwala Pilah and Selangor, Klang (Foxworthy).

This species has been reduced to L. speciosa (L. flos-reginae) by Koehne in his monograph. It is very distinct, however, from the true flos-reginae in its larger, oblong-rounded stiffer leaves and unribbed calyx. The typical L. macrocarpa has very large fruits and flowers and may be seen in gardens. The specimens quoted above closely resemble Burmese forms, rather smaller in all parts. The first quoted may be wild, the other two, doubtless, planted.

5. DUABANGA, Ham.
Large trees. Branches pendent, 4-angled. Leaves opposite distichous elongate acute, base cordate or rounded. Panicles large terminal. Flowers large, white. Calyx-tube wide adnate to base of ovary; lobes 4 to 7, valvate. Petals 4 to 7, obovate clawed crisped. Stamens numerous on a perigynous ring. Ovary conic, 4-celled; style long. Stigma capitate, 4- to 8-lobed. Capsule sub-globose with spreading calyx-lobes at base, coriaceous 4- to 8-valved. Seeds very numerous, minute, tailed. Species 2, Indo-Malayan.

(1) D. sonneratioides Ham. in Trans. Linn. Soc. xvii. 178; Hook. fil. Ill. Him. Pl. t. 11; Clarke, in Hook. fil. F.B.I. ii. 579; King, l.c. 10.
Tree 60 to 100 ft. tall. Leaves coriaceous, 7 to 12 in. long, 2.5 to 4 in. wide, glaucous beneath. Flowers 2 to 2.5 in. wide, few on a panicle 6 in. long and as wide. Petals 1 in. long, 0.5 in. wide. Capsule ovoid-globose, 1 to 1.5 in. across. Hab. In forests. Perak, base of Hermitage Hill; Batang Padang valley to Telom. Penang, Balik Pulau (Curtis); Setul. Distrib. India, Burma. Native names: Kandada; Berombong Hutan.

Big trees or shrubs growing near or in the sea, glabrous. Leaves fleshy-coriaceous opposite petioled. Flowers in cymes of 3, terminal large (occasionally solitary axillary). Calyx coriaceous; lobes 4 to 8 lanceolate. Petals linear-oblong 4 to 8 or none. Stamens numerous inserted in a band in tube. Ovary free or adnate at base of tube; style long. Stigma capitate. Berry sub-globose, 10- to 15-celled. Seeds many, curved, imbedded in pulp. Species 4 or 5, Indo-Malaya.

Leaves narrow oblong; petals present and with stamens

- pink .............................................................................................................. (1) **S. acida**
- Leaves obovate; petals o; stamens white. .................................................. (2) **S. Griffithii**
- Leaves obovate narrowed to base
- Leaves oblong orbicular ................................................................. (3) **S. alba**

(1) **S. acida** Linn. fil. Supp. 252; Griff. Notulae iv. 652; Clarke, in Hook. fil. F.B.I. ii. 580.


Very distinct in its thin willow-like leaves and pink stamens. The Indian and Bornean plants have blunt tips to the leaves, ours and the Siamese forms are acuminate.


Tree growing in sea, large with very stout stem. Leaves obovate petioled, blunt, narrowed to base, 3-5 in. long, 2 in. wide; petioles 5 in. long. Calyx-tube obconic, 5 in. long; lobes 5, triangular acute, 5 in. long. Petals o. Stamens 75 in. long, white. Style longer. **Hab.** In muddy bays in the sea. Singapore, Gelang; Freshwater Island; Toas; Changi. Malacca, Pulau Jawa (Griffith); Selangor, Jugra and Pasir Panjang (Foxworthy) Perak, Sungei Limau (Foxworthy). **Native names:** Bedada; Pedada; Gadabu; Perapat.

(3) **S. alba** Smith in Rees Cyclop. xxxiii. No. 2; Clarke, l.c. ii. 580; King, l.c. 11.

Tree, large with many aerial roots. Leaves obovate to reniform decurrent on petiole blunt, 2 to 4 in. long and as broad; petioles 25 in. long. Flower-buds narrow, ellipsoid tapering to both ends.

7. AXINANDRA Thw.


(i) A. Maingayi Clarke, in Hook. fil. F.B.I. ii. 581.


Order LXI. ONAGRACEÆ

Herbs usually found in damp spots. Leaves opposite or alternate. Flowers usually axillary solitary, yellow, white (or pink). Calyx tube wholly adnate to ovary, lobes 3 to 6. Petals epigynous as many. Stamens as many or twice as many. Ovary inferior, 4- or 5-celled; style 1. Stigma capitate or lobed. Fruit usually dehiscent, 1- to many-seeded. Species 3000, chiefly in temperate regions.

Stamens twice the number of sepals . . . . . 1. JUSSIÆA
Stamens as many as sepals . . . . . . . 2. LUDWIGIA

1. JUSSIÆA, Linn.

Water or ditch herbs. Leaves alternate. Flowers yellow or white, solitary axillary. Calyx-tube narrow or obconic, teeth 4 to 6, acute persistent. Petals 4 to 6, usually yellow, caducous. Stamens short, twice as many. Ovary 4- or 5-celled; ovules numerous axile; style simple, short. Stigma 4-lobed. Capsule narrow, cylindric or angled or obconic, 4- or 5-celled. Seeds very numerous minute. Species 30, tropics generally.
Aquatic floating plant; flowers white, centre yellow. (1) J. repens
Terrestrial erect herbs; flowers yellow.
Petals much shorter than sepals, small, rhomboid. (2) J. suffruticosa
Petals large obovate clawed.
Plant nearly glabrous; corolla 1.25 in. wide; fruit narrow, cylindric. (3) J. erecta
Plant hairy.
Corolla 1.75 in. wide; fruit thick cylindric. (4) J. villosa
Corolla 3 in. wide; fruit obconic, woolly. (5) J. speciosa


A creeping or floating plant. Leaves obovate or oblancoolate, narrowed to the petiole 1.5 to 3 in. long, 1.2 to 1.5 in. wide, glabrous. Pedicels 1.5 to 1 in. long. Ovary as long. Flower 1 in. across. Petals white yellow at base, very caducous. Capsule 1.5 to 1.5 in. long, linear cylindric. Seeds quadrate, raphe corky. Hab. Ponds and ditches. Common. Singapore, Tanglin; Serangoon Road, Pahang, Pekan. Province Wellesley, Permatang Bertam. Penang. Bagian Jemmal (Curtis); Patalung (Gwynne-Vaughan). Kelantan, Kota Bharu. Distrib. Whole tropics.


Erect branched glabrous herb, 1 to 2 ft. tall. Branches slender winged. Leaves lanceolate acuminate at both ends, thin membranous, 1.5 to 3 in. long, 1.25 to 1.5 in. wide; petioles slender winged nearly to base. Pedicel and ovary 1.5 in. long. Sepals 4, very narrow lanceolate acuminate 1 in. long. Petals shorter, 1 in. long or less, rhomboid, base narrowed. Fruit cylindric, 1.75 in. long, 1 in. through. Seeds in upper part ellipsoid, smooth, pale, in middle larger slightly corky, at base oblong, corky with a groove on one side, much larger. Hab. Damp spots by runnels and ditches. Singapore, Tanglin, etc., very common, to Kelantan, Chaning. Penang (Curtis). Distrib. India, Siam, Christmas Islands, Philippines.


Herb 1 to 3 ft. tall, glabrous or sparsely hairy especially on the young parts, fairly stout. Stem angled or slightly winged, simply branched. Leaves lanceolate-acuminate, long, narrowed to the base; nerves ascending, 1.4 pairs slightly elevate beneath and usually sparsely hairy 2 to 4 in. long, 1.25 to 1 in. wide. Ovary and pedicel 1.5 in. long. Sepals 4, ovate acuminate 1.2 to 2 in. long and increasing to 3 in fruit; nerves prominent, 3, hairy. Corolla 1 in. across; petals obovate slightly emarginate clawed. Fruit oblong, obcuneate glabrous, broadest above, narrowed to base, 1.75
to 1 in. long, ·25 in. through at top. Seeds ellipsoid polished, mahogany brown. *Hab.* Wet spots, ditches, etc. Common. Singapore, Tanglin, Tanjong Katong, Malacca (Griffith); Pulau Besar (Maingay) to Kelantan, Chaning; Kota Bharu. Penang (Wallich). *Distrib.* India, Java, Borneo, Timor, Philippines, Papua, Australia, China. *Native names:* Bujong Samalam; Pujong Malam; Lakom Ayer. *Use:* As a poultice for headache.


A tall densely hairy plant. Leaves lanceolate, narrowed at both ends, sessile hairy all over, 3 in. long, 1 in. wide. Ovary cylindric hairy. Sepals ovate acute ·3 in. long, ·1 in. wide at base, hairy outside. Corolla ·75 in. across; petals oblong oblanceolate retuse, ·25 in. across. Fruit thickly cylindric, base narrowed, hairy, ·25 in. long, ·25 in. through. Seeds dark red ellipsoid, grooved. *Hab.* Wet spots, Singapore, Alexandra Road. *Distrib.* S. India, Cambodia, Borneo, Timor, Philippines, Australia.


A plant 4 to 6 ft. tall, densely softly tomentose-hairy all over. Leaves lanceolate broad, narrowed to both ends 4 in. long, 1 in. wide; nerves over 20 pairs; petioles short, distinct, ·25 in. long. Sepals triangular acuminate, cuspidate, densely hairy outside ·5 in. long, ·25 in. wide at base. Corolla 3 in. across; petals ·25 in. across, obovate. Capsule obconic, densely softly hairy and crowned by the large sepals now ·9 in. long. Seeds ellipsoid not grooved, red. *Hab.* Ditches and swamps, local and not common. Singapore, Balestier Plain, Serangoon Road. *Distrib.* South India, Ceylon.

2. **LUDWIGIA**, Linn.

Erect or decumbent herbs. Leaves alternate. Flowers axillary, sessile or nearly so. Calyx-tube slender, cylindric, lobes 3 to 5, persistent acute. Petals 3 to 5, epigynous, yellow, very small. Stamens as many. Ovary inferior 4- or 5-celled; ovules many in two or more rows; style simple. Stigma capitate. Capsule linear or oblong 4- to 5-celled breaking up irregularly. Seeds numerous, obovoid smooth not corky. Species 20. Temperate or tropical regions. Differs from *Jussiæa* simply in the smaller number of the stamens.

Capsule oblong, thick; seeds in several rows . . . . (1) *L. parviflora*
Capsule very slender, cylindric; seeds in 1 row . . . . (2) *L. prostrata*

(1) *L. parviflora* Roxb. *Hort.* Beng. ii; Clarke, l.c. ii. 588; *King, l.c.* 13.

Erect glabrous herb 6 to 12 in. tall. Leaves lanceolate to linear-oblong narrowed to both ends 1 to 3 in. long, ·25 to ·5 in.
Ludwigia.]

Order LXII. SAMYDACEAE.

Shrubs or small trees. Leaves alternate, sometimes serrate. Flowers rather small in clusters or racemes. Calyx inferior. Petals 5 to 10 or 0. Stamens 1 to 7 with alternating staminodes or glands. Ovary inferior, free or half superior 1-celled, many ovuled. Fruit fleshy or coriaceous, 2- to 5-valved. Species about 300, all tropics.

Petals 0.

Style 1; stamens 8 to 10 alternating with staminodes. 1. Casearia

Styles 3; stamens 8 to 10 alternating with hairy scales. 2. Osmelia

Petals 5 to 10; stamens 1 to 7 alternating with glands. 3. Homalium

1. Casearia, Jacq.

Shrubs or small trees. Leaves alternate distichous, occasionally serrate. Flowers small in axillary clusters, greenish yellow; pedicels short surrounded by small scales. Calyx inferior, 4- to 5-lobed, lobes imbricate. Petals 0. Stamens twice the number of calyx-lobes, united in a tube with alternating staminodes, hypogynous (sometimes nearly free). Ovary free, ovoid, 1-celled; ovules many; style simple. Stigma capitate or trifid. Fruit globose or ellipsoid, yellow, 3- or 2-valved. Seeds many, angular.

Leaves pubescent beneath.
Leaves thin, base cuneate or blunt, 3 in. long; fruit under 1 in. long.
Leaves rather thick, base cordate, 6 in. long; fruit 1 in. long.
Leaves broad elliptic, base cuneate, 6 by 4 in.; fruit 1 in. long.
Leaves quite glabrous.
Fruit under 1 in. long.
Leaves large ovate elliptic.
Racemes not elongating, sub-crenulate.
Leaves oblong-lanceolate 4 by 2 in.; fruit short, ovoid.
Leaves oblong 4 to 6 in. long, 2:5 to 3 in. wide.
Leaves lanceolate, thin coriaceous, 4 by 1:5 in.; fruit oblong.
Leaves lanceolate, 3 by 1 in.; fruit ellipsoid.
Racemes elongating; leaves thinly ridged coriaceous.
Fruit 1:5 to 2 in. long.
Leaves lanceolate 6 in. long; flowers crowded, several.
Leaves lanceolate, short, 4 to 5 in. long; flowers in ones and twos.

(1) C. Lobbiana
(2) C. greviæfolia
(3) C. velutinosa
(4) C. latifolia
(5) C. esculenta
(6) C. leucolepis
(7) C. coriacea
(8) C. flexula
(9) C. albicans

(10) C. Clarkei
(11) C. macrocarpa

Small shrub or small treelet, 4 to 15 ft. tall, pubescent. Leaves oblong or oblong-lanceolate short acuminate, membranous, glabrous above, except midrib and nerves beneath, softly pubescent; nerves 8 to 10 pairs, 2 to 5 in. long, 75 to 2:25 in. wide; petioles 2 to 3 in. long tomentose. Flowers few, axillary, green. Calyx teeth triangular, acute, 5 in. long, 4 in. wide. Fruit sub-globose orange 5 in. long, 4 in. wide. Seed with crimson aril. Hab. Lowland woods. Singapore, Garden Jungle, Johor, Tanjong Kupang. Malacca, Alor Gajah (Griffith). Selangor, Bukit Hitam (Kelsall). Perak, Larut (Kunstler); Gunong Keledang. Penang, Waterfall (Curtis).

Bruas. Perak (Scortechini): Gunong Keledang (Ridley). *Distrib.* Cambodia, Malay islands.

(3) C. *velutinos* *a* *Ridl.* *Journ.* *Roy.* *As.* *Soc.* *S.* *Br.* *75,* *p.* *34.

Shrub. Branches velvety flexuous. Leaves thinly coriaceous, oblong to ovate acuminate, base rounded or shortly narrowed; nerves 12, prominent beneath, depressed above; glabrous above, softly tomentose beneath, 6 to 10 in. long, 3 to 4·5 in. wide; petioles tomentose, ±2 in. long. Heads ·15 in. across. Flowers ·1 in. across. Sepals imbricate, pubescent, 5 sub-orbicular, oblong hairy outside. Petals 0. Stamens 10, glabrous; anthers small introrse. Stamnodes forming a tube with them, sub-spathulate hairy. Ovary conic. Stigma large capitate. Capsule ·5 in. long, dehiscing into 3 narrow boat-shaped valves. *Hab.* Forests, local. Perak, Gunong Keledang. Dindings, Lumut; Bruas (Ridley).

(4) C. *latif* *o* *lia* *Ridl.* *Journ.* *Roy.* *As.* *Soc.* *S.* *Br.* *75,* *p.* *34.

C. *albic* *ans* *King,* *l.c.*, *not of* Wallich *nor of* Clarke.

A big shrub or tree (Wallich), about 10 ft. tall with flexuous white slender branches, quite glabrous. Leaves thinly coriaceous dark green, elliptic-ovate long-acuminate, base rounded; nerves fine, 8 pairs, slightly raised beneath, reticulations fine conspicuous, 8 in. long, 4 in. wide; petioles ·2 in. long. Heads small, axillary usually many-flowered. Bracts short, ovate. Buds globose, glabrous pedicelled. Fruit oblong-ellipsoid, yellow, ·5 in. long. *Hab.* Hill forests. Perak, Ulu Bubong (Kunstler 10869), Penang (Wallich 7197 (i), 7432) halfway up Western Hill; Pulau Betong (Curtis).

(5) C. *esculenta* *Roxb.* *Fl.* *Ind.* ii. 422; *Clarke,* *l.c.* ii. 592; *King,* *l.c.* 17.

Shrub or treelet up to 20 to 30 ft. tall, glabrous. Branches white, flexuous. Leaves thinly coriaceous, elliptic-oblong acute, base cuneate or round, edge obscurely undulate (or not); nerves 6 to 8 pairs, 3 to 4 in. long, 1·5 to 2·25 in. wide. Heads many-flowered; pedicels ·2 in. long, all glabrous. Calyx teeth 4 ovate. Fruit oblong-ovoid, 1 in. long, valves broad, ovate. *Hab.* Malacca (Griffith, Maingay), rare. *Distrib.* India.

Griffith's Malacca specimens are identical with another one collected by him in Khasyia in Kew Herbarium, and I should conclude it was an error of localisation to refer them to the peninsula were it not for Maingay's specimens.

(6) C. *leucose*l*epis* *Turcz,* *Bull.* *Soc.* *Nat.* *Mos* *c.* i. 463.

Glabrous plant with stout branches. Leaves distant, thinly coriaceous or membranous, oblong blunt or bluntly acuminate, base inaequilateral rounded or sub-cordate, edge minutely crenulate; nerves slender, 10 pairs, 4 to 6 in. long, 2·5 to 3 in. wide; petioles ·2 in. long. Flowers several in short heads of woolly bracts. Pedicels slender, ·15 in. long. Sepals 4, oblong blunt inside pubescent. Stamens 8, shorter; anthers ovate acute. Stamnodes

(7) C. coriacea Vent. Choix des Plantes, 45; Koorders Boomsorten Java, 345.

Small tree 20 to 25 ft. tall, 2 to 3 in. through. Branches flexuous. Leaves thinly coriaceous, oblong or elliptic-acuminate, base narrowed shortly; nerves 5 to 6 pairs, slender, reticulations rather conspicuous when dry, 5 to 6 in. long, 2 to 2-75 in. wide;


Branches flexuous with pale bark. Leaves thinly coriaceous lanceolate, narrowed at both ends, acute; nerves 4 pairs, 3 to 3-5 in. long, 1 to 1-25 in. wide; petioles 2 in. long. Heads dense;

(9) **C. albicans** Wall. Cat. 7197 (3), not of King or Clarke.

Small tree. Leaves thinly stiff coriaceous shining, lanceolate acuminate, base narrowed; nerves 8 pairs fine, reticulations conspicuous on both sides, 4 in. long, 1-75 in. wide; petioles 1-24 in. long. Heads small, the racemes lengthening to 2 in. long with numerous ovate acute bracts. Flowers 1 in. wide. Sepals ovate rounded, edges ciliate. Stamens 8; staminodes hairy at tip as long as the filaments. Fruit oblong, 1-5 in. long (not ripe) orange. Hab. Penang, top of the hill (Wallich, Curtis).

Near **C. flexula**, but with more rigid leaves and racemes elongating.

(10) **C. Clarkei** King, l.c. 18. **C. albicans** Clarke, in Hook. fil. F.B.I. ii., not of Wallich or King.


var. **Kunstleri**. **C. Kunstleri** King, l.c. 17.

Tree 60 to 80 ft. tall. Branches and leaves as in type. Flowers much larger; pedicel 1-2 in. long. Fruit pear-shaped, 2-5 to 3 in. long, 2 in. through, very soft, bright yellow. Hab. Johor, Kwala Sembrong (Kelsall). Pahang, Telom. Perak, Larut Hills (Kunstler); Kamuning.

(11) **C. macrocarpa** Clarke, l.c. ii. 593; King, l.c. 18.

Tree about 20 ft. tall, glabrous. Leaves narrowly lanceolate acute or acuminate, base narrowed, thinly coriaceous, 4 to 6 in. long, 1 to 1-25 in. wide; petioles 1-3 to 1-4 in. long. Heads 1- or few-flowered; pedicels slender, 1-2 in. long. Buds globose 1 in. long. Calyx-lobes 5, oblong blunt, velvety inside. Fruit ellipsoid, compressed, 1-75 in. long, 1-5 in. through, red. Seeds obovoid. Hab. Hill forests, local. Penang Hill (Maingay); Batu Feringhi; Moniot’s Road (Curtis).

### 2. OSMELIA, Thw.

Trees. Leaves ovate or oblong-lanceolate. Flowers small nearly sessile in long simple or paniced racemes. Calyx inferior, cleft nearly to base, lobes 4 to 5, round, imbricate. Petals none.
Stamens 8 or 10, half alternating with as many bilobed hairy scales, and half in the notches of the scales. Ovary superior, 1-celled; ovules few; styles 3, with bifid or capitulate stigmas. Capsule sub-globose, 3-valved. Seeds few with a red aril. Species 6, Ceylon, Malay isles.

(1) **O. Maingayi** King, l.c. 19.
Unisexual tree 20 to 60 ft. tall. Branchlets, underside of leaves and inflorescence tomentose. Leaves membranous, oblong short acuminate, base round; nerves 6 to 10 pairs, 4 to 6 in. long, 1.75 to 3 in. wide; petioles 1.75 in. long. Male panicles terminal and axillary, 3 to 8 in. long. Flowers 1 in. wide, pink and yellow, in small heads. Sepals 4, pubescent. Stamens 8 in 2 unequal rows. Female panicles axillary; flowers as in male, but stamens sub-equal. Ovary tomentose. Capsule 5 to 65 in. long. *Hab. Forests, not uncommon in the lowlands. Singapore, Bukit Mandai; Bukit Timah. Pahang, Pulau Tawar. Malacca (Maingay). Selangor, Bukit Kutu; Batu Caves. Negri Sembilan, Bukit Tampin (Goodenough); Seremban (Cantley), Perak, Chanderiang and Goping (Kunstler). Native names: Berunai Ayer; Medang Kemantian. Use: For making chairs.


Shrubs or trees. Leaves alternate, crenate seldom quite entire. Flowers small, hairy, in slender axillary and terminal racemes, simple or panicled. Bracts sometimes large, caducous. Calyx funnel-shaped, adnate to base of ovary, lobes 5 to 10, narrow, persistent. Petals 5 to 10, narrow insert in throat of calyx. Disc tomentose. Stamens 1 to 2 opposite each petal alternating with glands. Ovary half superior, 1-celled; ovules many; styles 2 to 3, filiform. Capsule half superior, coriaceous, 2- to 5-valved at the tip. Species 50, tropics generally.

Flowers 3 in. wide.

<table>
<thead>
<tr>
<th>Description</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stamens 1 to each petal;</td>
<td>(1) <strong>H. longifolium</strong></td>
</tr>
<tr>
<td>Leaves glabrous</td>
<td></td>
</tr>
<tr>
<td>Stamens 2 to each petal;</td>
<td>(2) <strong>H. Kunstdleri</strong></td>
</tr>
<tr>
<td>Leaves glabrous, glaucous</td>
<td></td>
</tr>
<tr>
<td>Stamens 2 to each petal;</td>
<td>(3) <strong>H. propinquum</strong></td>
</tr>
<tr>
<td>Leaves glabrous, stiff</td>
<td></td>
</tr>
<tr>
<td>Stamens 2 to each petal;</td>
<td>(4) <strong>H. spathalatum</strong></td>
</tr>
<tr>
<td>Leaves entire, glabrous</td>
<td></td>
</tr>
<tr>
<td>Stamens 4 to a petal;</td>
<td>(5) <strong>H. Griffithianum</strong></td>
</tr>
<tr>
<td>Petals 6; calyx cylindric</td>
<td></td>
</tr>
<tr>
<td>Flowers 1.75 in. wide.</td>
<td>(6) <strong>H. frutescens</strong></td>
</tr>
<tr>
<td>Stamens 4 to a petal;</td>
<td>(7) <strong>H. undulatum</strong></td>
</tr>
<tr>
<td>Calyx-teeth 5, small</td>
<td></td>
</tr>
<tr>
<td>Stamens 7 to 9 to a petal;</td>
<td>(8) <strong>H. grandiflorum</strong></td>
</tr>
<tr>
<td>Accrescent in fruit</td>
<td></td>
</tr>
<tr>
<td>Tree 30 to 60 ft. tall,</td>
<td></td>
</tr>
<tr>
<td>Glabrous</td>
<td></td>
</tr>
<tr>
<td>Leaves coriaceous, oblong</td>
<td></td>
</tr>
<tr>
<td>Acuminate, base</td>
<td></td>
</tr>
<tr>
<td>Shortly cuneate;</td>
<td></td>
</tr>
<tr>
<td>Nerves 7 to 10 pairs,</td>
<td></td>
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</tbody>
</table>

entire or slightly crenulate 3 to 7 in. long, 1'25 to 2 in. wide; petioles 1'15 to 1'3 in. long. Racemes slender, 6 to 9 in. long, axillary, solitary, minutely white tomentose. Flowers 1'5 in. across, pale yellow, sub-sessile, in fascicles of 3 to 4. Calyx-tube 6-fid, lobes lanceolate. Petals similar, narrower. Stamens 1 opposite each petal, alternating with yellow glands. *Hab.* Forests at 200 to 2000 ft. altitude. Malacca, Selandel (Derry); Mt. Ophir. Selangor, Batu Caves; Kuala Lumpur. Perak, Batang Padang (Kunstler). Penang, Pulau Betong; West Hill (Maingay, Phillips, Curtis). Tomohon (Machado). Tringganu, Bundi (Rostado). Native names: Sangkah; Petaling Gajah; Selumbar; Kemap; Mesikang.

(2) H. Kunstleri King, l.c. 20.

Tree 20 to 40 ft. tall. Leaves stiffly coriaceous, oblong-elliptic, short acuminate, base narrowed or round, edges crenate, glabrous glaucous beneath; nerves 8 or 9 pairs, 4'5 to 7 in. long, 2'25 to 2'75 in. wide; petioles 1'2 to 1'3 in. long, thick. Racemes solitary rather thick, 4 in. or more long, tomentose; flowers in remote clusters of 3 to 4, 1'2 in. across, greenish yellow. Calyx-tube short funnel-shaped, teeth 6, oblanceolate. Petals 6, broadly lanceolate, villous inside. Stamens 2 opposite each petal, glabrous. Ovary hairy. *Hab.* Limestone rocks. Perak, Goping (Kunstler).

(3) H. propinquum Clarke, l.c. ii. 597; King, l.c. 21.

Big tree 30 to over 100 ft. tall, 15 to 24 in. through. Leaves coriaceous, elliptic to obovate obtuse or shortly acuminate, base narrowed, undulate or crenate, glabrous (except midrib beneath sometimes pubescent); nerves 9 to 11 pairs, raised beneath, 4 to 7 in. long, 2'25 to 3'5 in. wide; petioles 2'5 to 3'5 in. long. Racemes 1'2 in. long, clustered and panicked, pale tomentose. Flowers 2 in. across in clusters on pedicels 1'5 in. long, pale green. Calyx-tube funnel-shaped, lobes 6 to 7, sub-spathulate. Petals shorter. Stamens 2 to each petal. *Hab.* Forests. Perak, banks of Bernam River (Kunstler). Penang, Waterfall (Curtis). Native name: Pantat K’lat Putih.


Glabrous tree. Leaves thinly coriaceous, elliptic acuminate, blunt, base narrowed, entire or undulate; nerves about 7 pairs, very fine and rather obscure, 4 in. long, 1'5 in. wide; petioles 1'2 in. long. Racemes axillary, solitary, 3 in. long, slender, tomentose. Flowers numerous, not clustered, sub-sessile, 1'2 in. wide. Calyx-tube funnel-shaped tomentose, 1'2 in. long, lobes 10 very narrow linear, edged with long hairs. Petals little longer, linear-spathulate to. Stamens glabrous, shorter, 2 to a petal; glands pubescent. Styles 3, glabrous. *Hab.* Dindings, Pangkor (Curtis).

(5) H. Griffithianum Kurz *Journ.* As. Soc. Beng. xl. (2), 57; Clarke, l.c. ii. 597; King, l.c. 21 (Fig. 68, p. 836).

Small tree 30 to 40 ft. tall, softly pubescent. Leaves thinly
coriaceous, obovate-oblong, shortly blunt apiculate, nearly entire or coarsely crenate, base shortly narrowed or round cordate, glabrous except nerves above and beneath (when adult); nerves 7 pairs, 2.75 to 5 in. long, 1.65 to 2.5 in. wide; petioles 2 to 4 in. long, pubescent. Racemes solitary, tomentose, 3 to 5 in. long, slender. Flowers 3 in. across, villous greenish yellow or white in small clusters. Calyx 1 in. long, conic, teeth 10, linear. Petals oblanceolate, larger. Stamens 2 opposite each petal, glabrous; styles 5. 


(6) H. frutescens King, l.c. 22. Small tree 15 to 30 ft. tall, glabrous. Leaves coriaceous, elliptic-oblong, shortly acuminate, narrowed to base, edge usually crenate, drying brown beneath; nerves 6 to 8 pairs, slender, secondaries conspicuous 3 to 5 in. long, 1.75 to 2.25 in. wide; petioles 1 in. long. Racemes axillary sometimes branched, fairly stout, glabrous
4 in. long. Flowers numerous not congested, '25 in. long, '15 in. wide. Calyx cylindric conic, rigid, teeth 6, lanceolate acute. Petals white, larger pubescent, oblong-lanceolate. Stamens 4 opposite each petal, glabrous, white, glands yellow, 5; styles 5 as long as stamens. Hab. Open wet jungle. Johor, Kota Tinggi; Serem; Kuala Sembrong (Kelsall), Pahang, Temerloh (Foxworthy). Selangor; Rantau Panjang (Kloss); Kuala Lumpur. Perak, Ulu Bubong (Kunstler). Distrib. Malay isles. Native names: Petaling Ayer; Dada Ruan.

(7) H. undulatum King, l.c. 23.

Tree 40 to 60 ft. tall, 10 to 15 in. through. Leaves coriaceous, elliptic, shortly blunt-apiculate, shortly narrowed at base, serrate crenulate, glabrous yellowish green; nerves 8 pairs, very fine, 3 to 4 in. long, 1.75 to 2 in. wide; petioles 2.25 in. long. Panicle terminal '6 in. long and racemes axillary, sparsely tomentose, slender. Flowers '6 to '7 in. across, greenish yellow with a silvery tinge, tomentose; pedicels slender '4 in. long. Calyx broad, funnel-shaped, teeth 5, lanceolate. Petals obovoid, clawed. Stamens much shorter, 4 to each petal, glabrous. Ovary hairy. Hab. Rare, limestone rocks. Perak, Kinta, Gunong Malacca (Kunstler).

(8) H. grandiflorum Benth. Journ. Linn. Soc. iv. 36; Clarke, l.c. 598; King, l.c. 23.

Tree 30 to 60 ft. tall. Leaves bright green, red when young, glabrous, thinly coriaceous shining, elliptic to oblong acute or acuminate, narrowed near petiole faintly crenulate; nerves 9 to 12 pairs, slender, 3.5 to 6.5 in. long, 1.75 to 3.25 in. wide; petioles 2 to 3 in. long. Racemes or panicles 6 in. long; branches of panicles short tomentose. Flowers numerous, scattered, with large ovate glabrous caducous bracts. Calyx-tube short, hemispheric, with pedicel 1 in. long, tomentose, teeth 7 to 9, spatulate oblong. Petals shorter, whole flower '4 in. across. Stamens 7 to 12, opposite each petal; filaments pilose; glands alternating with petals. Ovary free, 6-ridged, tomentose. Hab. Lowland forests, very rarely flowering, probably once in twenty-five years. Singapore, Tanglin; Garden Jungle; Kranji. Malacca (Griffith). Selangor, Ulu Gombak (Burn-Murdoch). Distrib. Tenasserim.

Order LXIII. TURNERACEÆ.

Shrubby plants or herbs usually hairy. Leaves alternate serrate. Flowers large axillary r or few, bisexual. Calyx tubular, 5-lobed. Petals 5, insert in calyx mouth, clawed, white or yellow. Stamens 5 in the middle or mouth of tube; filaments free. Styles 3, filiform (simple) or fimbriate; ovules many. Capsule i-locular, 3-valved. Seeds numerous, oblong-cylindric. Upwards of 100
species, chiefly American. Two species of *Turnera* have run wild in the Straits.

**TURNERA**, Linn.

Description as above.

Flowers white with maroon eye .... (1) *T. trioniflora*
Flowers bright yellow .... (2) *T. ulmifolia*

(1) *T. trioniflora* Sims *Bot. Mag.* 2106.
Shrubby herb about 18 in. tall. Leaves narrowly lanceolate acuminate, base long narrowed, serrate, 2·25 in. long, 1 in. wide, upper ones smaller, glabrous above; nerves 9 pairs, slender, hairy beneath; petiole 2 in. long, strigose. Flowers sub-sessile in terminal axils. Calyx-lobes 75 in. long, narrow acuminate, strigose. Corolla 2 in. across, pale yellow with a black centre. Stamens black. Capsule 3 in. long, hairy. *Hab.* Damp, open country, Singapore, Tanglin, Penang, Batu Feringhi (Curtis).

This has been reduced to a form of *T. ulmifolia*, but no two species could be more dissimilar.

A stiff branched herb 12 in. tall. Leaves herbaceous lanceolate or ovate lanceolate dentate serrate narrowed to base, hairy all over; nerves slender, 9 pairs, 3·5 in. long, 1 in. wide; petioles 75 in. long. Flowers solitary in terminal axils. Calyx of 5 long lanceolate acuminate segments, 2 in. long strigose. Corolla 2 in. wide, deep yellow. Petals 5, round, clawed. Stamens yellow. *Hab.* Sandy open spots, Singapore, Tanjong Katong; Tanglin, Penang, Batu Feringhi (Curtis). *Distrib.* South America. Now established in the Mascarene Isles, India, Ceylon, Cocos and Christmas islands.

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**Order LXIV. PASSIFLORACEÆ.**

Twining herbs or shrubby at base, with tendrils, more rarely trees. Leaves alternate, often lobed, stipulate. Inflorescence axillary, cymose. Flowers regular. Calyx tubular at the base, lobes imbricate 5. Petals none or as many as the calyx-lobes rising from the calyx-tube, a corona of one or more rows of filaments from the tube mouth. Stamens 5, on a gynophore. Anthers oblong. Ovary superior on the gynophore, 1-celled; styles 3, with reniform stigmas. Fruit, a berry many-seeded or a capsule. Species about 300, chiefly in the tropics of South America. The Papaya (*Carica Papaya*, L.), Malay name, Betik, is usually referred to this Order.
It is a native of South America. (King, Journ. As. Soc. Beng. lxxi. (2), p. 49.)

<table>
<thead>
<tr>
<th>Botanical Name</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>1. <em>Passiflora</em></td>
<td>Climbing plants. Flowers bisexual, spreading; fruit a berry.</td>
</tr>
<tr>
<td>2. <em>Adenia</em></td>
<td>Flowers unisexual; fruit a capsule.</td>
</tr>
<tr>
<td>3. <em>Paropsis</em></td>
<td>Tree, bisexual; petals and stamens 5; fruit a capsule.</td>
</tr>
</tbody>
</table>

1. **PASSIFLORA**, Linn.

Twining herbs or half shrubby plants. Leaves simple or lobed. Stipules filiform or leafy. Flowers solitary or in cymes, peduncled often showy. Calyx-tube fleshy, 5-lobed. Petals 5 from throat of calyx-tube. Corona of one or more rows of filaments. Gynophore surrounded at base by a shallow cup. Stamens 5; anthers oblong. Ovary 1-celled; styles 3. Stigmas reniform, capitate. Fruit, a berry with numerous arillate seeds. Species about 250, chiefly South American. Only one species is native here and another thoroughly established as an alien. Several South American species are in cultivation here, and some have more or less established themselves as garden escapes.

(1) **P. Horsfieldii** Blume, *Rumphia* i. 170, t. 52; King, l.c. 50.

Slender climber. Leaves membranous oval or oblong ovate sub-acute, base rounded and minutely emarginate, glabrous; nerves 5 pairs, 4 to 6 in. long, 2.5 to 3.25 in. wide; petioles 6 to 9 in. long, with two oval glands near middle. Inflorescence 2 in. long, axillary 5-flowered. Flowers white 1.25 to 1.5 in. wide; pedicels 4 in. long. Fruit sub-globular, 75 in. through. *Hab.* Forests, not common. Pahang, Kwala Lipis (Machado). Perak, Goping; Larut (Kunstler). *Distrib.* Java.

(2) **P. foetida** Linn. *Sp. Pl.* 959.

Slender climber, hairy. Leaves thin, trilobed hairy, 2.5 to 3.5 in. long, 1.5 to 3 in. wide, base cordate; petioles hairy 1 in. long. Flower solitary, axillary, 1.25 in. across, white with a fimbriate sticky involucre of 3 leaves. Fruit globose, 75 in. through, orange enclosed in the green involucre. Native of South America, now thoroughly established all over the peninsula in open country. Singapore, Selangor, Pahang, Perak. First record Malacca, Cuming 1841. The plant was extensively used at one time for killing Lalang grass by climbing over and smothering it. *Native names:* Lang Buluh; K’rang Kraut; Letop-Letop; Timun Dindang; Timun Padang.

**Occasional Escapes**

**P. quadrangularis** Linn.

A large plant with soft 4-angled stems and large entire light green leaves. Flowers 3 to 5 in. across, purple banded with white. Fruit pale green, oblong, 8 in. long. The Granadilla.
P. laurifolia Linn.
A long slender slightly woody climber, not 4-angled. Leaves sub-coriaceous oblong, dark green. Flowers violet 3 in. across. Fruit egg-shaped and as big as an egg, yellow with 2 persistent green leafy bracts at the base. Native name: Buah Susu. The best eating passion-fruit. It is cultivated and has run wild in Singapore and Malacca.

P. suberosa Linn.
A very small species with lobed leaves, small, green flowers ½ in. across and sub-globose; purple fruit, ½ in. long. Occurs as an escape in Tanglin, Singapore.

P. edulis Sims.
With trilobed serrate leaves, given by King, l.c., as the Grana-dilla, and as an alien here, has often been planted in gardens, where it rarely, if ever, flowers, and has never been known by me to fruit. It cannot be counted even as an alien escape.

2. ADENIA, Forsk.
Long slender climbers, sometimes woody at base. Leaves entire (lobed in other countries) with circular glands on the petiole. Cymes axillary on long peduncles. Flowers tubular, green, unisexual. Male flowers, calyx tubular or campanulate, 5-lobed. Petals 5 from the tube. Corona a ring of threads from near the base of the tube or absent. Disc-glands 5, opposite the calyx-lobes, strap-shaped or capitate. Stamens 5, connate in a ring at the base of the tube; anthers linear. Females as in males with staminodes connate at base, no anthers. Ovary globose, sessile or stalked. Stigmas 3. Fruit capsular, 3-valved, red. Seeds black, pitted orwarted, suspended by long white funicles. Species 40, Old World tropics.

Leaves lanceolate acuminate, minutely peltate
Leaves ovate, base cordate
Leaves shortly narrowed at base, not cordate oblong.
Leaves thin; peduncles 2 to 4 in. long
Leaves rigid, pale beneath
Leaves 4 to 6 in. long, sub-coriaceous; panicle 1½ in. long

Very slender, wiry climber. Leaves membranous, elliptic-oblong or lanceolate, base round peltate, acuminate at tip; nerves 4 pairs inarching, 2½ to 4½ in. long, ½ to 1½ in. wide; petioles 4 to 8 in. long; peduncles 1½ in. long with a tendril and 1 to 2 flowers. Flowers ½ in. long, green. Males, calyx campanulate, deeply 5-lobed; lobes linear acute. Petals shorter ob lanceolate truncate; anthers as large, oblong, blunt cordate, tube of filaments
wide. Capsule elliptic-oblong, acute, 2·3 in. long, 1·75 in. wide, red. Seeds sub-orbicular with radiating grooves from centre. *Hab.* Thickets, Johor, Tebing Tinggi. Selangor, Kwala Lumpur. Perak; Waterfall, Thaiping (Wray); Tanjong Hantu. Dindings, Lumut. Penang Hill at 2500 ft. altitude (Maingay, Curtis); Telok Bahang (Curtis); Lankawi (Curtis); Setul Heath, a very narrow-leaved form. *Distrib.* Andamans and Nicobars.

(2) **A. populifolia** Engl. *Jahrh.* xiv. 376; var. *pentamera* King, l.c. 54.

Slender climber. Leaves membranous oblong-ovate acuminate, acute, base cordate; nerves 5 to 7 pairs, faint, 3 to 5 in. long, 1·75 to 2·5 in. wide; petioles 1·75 to 1·25 in. wide with two large cup-shaped glands at top. Peduncles 1 in. long with two branches and a tendril. Flowers few, on pedicels 4 in. long. Male flowers 2 in. long, green, fusiform. Calyx-lobes 5, oblong blunt. Petals just below lobes; anthers 5, sagittate, linear; filaments in a tube. Female flowers 1·5 in. long. Fruit fusiform red, 2·5 to 3 in. long, 1·75 in. through. Seeds oblong foveolate. *Hab.* Edges of woods. Selangor, Sungei Buluh; Petaling. Sungei Ujong, Pantai (Cantley); Perak, Goping and Gunung Bubu (Kunstler); Ipoh (Curtis). *Distrib.* Borneo, Timor.

(3) **A. acuminata** King, l.c. 55.

Stem slender. Leaves thin, coriaceous, ovate-oblong or ovate sub-cordate or round, short acuminate; nerves 2 (or 3) pairs, 4 to 6 in. long, 2 to 4 in. wide; petioles 1·75 to 1·35 in. long. Peduncles 2·5 to 4·5 in. long with 2 or more branches 1 in. long and a tendril. Male flower narrow ovoid green 2·5 to 3·5 in. long. Calyx leathery, lobes ovate lanceolate. Petals oblong acute. Females larger 4 in. long, tubular, swollen at base. Ovary fusiform. Fruit fusiform, red, 2 in. long, 1·75 in. through. Seeds pitted in centre with radiating grooves to edge. *Hab.* Common on edges of woods. Pahang River, Tahan River. Malacca, Merlimau (Cantley); Bukit Bruang (Derry). Selangor, Batang Berjuntai. Negri Sembilan, Bukit Kapayung (Cantley). Perak, Padang Rengas (Curtis); Larut (Kunstler); Tapah (Wray); Ulu Bubong (Kunstler); Dindings, Lumut. *Distrib.* Java, Sumatra. *Native names*: Akar Lempedu Gajah; Akar Gelompong; Akar Lupok; Akar Merapoh; Kulipunang.


Lofty climber. Stem rather thick, woody. Leaves coriaceous, oblong, base cuneate, glands 2, sub-acute, underside pale, reticulations obscure; nerves 3 pairs, 3·5 to 4·5 in. long, 1·75 to 2·25 in. wide; petioles 5 to 1·5 in. long. Male flowers 2·5 in. long, pale green, elongate, fusiform. Fruit fusiform, base rounded 2 in. long, red. Seeds compressed, ellipsoid, 3 in. across, strongly tubercled. *Hab.* Woods in the south, not common. Singapore, Garden
Jungle; Chan Chu Kang; Pulau Tekong. Johor, Bukit Soga; Jaffaria (King).


(1) **P. vareciformis** Masters, *in Trans. Linn. Soc.* xxvii. 639; *King, l.c.* 49.

Shrub or small tree. Leaves sub-coriaceous, oblong or oblong-lanceolate acute or acuminate, base cuneate, edges entire or serrate, glabrous except midrib and 6 to 7 pairs of nerves, 2·5 to 5·25 in. long, 1 to 1·75 in. wide; petioles 1 to 2 in. long. Flowers 5 in. across; pedicels 1·5 in. long, tomentose. Calyx campanulate, villous, lobes oblong acute. Petals smaller ob lanceolate. Corona single woolly. Stamens 5. Ovary villous. Fruit ovoid 5 to 7 in. long. Seed flat scrobiculate. *Hab.* Forests. Malacca (Maingay, etc.). Bukit Bruang. Selangor; Ulu Gombak (Burn-Murdoch); Weld’s Hill, Kwala Lumpur (Foxworthy). Perak (Kunstler and Scortechini).

**Order LXV. CUCURBITACEÆ.**

Climbing herbs, with tendrils. Leaves alternate often cordate, lobed. Flowers unisexual (rarely bisexual) yellow or white, racemed or solitary. Calyx-tube quite adnate to ovary; limb rotate or campanulate; lobes 5. Petals 5, insert on calyx-limb, often fimbriate at edge. Stamens usually 3, insert on mouth or lower down; anthers free or united; cells straight or flexuous. Ovary inferior; carpels 3; style 1. Stigmas 3 (rarely with 2, 3 or 4 styles). Fruit a large or small berry, occasionally a capsule. Seeds
often compressed and corrugate on edge, many; in capsular fruits, winged. Species 600, whole world. (King, Journ. As. Soc. Beng. lxvii. (2), p. 24.)

Female flowers solitary, fruit baccate.
Anther-cells conduplicate or sigmoid.

Petals cirrhiferous.

Seeds 6, woody, large; testa fibrous
Seeds numerous, small; testa not fibrous

Petals entire, divided nearly at base.
Calyx-tube elongate in male; anthers included
Calyx-tube short; anthers more or less exsert.

Stamens insert below the corolla mouth.

Flowers yellow

Corolla campanulate, divided half-way.
Flowers white

Anther-cells straight; connective produced.

Flowers very small, solitary

Flowers, males corymbose

Female flowers in panicles; anther-cells straight.

Fruit a berry

Fruit a cylindric or campanulate capsule opening by a lid; seeds thin winged.

Calyx-lobes 3; seeds winged all round
Calyx-lobes 5; seeds winged at top only

1. HOGSONIA, Hook. fil.


2. TRICHOSANTHES, Linn.

Climbers. Leaves entire or 3- to 9-lobed, toothed, tendrils usually 2- to 5-fid. Flowers unisexual, white, nocturnal. Males, peduncles usually in axillary pairs, one 1-flowered, the other
racemose, gradually lengthening. Bracts often large laciniate, or small or 0. Female flower solitary. Male calyx long tubular; lobes 5, lanceolate, entire or serrate. Corolla 5-lobed, lobes fimbriate, Stamens 3; anthers linear conduplicate, one 1-celled, two 2-celled. Female as in male; stamens 0. Ovary inferior 1-celled; style filiform, 3- to 6-fid at top. Fruit oblong or globose, red. Seeds many in greenish black pulp, ellipsoid. Species 38, Indo-Malaya, China, Japan, Australia.

Usually lofty climbers; flowers opening at 12 o’clock at night, fragrant, falling by morning. Fruits very showy, scarlet, usually egg-shaped, and commonly called “Easter eggs.” The plant often dies down after flowering, when the fruit is ripe, so that the brilliant fruits are very conspicuous on the dead stems.

Leaves lobed, not trifoliolate.
- Male inflorescence ebracteate.
- Male inflorescence bracteate.
- Bracts distant, ovate, slightly toothed.
- Bracts crowded, long, laciniate.
- Leaves broad-lobed; fruit globular; sepals laciniate.
- Leaves long, narrow-lobed; fruit ellipsoid.
- Leaves adult trifoliolate.
- Leaves membranous.
- Leaves coriaceous.

(1) **T. cucumerina** Linn. Sp. Pl. 1008; King, l.c. 27.
Leaves membranous orbicular-reniform to broad ovate, edges denticulate, often 3- to 7-lobed; lobes broad acute, base cordate, above sparse pubescent, beneath pubescent, later scabrid, 2 to 4 in. long and wide; petioles 1 to 2 in. long, pubescent. Male peduncles pubescent, ebracteate. Flowers 0.5 to 1 in. across, tube 0.9 to 3 in. long. Female peduncle 0.5 in. long. Fruit 1 to 3 in. long, ovoid, apex conic, red. Seed elliptic corrugate. Hab. Perak (Kunstler). Perhaps only cultivated or an escape. I have seen no specimen, but King says it has larger flowers than the Indian plant and is doubtful about its identity. Distrib. India.

(2) **T. tricuspidata** Lour. Flor. Cochinchine, ii. 723; King, l.c. 28.
Slender climber. Leaves membranous, ovate-subtriangular; lobes 3 to 5, triangular, base cordate, acute or acuminate or subentire, glabrous, 3 to 5 in. long and as wide; petioles slender, 1 to 1.5 in. long. Male peduncles floriferous for half the length, stout, 6 in. or more long. Bracts ovate, lanceolate cadvate, entire or toothed. Calyx-tube shortly dense tomentose; lobes cadvate toothed. Corolla 1.5 in. wide. Female flower, from same axil as male peduncle, tube 1.5 in. long. Fruit sub-globose, 2 in. through, red. Seeds ovate, 0.5 in. long. Hab. Thickets. Pahang, Pulau Chengei, Pahang River. Perak, Larut (Kunstler); Tambun, Ipoh. Penang (Curtis); Pulau Betong. Distrib. Siam, Cochin China. Native name: Akar Katominon.
var. penangensis Ridl.

Leaves quite similar to type, but bracts large, strongly toothed as in *T. palmata*, and calyx-lobes only slightly denticulate. Probably a distinct species, but specimens few and incomplete. *Hab.* Penang (Curtis).

(3) **T. palmata** Roxb. Hort. Beng. 70; *Fl. Ind.* ii. 704.

Leaves thick membranous, ovate or orbicular, cut down to 3 to 7 lobes; lobes acute or acuminate, edges sub-entire, base deeply narrowed cordate, scabrous above, glabrous or pubescent beneath, 2 to 6 in. long, 1 to 3 in. wide. Male racemes few-flowered, sometimes paired, 8 in. long. Bracts large, ovate to sub-ornicular deeply cut or serrate, glabrous or hairy. Calyx-tube 1.5 in. long; teeth lanceolate, edges deeply laciniate. Female flower solitary; peduncle under 1 in. long. Fruit ovoid acute, globular when ripe 1.5 in. long. *Hab.* Perak, Ulu Bubong (Kunstler). *Distrib.* India.


Leaves membranous sub-ornicular divided half-way down into 3 to 5 oblong or triangular acute lobes sparsely-toothed, base cordate, glabrous, 3 to 7 in. long and wide. Male peduncles stout lengthening to 8 in. Bracts oblong-ovate, edges laciniate. Calyx-tube glabrous, teeth entire lancelate-acuminate. Petals obovate laciniate. Female flowers solitary. Fruit ellipsoid obtuse, red, 2 to 4 in. long. *Hab.* Forests. Singapore Gardens; Bukit Timah; Pulau Ubin, very common. Johor, Kukub. Selangor, Rantau Panjang (Kloss); Bukit Bintang (Goodenough). Sungei Ujong, Bukit Sulu (Cantley). Province Wellesley, Ara Kudah. Penang (Curtis). *Distrib.* India. *Native names:* Akar Timun Gagak (crow's pumpkin); Akar Balistur. The jungle crows often come from the forest to eat these fruits.


Leaves membranous trifoliate (or simple); leaflets unequal acuminate, median one oblanceolate 4 in. long, 1.5 in. wide, petiolule 3 in. long, laterals inaequilateral lobulate at base on outside shorter and broader; petiolules shorter than median one, glabrous, reticulate when dry; petioles 1.25 in. long. Male peduncles long, stout sulcate. Bracts small, oblong, teeth few, short. Calyx 1.5 in. long, narrow, campanulate, suddenly contracted into tube, teeth lanceolate-acuminate. Female, flower tube slightly ciliate at tip. Petals white, oblong, long fimbriate. Fruit oblong, red. *Hab.* Forests. Singapore, Selitar; Pandan Kechil. Johor, Pengerang; Gunong Pulai. Malacca, Selandor (Cantley). Pahang, Kwantan (Durnford). Perak, Larut (Kunstler); Goping. Penang. *Native name:* Akar Tiga Chabang.


Leaves coriaceous trifoliate. Leaflets unequal, mid-one largest ovate oblong acuminate, base slightly narrowed entire, laterals
broadly unequal round at base, 3 to 4.5 in. long, 1.5 to 2.5 in. wide; petioles 1 to 1.5 in. long; petiolules 2 in. long or less. Male inflorescence long stout sulcate. Bracts deltoid pectinate glandular tomentose. Calyx-tube narrow, funnel-shaped, pubescent, teeth lanceolate, entire. Fruit oblong ovate, red, 4 to 5 or nearly 6 in. long, 3 in. through. Seeds in greenish black pulp, brown, edge thick. Singapore, Orchard Road; Chan Chu Kang; Tanglin. Hab. Johor, Bukit Murdom (Kelsall). Malacca, Alor Gajah (Griffith). Dindings, Lumut. Distrib. Celebes. Native names: Akar Tiga Chabang; Timun Dendang Lunjung.

Cultivated Species.

T. ANGUINA Linn. Sp. Pl. 1008.

"Serpent Gourd," "Ketola Ular," easily recognised by its long snake-like fruit, dark green with lighter patches when young, red when ripe, very slender racemes and small flowers. It is often cultivated in vegetable gardens.

3. GYMNOPETALUM, Arn.

Usually creeping herbs, slender. Leaves entire or deeply 3- to 5-lobed. Flowers white, rather large. Male peduncles 2 from each axil, one 1-flowered, the other racemose. Bracts on racemes large, lanceolate incised or small. Females 1-flowered. Male, calyx-tube long, lobes 5, lanceolate. Petals 5 not fimbriate. Stamens 3, anthers conduplicate. Female, ovary oblong; style long. Stigmas 3. Fruit ovate, oblong, acute at both ends. Seeds ellipsoid, margined. Species 6, Indo-China, Malaya.

Leaves not lobed
Leaves deeply 3- to 5-lobed.
   Lobes triangular, acute
   Lobes lobulate sinuate

(1) G. integrifolium

(2) G. cochinchinense

(3) G. quinquelobum

(1) G. integrifolium Kurz, Journ. As. Soc. Beng. xl. 58; King, l.c. 31.

A creeping plant in grass, scabrid. Leaves reniform, blunt, edge undulate or toothed, above scabrid, beneath tomentose, 1.75 in. long, 8 to 2.25 in. wide; petioles 45 to 65 in. long. Flowers solitary. Male peduncles 1.5 in. long. Females 25 in. long. Calyx-tube hairy, teeth lanceolate. Corolla white, 1.35 in. wide, lobes obovate, pubescent. Fruit 75 in. long, globular, orange colour. Hab. Open grassy spots. Perak, Batu Togoh (Wray); Dindings, Lumut. Kelantan, Chaning Estate. Distrib. Cambodia, Java.


Stem scabrid, hairy. Leaves reniform to triangular, 5-angled or lobed half-way, lobes triangular acute, edges crenate dentate,

Fig. 69.—Gymnopetalum cochinchinense.

(3) G. quinquelobum Miq. Fl. Ind. Bat. i. (1), 681; King, l.c. 32.

Slender creeper. Leaves orbicular or triangular deeply 5-lobed, lobes 2- to 3-lobulate, sparsely hairy with thick hairs, 1.5 to 2.25 in. long, 1.75 to 3 in. wide; petioles '75 to 1 in. long. Male flowers solitary (rarely racemose) pilose. Bracts oblong, serrate '5 in. long. Calyx-teeth entire or toothed. Petals oblong acute puberulous outside. Female peduncles '5 to 1 in. long. Fruit oblong, fusiform, ribbed, pubescent, scarlet '5 to 2 in. long. Hab. Not common. Singapore (Thomson); Malacca (Griffith), Perak, Plus River (Wray). Penang (Porter, seeds collected here and
cultivated in Europe). *Distrib.* Andamans and Nicobars, Borneo, Java.

Motley, who collected it in Borneo, 1857 to 1858, says it is called Petola Bruang, and that it is common on dry ground after burning and fruit eatable, cultivated much in Singapore and Penang; but it seems to have disappeared of late years.

4. **MOMORDICA**, Linn.


*Momordica charantia* Linn. with small 5-lobed leaves, small yellow flowers and fusiform fruit acuminate at both ends, yellow, softly prickly, dehiscing into 3 valves, with the seeds in a crimson aril, is often cultivated and is known as "Peria Laut."

Leaves entire, thin; flowers 1 in. wide or less. Flowers '75 in. wide on long slender pedicels . (1) **M. Clarkeana**

Flowers 1 in. wide with large bract . . . . (2) **M. subangulata**

Leaves trilobed; flowers 3 in. wide, cream yellow; black centre; fruit large spiny . . . . (3) **M. cochinchinensis**

(1) **M. Clarkeana** King, l.c. 35.

Stem 4-angled. Leaves thin membranous, ovate cordate acute, glabrous 3 to 5 in. long and nearly as wide; petioles 1.5 to 2 in. long. Male flowers '75 in. across; pedicels slender, several from one axil or in lax racemes. Calyx-lobes puberulous, broad, obtuse, edge glabrous. Corolla of 5 broad lobes, puberulous. Fruit sub-globular, apiculate, red; 1 to 2.5 in. through. *Hab.* Forests. Perak, Gunong Bubu (Kunstler); Kamuning (Ridley).

(2) **M. subangulata** Bl. *Bijdr.* 928; King, l.c. 36.

Stem angled. Leaves broad ovate deep, cordate with remote teeth, glabrous above, sparse hairy beneath, '75 to 2.25 in. long, 1.25 to 1.65 in. wide; petioles 1 in. long. Male peduncles 1 in. long, pubescent. Flower-bracts broad, cordate, blunt, minutely pubescent. Flower 1 in. across. Calyx deep purple, lobes oblong blunt, '2 in. long. Corolla yellow; petals oblong with black spot at base. Fruit ellipsoid 2 to 3 in. long, ribbed. *Hab.* Limestone rocks and river-banks. Perak, Ipoh (Curtis); Kamuning. Kelantan, Chaning, river-banks. *Distrib.* India, Java.


A big climber. Leaves broadly ovate-cordate trilobed, glabrous, 4 to 7 in. long and as wide; petioles 2 to 3 in. long. Male peduncles 2 to 6 in. long. Bract orbicular reniform cucullate. Calyx-lobes coriaceous, hairy. Corolla 3 in. across, cream white, base of petals

5. CEPHALANDRA, Schrader.


6. MELOTHRIA, Linn.

Small climbing herbs. Leaves deltoid or ovate, truncate or cordate, entire or 3-lobed. Flowers very small, yellow or white. Males and females often from the same axil. Male pedicels long, clustered on long peduncles. Female long-pedicelled. Male calyx-tube short, teeth 5. Corolla 5-lobed. Stamens 3, in the middle of calyx-tube; anthers free, straight, connective prolonged. Female ovary oblong; style long. Stigmas 3, sub-globose. Fruit globose or fusiform. Seeds oblong compressed margined. Species 55, tropics.

Fruit not beaked.

| Fruit globose, red; leaves ovate-cordate | (1) *M. affinis* |
| Fruit oblong, white; leaves triangular | (2) *M. indica* |
| Leaves widely 3-lobed, sagittate | (3) *M. odorata* var. *triloba* |
| Fruit beaked, fusiform | (4) *M. marginata* |

(i) *M. affinis* King, l.c. 38.

Climbing 4-angled. Tendrils bifid. Leaves ovate-cordate to triangular often 5-lobed, denticulate, scabrid-hispid on both sides, 1'35 to 4'25 in. long, 1'5 to 3'25 in. wide; petioles '5 to 1 in. long. Male and female flowers from same axil. Males in many-flowered umbels on pedicels 1 to 2 in. long; pedicels 20, glabrous, '35 in. long. Flower '1 in. across, globose pubescent. Calyx-teeth subulate 5. Fruit globose red, '4 to '5 in. through. Seeds obovoid, pitted. *Hab.* Johor, Batu Pahat. Pahang, Pekan. Selangor, Fl.M.P., 1.

(2) **M. indica** Lour.  Flor.  Cochinchine, 35; King, l.c. 38.  
Stem slender rooting at nodes, tendrils simple.  Leaves triangular-cordate acute entire or 3-lobed, glabrous except the hairy nerves, lobes denticulate or lobulate, 1.25 to 2 in. long and as wide; petioles 6 to 1 in. long.  Male pedicels solitary or racemose, 2 to 3 on a 1 in. peduncle.  Calyx-tube broad, campanulate, teeth subulate.  Corolla white, puberulous, 1 in. wide; petals ovate-oblong.  Anthers connective much produced.  Peduncle of female flowers solitary.  Fruit oblong, white, 5 to 7.5 in. long.  Hab.  Open country.  Malacca, Chabau.  Selangor (Kunstler).  Province Wellesley, Bukit Mertajam (Burkill).  
Distrib.  Indo-Malaya.

(3) **M. odorata** Clarke, in Hook.  fil.  F.B.I.  ii. 626; var.  *triloba*  Clarke, i.e.
Distrib.  Indo-Malaya.

(4) **M. marginata** Cogn.  Mon.  Phan.  iii. 593; King, l.c. 39.  
Stems creeping rooting angular.  Tendrils simple, puberulous.  Leaves ovate-cordate or more or less 3-lobed, acute edge minutely denticulate, coarsely strigose both sides; nerves pubescent, 1 to 1.25 in. long and about as broad; petioles 7.5 to 1 in. long, tomentose.  Males umbellate on a filiform peduncle, glabrous short; pedicels 2 to 3 in. long.  Calyx campanulate, pubescent.  Petals villous, yellow.  Female flowers solitary; peduncle 5 in. long.  Fruit narrow, cylindrical, beaked velvety, 7.5 in. long.  Seeds 6 to 8 foveolate.  Hab.  Thickets, waste ground, Pahang, Pekan.  Malacca (Maingay).  Sungei Ujong (Cantley).  Selangor; Batu Caves.

var.  *heterophylla*  Cogn.  l.c. 594.  
Leaves entire, ovate cordate almost smooth except nerves.  Hab.  Pahang, Pahang River, Perak, Kwala Temengoh.  Penang (Wallich 6704); Pulau Betong (Curtis).  

7. **ZEHNHERIA**, Endl.
Climbing herbs.  Tendrils simple.  Leaves entire or lobed.  Flowers small.  Males in a short corymb.  Females solitary or sub-corymbose.  Bracts 0 or very small.  Male calyx tubular, campanulate, teeth 5.  Corolla divided nearly to base into 5 triangular segments.  Stamens 3, anthers 2- or 1-celled, curved
or sigmoid. Female, style cylindric, 3-lobed. Fruit globose or cylindric. Seeds obovoid. Species 10, all tropics.

(1) **Z. umbellata** Thu. **Enum.** i25; **Hook. fil.** F.B.I. ii. 625.

Usually glabrous. Leaves ovate-deltoid cordate to hastate (or 3- to 5-partite to near base), mucronulate, 3'5 in. long, 2 in. wide at base; petioles '2 in. long. Male corymb sub-sessile, '2 in. long. Flowers numerous crowded very small. Females solitary; peduncle very short. Fruit short, cylindric. Seeds few, obovoid, slight-compressed, quite smooth. **Hab.** Open sandy country. Perak, Kwala Temengoh (Ridley). **Distrib.** Indo-Malaya, China, Australia.

8. **GYNOSTEMMA**, Bl.

Climbing shrubs, tendrils simple. Leaves pedate; leaflets 3 to 5, ovate, lanceolate serrate membranous. Flowers very small in diffuse axillary panicles. Male calyx short, bilobed. Corolla rotate, 5-partite lobes lanceolate. Stamens 5; anthers 2-celled, straight. Females as in male, but ovary round; styles 2 to 3 united below, bifid at tip. Fruit globose umbonate 1- to 3-seeded. Seeds warty. Species 4, Indo-Malayan.

(1) **G. pedata** Bl. **Bjtìdr.** 23; **King, l.c.** 40.

Leaves, petioles '1-5 in. long; leaflets 3 to 7 acute, base narrowed, crenulate, '75 to 2'5 in. long, '4 to 1 in. wide; petiolules '2 in. long. Panicles 3 to 6 in. long, pubescent. Corolla yellowish. Fruit '15 in. across. **Hab.** Edges of forests, rare. Perak, road to Jor from Tapah. **Distrib.** Indo-Malaya.

9. **ZANONIA**, Linn.


Leaves ovate oblong; fruit 2'5 in. long . . . . . . (1) **Z. indica**
Leaves ovate round; fruit 5 to 8 in. long . . . . . . (2) **Z. Clarkei**

(1) **Z. indica** Linn. **Sp. Pl.** i028; **Clarke, in Hook. fil.** F.B.I. ii. 633; **King, l.c.** 41.

Slender climber 30 to 50 ft. long, glabrous. Leaves coriaceous, ovate-oblong acute, base rounded retuse; nerves 6 to 8 pairs, 2 to 3'5 in. long, 2 to 3'5 in. wide; petioles '68 to '8 in. long. Panicles large about 18 in. long with very many slender branches, on the lower part of the stem. Flowers light yellow about '3 in. wide, very shortly pedicelled. Fruit cylindric, campanulate, 3 in. long, dark green, truncate at top. Seeds flat thin, nucleus '6 in. long;
wings 1·75 in. across. Hab. Damp jungle climbing on trees or shrubs. Rare. Perak, Gunong Bubu and Batang Padang River (Kunstler). Distrib. India, Ceylon.

(2) Z. Clarkei King, l.c. 41.
A lofty climber 60 to 80 ft. long. Leaves coriaceous ovate round acute, base broad emarginate; nerves 5 to 7 radiating from base, 2·5 to 3·5 in. long, 2·5 to 3 in. wide; petioles 75 in. long. Flowers unknown. Fruit cone-shaped, ovoid cylindric, dark green mottled lighter, 5 to 8 in. long. Seed star-shaped with 7 or 8 projecting processes 1 in. thick, brown and pustulate on the faces 1 in. long; wings thin 1 in. wide. Hab. Rare. Hanging from lofty trees. Selangor, Batu Caves. Perak, Kinta (Kunstler).

10. ALSOMITRA, Benth. and Hook. fil.


Cultivated Plants

Luffa aegyptiaca Mill. Gard. Dict. viii; King, l.c. 33. Native names: Petola Manis; Ketola Manis. The Loofar. Slender long climber with lobed leaves, 4 to 6 in. across, long tendrils. Flowers light yellow expanding at dusk, 2 in. across; petals rounded, tube short. Fruit oblong cylindric smooth, very fibrous, 2 to 6 in. or more long.

L. acutangula Roxb. Native name: Petola Sanding. Chiefly differs from the last in its 10-angled fruit, but these cultivated Loofars require, as King points out, careful study from the life.

Benincasa cerifera Savi Bibl. Ital. ix. 15. Native names: Kundur; Kundur China. The Wax Gourd. A large gourd with round lobed leaves and yellow flowers 2 in. wide. Fruit oblong, sub-cylindric 12 to 18 in. long, 8 to 10 in. through, hairy when
young, covered with a white bloom when adult. Commonly
cultivated by the Chinese and Malays.
*Cucumis sativus* L. Native name: Timun China. Cucumber.
*Cucurbita Pepo* L. Native names: Labu Ayer; Labu Manis;
Labu Pringgi. The pumpkin.
*Lagenaria vulgaris* Ser. Native names: Labu Jantong; Labu
Ayer Putih; Labu Kendi. The bottle gourd.
*Citrullus vulgaris* L. The water melon. Native name:
Mendikai.

**Order LXVI. BEGONIAE.**

Succulent herbs. Stem rhizomatous or creeping, rarely tuberous,
often simple or erect. Leaves alternate, usually unequally bilobed
at base, sometimes equal-sided, entire, toothed or lobed. Stipules 2.
Peduncles axillary dichotomously cymose. Flowers white or pink,
unisexual. Males above, females below on the cymes. Males,
sepal 2, petaloid. Petals 2, similar but smaller, occasionally
absent. Stamens indefinite free or with the filaments connate
into a column; anthers narrow linear or clubbed. Female perianth
as in male, or with one extra petal. Ovary 2-, 3-, or 4-celled,
triquetrous; ovules many; styles 2 to 4 free or connate at the
base. Stigmas branched or twisted. Fruit capsular, rarely succu-
luent, triquetrous, or 3-winged; wings equal or one larger than the
other. Seeds very minute. Species 400, of 4 genera. Most
belong to the genus *Begonia*. *Distrib.* All warm, wet tropical
countries.

**BEGONIA, Linn.**

**Characters of the Order.**

(King, Journ. As. Soc. Beng. Ixxi. (2), p. 56.)

i. Casparya. Fruit fleshy 3-angled, not winged  (1) *B. tricornis*
ii. Kniesbeckia. Capsule with 3 nearly equal narrow vertically oblong
wings, 3-celled.
    Small herb; leaves round ovate, slightly oblique  (2) *B. Forbesii*
    Short stout plant; leaves broad round oblique bullate
    Tall herbs 2 to 3 ft.; leaves very unequal at base, glabrous.
    Male flowers 2 to 3 in. wide  (3) *B. Rajah*
    Male flowers 1½ in. wide
    Hairy herb 1 ft. tall; leaves oblique lanceolate, base narrow
    (4) *B. isoptera*  (5) *B. isopteroidea*

iii. Platycentrum. Capsule 2-celled; wings sub-equal, one larger but
thin; small plants; flowers usually small.
    Leaves glabrous; plant tuberous  (6) *B. barbellata*
    Leaves hairy, no tubers.
    (7) *B. Curtisii*
    Leaves acute toothed, one or two  (8) *B. sinuata*
Leaves round, blunt. (9) B. clivalis
Leaves peltate from over-lapping lobes. (10) B. thaipingensis
Leaves ovate entire distinctly unequally cordate lobed.
Petiole glabrous; leaves hairy on nerves only; flowers rather large
Petiole hairy; leaves hairy all over beneath. (11) B. carnosula
Leaves glabrous.
Leaves oblique, cordate 3 in. long; flowers small
Leaves oblong ovate cordate 3 in. long; flowers '25 in. wide
Leaves orbicular crenate not oblique '3 in. wide

iv. MONOPTERA. Capsule, with 2 short and one much larger wing usually thick, dehiscing on the faces between the wings.

Leaves peltate.
Petioles slender, glabrous. (18) B. Hasskarli
Petioles thick, woody. (19) B. eiromischa
Leaves lanceolate not cordate or oblique.
Leaves hairy, base long, narrowed (20) B. Scortechinii
Leaves glabrous, lanceolate.
Leaves narrowed to base, distant serrulate. (21) B. rhoephila
Leaves broad at base, toothed. (22) B. perakensisc
Leaves broad at base, ovate, long acuminate, edge sinuate
Leaves large 9 in. long, ovate acute, fleshy
Leaves ovate acuminate dentate.
Leaves ovate oblique, cordate, broad and round, not acuminate, completely glabrous.
Flowers 15 in. wide; stems short (26) B. venusta
Flowers 15 in. wide; stems tall with large stipules (27) B. longicaulis
Flowers under 1 in. wide.
Leaves undulate, acutely acuminate. (28) B. paupercula
Leaves rounded not undulate.
Bracts ovate acute (29) B. Robinsonii
Bracts linear (30) B. pavonina
Leaves hairy on nerves only and on edge; flowers small (31) B. Maxwelliana
Leaves all hairy; flowers large.
Rhizome creeping (32) B. decora
Stem tall, 3 ft., hairy (33) B. Lowiana
Stem 4 to 12 in. tall; leaves thin; flowers small (escape) (34) B. hirtella

Stem 3 ft. tall, succulent, glabrous, dull red. Leaves lanceolate long acuminate, base unequally cordate, edge toothed, 6 to 8 in. long, 2 in. wide, light green. Flowers in clusters on short
axillary peduncles, white. Male 0.5 in. across. Sepals 2 ovate, obtuse. Petals 2, obovate as large. Stamens in a head; anthers linear-oblong, blunt. Female, stigmas 2, bilobed, spiral. Fruit green, pulpy, 0.5 in. long with 3 rounded ridges ending in points, not winged, 3-celled. Hab. Dense forests. Selangor, Ginting Bidai; Menuang Gasing (Kloss). Pahang, Telom (Ridley).

(2) B. Forbesii King, l.c. 58.

A dwarf plant hardly 6 in. tall, rhizome rusty villous. Leaves round ovate acuminate, slightly equally cordate, edge toothed, glabrous above, white-scaly beneath, nearly glabrous; nerves 9, 1-2.5 to 2-2.5 in. long, 1 to 2 in. wide; petioles 1-5 to 3 in. long. Stipules lanceolate, villous -3 in. long. Peduncles slender, 1 to 3-5 in. long with 1 terminal flower or branched 2 to 5 flowers. Bracts obovate oblanceolate. Flowers pink; pedicels red. Males, sepals 2, oblong blunt, 1-5 in. long. Petals 2, smaller. Anthers obovate, tips emarginate. Females, sepals round ovate. Petals oblong. Styles 3. Capsule 3-celled opening on each face; wings sub-equal triangular blunt. Hab. Perak, Sungei Larut (Wray), rare.


Dwarf plant. Leaves radical oblique cordate, green with red-brown blotches, edge ciliate, 3 to 4 in. long, 3 to 6 in. wide. Stipules lanceolate-oblong. Peduncles hairy, 3-5 to 7 in. long, laxly cymose at tip. Flowers small, rose pink, 0.7 in. across. Males, sepals 2, obovate, orbicular, blunt. Petals 2, narrow oblong. Stamens on a convex torus. Females, sepals 2, elliptic-ovate. Petals 1 to 2, narrow oblong. Capsule 0.5 in. across with 3 oblong rounded equal thin wings. Hab. Tringganu. Brought to Singapore Botanic Gardens in 1892 and cultivated there.


Caulescent, 3 ft. tall, nearly glabrous. Leaves ovate-oblong to lanceolate, base cordate, very unequal, coarsely dentate; nerves prominent, 3-5 in. long, 1-5 to 3 in. wide; petioles 1-5 to 2-2.5 in. long. Stipules 0.75 in. long, lanceolate or oblong. Panicles leaf-opposed, slender; females at base, males at top, 3 to 6 in. long. Males 2 to 3 in. across. Sepals 2, round, pink; anthers oblong apiculate. Female, sepals and petals 5; styles 3, bifid. Capsule 3-celled, 0.8 in. long and as broad, oblong, base usually broad and top broad retuse; wings 3 equal narrow, 0.25 in. wide. Hab. Common in lowland woods in damp spots. Pahang, Tahan River. Malacca, Sungei Hudang (Goodenough). Selangor, Ulu Gombak; Ginting Simpai; Semangkok. Negri Sembilan, Perhentian Tinggi. Perak, Ulu Kerling; Goping (Kunstler); Ulu Kenering (Wray). Penang, Penara Bukit; Batu Hitam (Curtis). Legeh (Gwynne-Vaughan). Distrib. Sumatra, Java.
(5) **B. isopteroidea** King, *l.c.* 59.

About 3 ft. tall. Leaves very oblique ovate-lanceolate acuminate, base rounded broad or the narrow side shortly acute, lobulate dentate, white, scaly beneath; nerves 7, 3·5 to 4·5 in. long, 1·2 to 1·5 in. wide, green; petioles 2 to 3·5 in. long, red. Stipules lanceolate acute, 7·5 in. long. Peduncles 1 in. long with 2 pedicellate and 1 sub-sessile, pale apple-pink flowers. Males, sepals 2, round oblong 7·5 in. long. Petals 2, 5 in. long. Stamens on an elongate column; anthers quadrate short truncate. Females, nearly as large; style short, branches 3, spiral. Capsule 7·5 in. long and wide, 3-celled, narrowed at base, wings oblong, narrow, unequal. *Hab.* Perak, Gunong Brumber Pahang, at 5000 ft. altitude (Wray).


Plant 14 in. tall or less. Stem firm glandular-hairy. Leaves membranous, obliquely lanceolate-acuminate crenate serrate, base narrowed to a blunt rounded tip, with a few scattered hairs on the upper surface and the nervules hairy beneath, 5 in. long, 1·75 in. wide; petioles 1 to 2·5 in. long. Male flowers white, 5 in. wide in cymes of 2 or 3, from lanceolate acuminate hairy bracts. Sepals oblong. Females slightly larger; ovary hairy from lower axils. Capsule oblong, base slightly narrowed of three equal narrow wings, 4 in. long, 2·5 in. wide. *Hab.* Sandy woods. Kelantan, Channing Woods; very local in sandy spots (Ridley).


Tuberous; stem erect, red 2 to 8 in. tall, glabrous. Leaves ovate, unequally cordate or ovate-lanceolate, 2 to 6 in. long, 2 in. wide, green to brown spotted silver; petioles 1 to 2·5 in. long. Cymes terminal or axillary. Bracts ovate, white veined red. Male flowers 7·5 in. wide; sepals 2, oblong or orbicular. Petals 2, oblong-linear, white or pink-tinted. Stamens in a round head. Females with 4 to 5 sepals and petals. Styles 2; ovary 2-celled. Fruit 6 in. long, 3-winged, 1 wing longer, obtuse, triangular, 5 in. long. *Hab.* On limestone rocks. Lankawi (Haniff). *Distrib. Kasum* (Curtis).

This charming plant dies down completely in the dry season.

(8) **B. sinuata** Wall. *Cat.* 3680; *Clarke, in Hook. fil. F.B.I.* ii. 650; *King, l.c.* 59.

Rootstock tuberous. Stem 2·5 to (rarely) 15 in. tall. Leaves reniform blunt or ovate acute, deeply cordate or entire, edges wavy or denticulate, 1·3 to 6 in. long, 1 to 8 in. wide, often purple, appressed white-hairy; nerves 7 to 11; petioles 5 to 3 in. long pubescent. Stipules small oblong-lanceolate glabrous. Panicle slender, 3 to 8 in. long, puberulous. Flowers few, pink or white, glabrous. Bracts minute, 0·05 to 1 in. long. Males 2 to 2·5 in.

This plant sometimes produces a bulbil in the notch of the leaf. It varies very much in size.


Small herb 4 to 8 in. tall with a short rhizome. Stem red-hairy, branched. Leaves orbicular or ovo-cordate, sub-œquilateral, edge undulate, sparsely toothed hairy beneath, 1 to 3 in. long, .75 to 3 in. wide; petioles 1 or 2 in. long, hairy. Cymes 3, pubescent, 2 to 4 in. long. Males, sepals 2, ovo-cordate, basin to 2 in. long. Petals 2, narrower, linear-oblong. Stamen-head globose. Females; sepals red 2. Petals 2, white. Capsule 2.25 in. wide, 2 wings, short triangular, one longer blunt. Hab. Sandy banks, Selangor, Klang Gates; Semangkok Pass.

(10) **B. thaipingensis** King, l.c. 61.

Rhizome long, slender, creeping, villous. Leaves velvety dark green, claret-colour beneath, round reniform, edges dentate, lower lobes overlapping, scaly, especially on underside and nerves 6 to 7 tomentose, 1.25 to 2 in. long, 1.5 to 2.25 in. wide; petioles 1 to 4 in. long, tomentose. Peduncles 4 to 9 in. long villous, slender with 1 to 2 pairs of lanceolate bracts and 3 to 5 slender-pedicelled pink flowers. Males, sepals 2, rounded .15 in. long. Petals 2, smaller, oblong. Anthers obovate, tip emarginate. Female of 5 lobes. Style thick, 2 arms. Stigmas twisted. Capsule 2-celled .5 in. wide; wings sub-equal triangular. Hab. Shady places. Selangor, Semangkok; Kanching (Ridley). Perak, Thai-ping (Scortechini, Wray, Kunstler).


Succulent, acaulescent, rhizome creeping. Leaves ovo-cordate oblique, lobes sub-equal, edge entire, 4 to 5 in. long, 3 to 4 in. wide; nerves 6, red-hairy; petioles 3 to 5 in. long, glabrous; peduncle axillary, 5 to 7 in. long, glabrous; branches one or two, 1 in. long. Flowers white. Males, sepals 2, oblong ovo-cordate, 3 in. long. Petals 2, linear narrower. Stamens, anthers in a ball on a peduncle as long, spatulate blunt. Fruit .5 in. long, 3-winged, 1 wing larger rounded, .25 in. across, others narrower, 2-celled. Hab. Muddy banks in forest, local. Perak, Ulu Batang Padang (Ridley).


Rhizome under 1 in. long. Stem 4 in. tall hairy with 3 to 4 remote leaves. Leaves ovo-cordate, entire, succulent, 6 in. long, 4 in. wide, glabrous above, hairy beneath, especially on nerves and edge; petioles 1 to 3 in. long, hairy. Peduncle 1.5 in.
long with 1 to 2 branches, \( \cdot 5 \) in. long, glabrous. Bracts oblong truncate caudate, hairy \( \cdot 25 \) in. long. Male flowers white, \( \cdot 75 \) in. wide. Sepals oblong obtuse, \( \cdot 25 \) in. long. Petals narrow linear-oblong \( \cdot 12 \) in. long. Stamens in a globose head; anthers pyriform truncate. Females, petals oblong truncate, sub-equal. Ovary 2-celled. *Hab.* Forest banks, local. Perak, on banks at Temengoh (Ridley).

(13) **B. debilis** King, *l.c.* 60.

Slender weak herb 6 to 8 in. tall. Leaves about 3, thin, ovate reniform blunt to sub-acute deep green, base unequally rounded, nearly or quite entire, \( 1\cdot5 \) to 3 in. wide, 3\( \cdot 5 \) to 7 in. long, glabrous; nerves 7; petioles 1 to 3 in. long. Panicle lax, slender axillary and terminal; branches few; bracts in pairs, ovate-lanceolate \( \cdot 1 \) to \( \cdot 15 \) in. long. Flowers white. Male \( \cdot 35 \) in. across. Sepals 2, oblong-ovate, blunt. Petals 2, smaller. Stamens in a globular mass; anthers obovate emarginate. Female flower of 5 segments obliquely oblong. Styles united in a column, above divided. Capsule \( \cdot 75 \) in. broad, \( \cdot 4 \) in. long, 2-celled, lateral wings triangular acute, posterior oblong twice as long. *Hab.* On rocks in forests. Negri Sembilan, Gunong Tampin (Robinson). Perak, Gunong Pondok, on limestone rocks (Kunstler).

(14) **B. guttata** Wall. *Cat.* 3671A; Clarke, in *Hook. fil.* *F.B.I.* ii. 648; *King*, *l.c.* 61.

Dwarf creeping plant. Stem succulent, red. Leaves 2, oblique reniform, glabrous, base completely cordate, apex sub-acute; nerves 5, sparsely hairy, 4 to 7 in. long, 2 to 4\( \cdot 5 \) in. wide; petioles \( 1\cdot5 \) to 4 in. long. Peduncles 1 to 2 in. long, glabrous with a few flowers at tip. Males, sepals 2, round. Petals 2, oblong, white tinged pink. Stamens 50; anthers obovoid. Female flower segments 5. Styles 2; branches twisted 2. Capsule \( \cdot 4 \) in. long, \( \cdot 75 \) in. wide, smaller wings very narrow, posterior broad. *Hab.* Local, and not common; on damp rocks in woods. Selangor, Ginting Bidai. Penang (Wallich); Batu Hitam (Curtis).


Caulescent, \( 12 \) in. tall, glabrous. Leaves distant, lanceolate acuminate, base bilobed very oblique acute 4 in. long, 3 in. wide; lower lobe 2 in. long, purple, green or green with white spots; petioles \( 1\cdot5 \) to 3 in. long. Peduncle 2 in. long. Bracts papery, lanceolate-acuminate, \( \cdot 5 \) in. long. Males in terminal cyme, \( \cdot 25 \) in. wide. Sepals orbicular ovate blunt. Petals as long narrower oblanceolate; anthers pyriform. Capsule wings 3, nearly equal. *Hab.* Banks in forests. Perak, Temengoh (Ridley).


Small dwarf plant with creeping rhizome, 4 to 6 in. tall. Stem pink, glabrous. Leaves ovate acuminate cordate unequally, light green or dark with white spots; nerves 5 to 7; 4 in. long, 2\( \cdot 25 \) to

Fig. 70.—Begonia eiromischa.

Rhizome tuberous 2 in. long, golden-hairy. Stems very slender 2 to 4 in. long red, glabrous. Leaves in distant pairs, orbicular cordate crenate, red beneath, glabrous 5 in. long and wide not oblique; petioles 2 to 8 in. long. Male flowers small 2 to 3 sub-terminal on 1 to 3 branches. Sepals 2, oblong, blunt. Petals 2, all white or rose pink. Anthers in a globose pedicelled head. Fruit 1 in. long, one wing large oblong 2 in. long, others very short. Hab. Kedah Peak at 3800 ft. altitude (Robinson).
(18) **B. Hasskarli** Zoll. and Mor. Syst. Verz. Zoll. 31 (not of Miquel); King, l.c. 62. B. peltata Hassk. B. hernandiaefolia Hook. fil. Bot. Mag. t. 4676, not of others.

Small glabrous plant, with a creeping rhizome, rather thick with 3 or 4 leaves. Leaves fleshy ovate acuminate peltate, bluish green, beneath deep red; nerves 10, 3-5 to 5-5 in. long, 2-25 to 3-75 in. wide; petioles 2 to 3 in. long. Stipules lanceolate. Peduncle from rhizome 7 to 8 in. long; panicle slender, few-branched, 2-5 in. long. Flowers small, white tipped red or all red. Males -2 in. broad. Sepals 2, reniform. Petals 2, narrow, oblong. Stamens cuneiform emarginate; filaments short, free. Females, sepals 2, reniform. Style short, thick; branches 4. Stigmas 4, lobulate. Capsule 4-celled, -6 in. long, lateral wings narrow; posterior -5 in. long, narrowed to blunt tip. **Hab.** Limestone rocks. Pahang, Gunong Senyum (Evans). Selangor, Batu Caves. Perak, Goping (Kunstler); Kwala Dipang.

var. **hirsuta**, with young leaves and adult petioles hairy. Pahang, Kota Glanggi (Ridley). **Distrib. Java.**

(19) **B. eiromischa** Ridl. Journ. Roy. As. Soc. S. Br. 75, p. 36 (Fig. 70, p. 859).

Rhizome short, stout. Leaves fleshy obliquely reniform peltate acuminate deep green, glabrous, 3 to 3-5 in. long and wide; nerves 7; petioles 2 to 3 in. thick, densely red-hairy. Peduncle glabrous red, about 5 in. long. Flowers on 2 branches, small rose pink -5 in. across. Male, sepals 2, broad orbicular rounded. Petals very narrow, linear. Females, style trifid; branches bifid. Fruit -6 in. long; lateral wings very short, posterior rather thin, broad oblong rounded, -3 in. long and wide. **Hab.** Penang, Pulau Betong (Curtis 1028).

(20) **B. Scortechinii** King, l.c. 62.

Rhizome stout scaly. Leaves narrow lanceolate-acuminate dentate, base sub-acute (not lobed) hairy on both sides; nerves pinnate 3 to 4 pairs, 2-3 to 4 in. long, 1 in. wide; petioles 5 to 7 in. long. Peduncles from rhizome 4-5 in. long, glabrous; branches at top 2 to 3, about 2 in. long. Bracts lanceolate. Flowers white tinged pink and green. Male, sepals ovate blunt, -75 in. long. Petals -15 in. across, linear oblong. Stamens in a ball on a short column; anthers apiculate. Female, segments 5. Styles free, 2- to 4-fid. Capsule -75 in. broad, lateral wings narrow oblong, posterior larger. **Hab.** Perak (Scortechini).

var. **Kunstleriana** Ridley. B. Kunstleriana King, l.c. 63.

Leaves broader, base somewhat rounded ovate-lanceolate; petioles very hairy, 6 in. long, 1-5 in. wide. Perak, Bujong Malacca (Kunstler).


Rhizome creeping, stout 1 in. long. Leaves nearly or quite glabrous, lanceolate caudate-acuminate, base decurrent on petiole, sparsely distant toothed, apex closely toothed; nerves 4 pairs,
often hairy on back, midrib always hairy (with appressed hairs), 5 to 6 in. long, 1 to 2 in. wide; petioles 1.5 to 4 in. long, glabrous or hairy. Peduncle 1 to 2 in. long in flower, 12 in. in fruit, stouter, glabrous. Flowers few, short pedicelled, white tinted pink on back or all rose pink. Male, sepals oblong-ovate 3 in. long, 3 in. wide. Petals narrower, oblong. Stamens numerous; anthers oblong apiculate as long as filaments. Females, 5-petalled. Fruit 1 in. across, 5 in. long, lateral wings blunt triangular, posterior 75 in. long, 3 in. wide, oblong rounded thick ribbed. *Hab.* Rocks in streams, forests. Selangor, Ulu Gombak (Ridley).

(22) **B. perakensis** King, *l.c.* 64.

Rhizome moderately stout. Leaves ovate-lanceolate acuminate caudate, base rounded, sparse and distant toothed, except apex closely denticulate, glabrous; nerves pinnate 4 to 5 pairs, 3.5 to 5.5 in. long; petioles 2.5 to 5 in. wide. Peduncles slender, 3 in. long, 4-angled. Flowers few, rich pink. Male, sepals round ovate 4 in. long. Petals 2, oblong, much smaller. Stamens linear, apiculate; filaments short. Female segments 5. Capsule 1.2 in. broad, 5 in. long, 2-celled, lateral wings narrow, posterior oblong, blunt, thick, 35 in. broad. *Hab.* Rocks in streams 500 to 3000 ft. altitude. Selangor, Bukit Hitam; Ginting Bidai; Semangkok Pass. Perak, Kal (Kunstler).


Rhizome long creeping. Leaves ovate base rounded acuminate entire, glabrous, but scurfy on the back; nerves 5, 4.5 in. long, 2.5 in. wide; petioles 7-5 in. long. Peduncles slender, 6 in. long. Male flowers 3 to 4 on slender pedicels, 75 in. long. Bracts 2, lanceolate, persistent, 4 in. long. Sepals oblong sub-spathulate rounded, 5 in. long. Petals narrower and shorter. Stamens-head sessile; anthers linear not apiculate. Capsule 3-winged, laterals obtusely triangular, posterior oblong obliquely rounded, 75 in. long, 5 in. wide. *Hab.* Mountains 3000 to 4000 ft. altitude. Selangor, Menuang Gasing (Kloss).

(24) **B. Herveyana** King, *l.c.* 63.

Big glabrous plant, rhizome rather stout, creeping. Leaves broad elliptic-ovate, short acuminate, base round or slightly narrowed, obscurely serrate; nerves 6 pairs, 5 to 9 in. long, 3 to 4.5 in. wide; petioles 6 to 8 in. long. Stipules lanceolate. Peduncles 5 to 10 in. long fleshy with 2 or 3 branches at tip with few pink flowers. Males, sepals ovate round. Petals 2, much smaller oblong, blunt. Stamens in a cone linear apiculate. Female, petals 5, round. Capsule 1 in. broad, 5 in. long, lateral wings narrow oblong, posterior ovate, blunt, 65 in. long. *Hab.* Forests. Johor, Pulau Tinggi (Feilding). Malacca, Ulu Bumgan (Derry); Jeram Nyalas (Derry). Negri Sembilan, Bukit Sulu (Cantley).

var. *robusta.* Rhizome very stout. Leaves ovate acuminate, denticulate on tip, base narrowed cuneate; nerves 4 pairs, 9.5 in. long, 5.5 in. wide; petioles 9 in. long. Peduncles stout
18 in. tall; branches 3 in. long. Flowers numerous, white. Bracts purplish pink. Capsule 1·25 in. wide, 5 in. long, lateral lobes oblong, 2 in. across, posterior thick, oblong, 5 in. long, rounded at tip. Hab. Pahang, Gunong Tahan 500 to 1000 ft. altitude (Robinson). A much stouter plant than the Malacca one.

(25) **B. monticola** Ridl. Journ. F.M.S. Mus. v. 34.
Glabrous, rhizome creeping. Leaves ovate inequilateral acuminate, base unequally bilobed, denticulate; nerves 10, 3·5 to 5 in. long, 1·75 to 2·5 in. wide; petioles 6 to 12 in. long. Peduncles 6 to 12 in. long with 2 to 3 large white pink-tinted flowers at top. Males, sepals 2 ovate or oblong, round blunt 7·5 in. long. Petals 2 larger. Stamens narrow oblong, apiculus large. Females, smaller of 5 petals; styles very short. Capsule 3·in. long, 1·15 in. broad, lateral wings more than half as long as posterior one, 7 in. long, thick. Hab. High mountains at about 6000 ft. altitude. Perak, Ulu Batang Padang (Wray); Gunong Kerbau (Robinson). Telom (Ridley).

*B. megapteroidea* King, l.c. 65, from Gunong Brumber Pahang (Wray), seems to me identical. The plants referred to it from Sumatra (Forbes, etc.) are hairy, and no doubt, as Koorders suggests, are *B. rubra* Bl.

Stem elongate with internodes 2·5 in. long, red, glabrous. Leaves ovate cuspidate, base deeply cordate unequally 3 in. long, 2·5 in. wide; petioles 4 to 6 in. long. Stipules persistent, oblong with a terminal seta, 1 in. long, 2 in. wide. Peduncles 6 in. long with 2 terminal flowers on pedicels 1 in. long. Flowers pinkish white, 1·5 in. wide. Males, sepals broad, ovate, 7·5 in. long and wide. Petals oblong-lanceolate, blunt, 3 in. wide. Stamens in a globose head on short stalk. Hab. Mountain woods. Pahang, Gunong Tahan (Ridley). Perak, Gunong Kerbau (Robinson).

(28) **B. paupercula** King, l.c. 64 (not of Ridley).
Rhizome rather stout. Leaves ovate unequal sided acuminate to ovate-lanceolate, base oblique, edges sinuate denticulate, glabrous; nerves 5 to 7 radiating from base, 3·5 to 5 in. long, 1·25 to 3·5 in. wide, glossy bright green, fleshy. Flower white, tinged red. Males, sepals 2 elliptic-oblong, 4 in. long. Petals 0. Stamens linear-oblong, apiculate. Females, petals 5, unequal. Capsule
Begonia.]  

LXVI. BEGONIACEÆ.  

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-6 in. long, 1 in. wide, lateral wings sub-elliptic, oblique, -3 in. broad, posterior oblong, blunt, thick, to 7 in. long, -35 in. wide.  

Hab.  

Forests on rocks.  

Perak, Goping (Kunstler).  


Rhizome stout fleshy, -5 in. through; sheaths ovate.  

Leaves ovate sub-acute unequal-lobed, fleshy, glabrous green polished entire, 3 in. long, 2 in. wide; nerves 5 to 7; petioles 2 in. long.  

Peduncle 1-5 in. long, axillary.  

Bracts 2 below flowers ovate acute green, -5 in. wide.  

Males, white; pedicel -25 in. long.  

Sepals 2, ovate blunt, -4 in. long, -25 in. wide.  

Petals 2, oblong blunt, a little smaller.  

Stamens capitate on a short column; anthers short, oblong.  

Hab.  

Dense forests at 4000 ft. altitude, occasionally creeping up trees a short way.  

Pahang, Telom woods (Ridley).  


Rhizome short, red.  

Leaves ovate-cordate acuminate or acute, base unequally lobed, entire, glabrous (except when young); nerves 9, satiny green when young, deep green shot peacock-blue above (when adult), red beneath, 5 in. long, 4 in. wide; petioles 7 in. long, red.  

Peduncles 6 in. long.  

Flowers few.  

Bracts linear-oblong.  

Males, sepals 2, ovate obtuse, -5 in. long, -75 in. wide.  

Petals narrower, linear-oblong, -2 in. wide.  

Stamens in a sessile or short-stalked head; filaments separate; anthers oblong.  

Females, sepals 2, ovate.  

Petals 2 (or 3).  

Styles 2, connate half-way; arms 2, spiral.  

Capsule wings 2 small, one large elliptic.  

Hab.  

Dense forests in mountains at 4000 ft. altitude.  

Pahang, Telom woods (Ridley).  

(31) B. Maxwelliana King, l.c. 66.  

Rhizome stout.  

Leaves ovate to round acuminate, base very unequally lobed, edges ciliate denticulate more or less hairy green; nerves 7 to 9, radiating 5 to 6 in. long, 4 to 7 in. wide; petioles 4 to 10 in. long, hairy.  

Peduncles 8 to 12 in. tall, hairy, above dichotomously branched.  

Bracts short broad.  

Males clustered, sepals 2, oblong ovate, blunt, -4 in. long.  

Petals 2, smaller.  

Stamens numerous in a sessile head.  

Females of 5 petals.  

Styles 2, much lobulate.  

Capsule 1-4 in. broad, 1-6 in. long, lateral wings sub-quadrate, blunt, posterior oblong, narrowed at tip, blunt, -8 in. long, -5 in. wide, ribbed thick.  

Hab.  

Banks in mountain forests.  

Perak, Thaiping Hills, 2500 to 3000 ft. or more altitude (all collectors); Bujong Malacca.  

Penang, Government Hill (Foxworthy).  

(32) B. decora Staff, Kew Bulletin 1893, p. 29.  

B. præclara  

King, l.c. 66.  

Rhizome creeping, scaly.  

Leaves oblique ovate acuminate, base unequally rounded, minutely dentate, dark green or red above with lighter colour along the nerves, with conical papillæ, each bearing a coarse hair, deep red or more or less hairy beneath; nerves 7, prominent beneath, 3-5 to 5-5 in. long, 2-5 to 3-5 in. wide: petioles 3 to 6 in. long, hairy.  

Peduncles taller, glabrous 1- to
3-flowered. Flowers white or red. Male, sepals 0.75 to 1 in. long, oblong-ovate. Petals 2, narrow oblong, 0.5 in. long. Stamens spathulate blunt. Female, styles 2 bifid, branches divided into twisted lobes. Capsule 0.5 in. long, 1.5 in. wide, lateral wings quadrate ovate, 0.4 in. long, posterior oblong blunt, 1 in. long. 

_Hab._ Mountains, 4000 to 4200 ft. altitude. Perak (Kunstler); Gunong Kerbau (Robinson). Pahang, Telom woods abundant. Lankawi (Curtis).

(33) _B. Lowiana_ King, l.c. 67.

A caulescent herb. Stem about 3 ft. tall, hairy. Leaves very oblique reniform (some ovate acute), basal sinus deep, dentate serrate, hairy all over; nerves 7, pale green, 3 to 4.5 in. long, 4 to 7 in. wide; petioles 0.4 (above) to 4 in. long, below, hairy. Cymes few-flowered, terminal 2 to 3 in. long; pedicels slender, red. Bracts ovate lanceolate, ciliate. Males, 0.75 in. across, white. Sepals 2, ovate-oblong. Petals 2, oblong, smaller. Stamens oblong not apiculate. Female, petals 5. Styles 2, bifid, spiral. Capsule 0.65 in. long and 1.2 in. wide, lateral wings very narrow, 0.15 in. broad, posterior broad ovate, blunt, 0.9 in. long, 0.8 in. wide. 

_Hab._ Mountains 6000 to 6700 ft. altitude. Perak, Gunong Brumber Pahang and Gunong Batu Putih (Wray).


A dwarf caulescent hairy herb 4 to 12 in. tall. Leaves thin very oblique reniform, hardly cordate, 1 to 3 in. wide, small white flowers and thin fruit 1 in. across with two short rounded lobes and one ovate oblong much bigger. 

_Hab._ Occurs on banks in Singapore and Penang Hill near the Crag Hotel. _Distrib._ Native of Peru and Brazil. A garden escape.

**Order LXVII. DATISCACEÆ.**

Trees (or herbs). Leaves simple (or pinnate). Flowers small bisexual, panicked or racemed. Males, calyx-tube short, teeth 4, (to 9). Petals 0. Stamens 4 (to 25). Female calyx adnate to ovary, lobes 4 (to 8). Petals 0. Ovary 1-celled; styles 4 (or 3); ovules many. Capsule coriaceous opening between the styles. Seeds many. Species 4, Europe, temperate Asia to Java and N.W. America.

**TETRAMELES,** R. Br.

Stigmas clubbed. Capsule ovoid, membranous opening between the styles. Seeds minute, ellipsoid, testa prolonged into a membrane. Species 1, India, Burma, Java.


A gigantic tree over 100 ft. tall. Leaves 6 in. long, 4-5 in. wide, toothed acute, base retuse, softly downy; petioles 3 in. long. Male panicles numerous 6 in. long, 1 in. across. Flowers about

\[\text{Fig. 71.—Tetrameles nudiflora.}\]

\(\cdot2\) in. across. Female racemes 15 in. long. Fruit \(\cdot25\) in. long, \(\cdot15\) in. through. *Hab.* Kedah, Gunong Geriang (Ridley), in fruit and leafless in February.

**Order LXVIII. CACTACEÆ.**

Succulent spiny leafless jointed shrubs. Flowers large, showy, white, yellow or red, solitary sessile. Petals and stamens indefinite, superior. Ovary inferior with numerous placentæ and ovules; style elongate. Stigma 2- to many-radiated. Fruit a berry.
Species over 1000, nearly all South American. One species introduced here and more or less established in sandy spots.

**OPUNTIA,** Mill.


Plant usually about 6 ft. tall, often more; lobes spathulate, 8 to 10 in. long, 4½ in. wide, spines long, white single or in pairs. Calyx 2 to 3 in. long, sepals green tipped red. Corolla 3 in. wide, yellow, reddish on the back. Stamens shorter. Stigmas 6. Style short thick. Fruit pear-shaped 4 in. long. *Hab.* Sandy spots near the coast. Singapore, Galang; Balestier. Malacca. Introduced many years ago and more or less established.

**Order LXIX. FICOIDEÆ.**

Herbs often succulent. Leaves often fleshy opposed or whorled. Flowers in cymes or clusters rarely solitary, bisexual. Calyx of 4 or 5 sepals connate into a tube or nearly free, free from ovary. Petals usually 0. Stamens perigynous or hypogynous, definite or indefinite. Ovary free, 2- to 5-celled, syncarpous (in Malay species); styles as many. Fruit capsular, splitting dorsally or circumsciss. Seeds many (or 1) reniform. Species 450, mostly African.

Succulent seashore herb; flowers conspicuous, pink . . 1. **Sesuvium**

Slender erect much-branched herbs; flowers very small.

Seeds with a bristle appendage . . . . . 2. **Glinus**

Seeds with no appendage . . . . . 3. **Mollugo**

1. **Sesuvium**, Linn.

Succulent prostrate herb. Leaves opposite, linear, spathulate, sub-cylindric, fleshy. Flowers axillary sessile or pedicelled, solitary. Calyx-tube short; lobes 5, coloured inside. Petals 0. Stamens many, insert round mouth of calyx-tube. Ovary free 3- to 5-celled; styles 3 to 5. Capsule ovate-oblong membranous, circumsciss. Seeds many reniform. Species 4 or 5, littoral, warm countries.

(1) **S. Portulacastrum** Linn. *Syst. ed.* 10, p. 1058; Clarke, *in* Hook. *fil.* F.B.I. ii. 659; *King, l.c.* 68.

A fleshy creeping plant with light green leaves about 1 in. long.

2. GLINUS, Linn.

Herbs tomentose or glabrous erect branched. Leaves alternate or falsely whorled, linear to spathulate. Flowers axillary in cymes, umbellate, small. Sepals 5. Petals 0. Stamens 5 or more; filaments filiform. Ovary ovoid or sub-globose. Seeds very numerous with an appendage of a short bristle. Species of about 6, Eastern and Western tropics.


3. MOLLUGO, Linn.

Herbs branched dichotomously. Leaves alternate or falsely whorled or radical, linear to obovate. Flowers axillary, sessile or pedicelled in panicles or racemes, small. Sepals 5, persistent. Petals 0. Stamens 5 to 3. Ovary free, globose or ellipsoid, 3- to 5-celled; styles 3 to 5. Capsule membranous, 3- to 5-celled. Seeds many with no bristles at the top. Species 12, tropics and sub-tropics.


Fig. 72.—Mollugo pentaphylla.

Order LXX. Umbelliferæ.

Herbs. Leaves alternate usually more or less lobed or divided; petiole usually sheathing. Styles none. Flowers bisexual (rarely unisexual) in compound umbels (simple in Hydrocotyle and Eryngium), involucrate. Flowers small. Calyx adnate to ovary with a 5-toothed limb, often absent. Petals 5, epigynous. Stamens 5, epigynous. Ovary inferior 2-celled, 1 ovule in each cell; styles 2. Stigmas capitellate. Fruit of 2 compressed indehiscent carpels attached to and pendulous from a carpophore with 5 primary ridges.
and often 4 secondary ones between. Seeds 1 in each carpel. Species about 1500, chiefly in northern temperate regions, very few in the tropics.

Creeping herbs.

1. Hydrocotyle

Lxx. Umbelliferæ.

1. Hydrocotyle, Linn.

Long-creeping herbs. Leaves cordate rounded or reniform lobed or crenate, long petioled. Umbels simple small dense. Flowers very small. Calyx-teeth minute or 0. Petals entire. Fruit ellipsoid, flat nearly or quite sessile in small heads. Species 70, tropics and temperate regions.

Stem branches ascending a foot or more; umbels clustered on long pendulous peduncles; leaves lobed.

No ascending branches; umbel peduncles very short; leaves reniform crenulate.

(i) H. javanica

Leaves ½ to 2 in. wide, crenate.

Leaves ¼ to 2 in. wide, lobed.

1. Hydrocotyle Thunb. Dissert. Hydrocotyl. n. 17, t. 2; Clarke, in Hook. fil. F.B.I. ii. 667; King, l.c. 70.

Stem creeping and throwing up branches a foot tall. Leaves rounded or reniform cordate with 5 or 6 lobes more or less crenulate, 2 in. wide and a little shorter; petioles 1 to 4 in. long, pubescent. Peduncles numerous terminal, hairy, ½ in. long with numerous bracts at the base, each bearing a compact umbel or head of many small white flowers, occasionally branched. Fruit numerous crowded, broadly obovoid, compressed, ½ in. long. Hab. Damp spots in woods usually high up on mountains. Pahang, Telom. Perak, Thaiping Hills 200 to 500 ft. altitude (Kunstler); near the Cottage, 4000 ft. altitude; Temengoh. Distrib. India, Malay isles, Australia.

(2) H. asiatica Linn. Sp. Pl. 234; Clarke, l.c. ii. 669; King, l.c. 71.

Slender creeping plant with no ascending stems. Leaves in tufts of 2 or 3 at the nodes, reniform crenate, glabrous, ½ to 2 in. wide; petioles 1 to 3 in. long. Flowers crowded in the leaf-axils with numerous bracts. Umbels compact on very short ½ to 2 in. long peduncles. Fruit ½ in. long, strongly ribbed. Hab. Very common in grass and waste places all over the peninsula. Distrib. tropics and sub-tropics of Old World. Native name: Pegaga. Use: A drug for liver-troubles and leprosy, much valued and largely collected and sold by the herb-women in the markets.
(3) **H. rotundifolia** Roxb. Hort. Beng. 21; *Fl. Ind.* ii. 28; Clarke, *l.c.* ii. 668.


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**Fig. 73.**—Hydrocotyle javanica.

2. **ERYNGIUM**, Linn.

Spiny, glabrous, erect herbs. Leaves spiny toothed, entire lobed or dissect. Flowers in simple heads, bracteate. Bracts whorled, spiny. Calyx-tube covered with ascending scales; teeth rigid, acute. Petals whitish, narrow, emarginate. Fruit nearly cylindric; carpels sub-compressed, ridges obtuse not prominent. Species 100, temperate and tropical, whole world.


About a foot tall. Stem branched above. Leaves radical, oblong-oblanceolate, serrate, 4 to 9 in. long, '1 in. wide. Bracts, lower deeply lobed, upper smaller, '1 in. long, entire, whorled, all spiny. Spikes cylindric, green, under '1 in. long. *Hab.* Waste
ground near houses, common. A very foetid plant when bruised, said to have been introduced by Chinese, who cultivate it as a drug. Singapore, Bajau; Chan Chu Kang; Kandang Kerbau; Bukit Timah (Kunstler). Negri Sembilan, Bukit Tumiah (Cantley). Pahang, Raub (Machado). Selangor, Semangkok Pass (Machado). Penang (Curtis). Kelantan, Kota Bharu (Yapp). Native name: Kulumbar. Use: As a pot-herb and drug.

3. SANICULA, Linn.


A herb 1 to 2 ft. tall. Leaves glabrous, palmate mucronate serrate, 2 to 4 in. across; petioles 1 to 4 in. long. Umbels wide spreading, 3 to 12 in. long, dichotomous, with few umbellules of few flowers densely crowded. Fruit 1 in. long covered with hooked bristles. Hab. In mountain forests at 4000 ft. altitude, rare. Pahang, Telom Valley (Ridley). Distrib. Europe, mountains of tropical Asia and Africa.

This is the form known as *S. javanica*. It is rather larger and of more straggling habit than the European plant, but I cannot see any really distinctive characters between this and the common one of the English woods.

4. GENANTHE, Linn.


(i) **O. stolonifera** Wall. Cat. 585; Clarke, in Hook. fil. F.B.I. 696. O. javanica and Dasyloma laciniatum Miq. Fl. Ind. Bat. i. (1), 741.

An aquatic herb 2 to 3 ft. tall, quite glabrous. Leaves thin, 9 in. long, bipinnate, segments rhomboid acute, base narrowed, strongly toothed, 5 in. long, 25 in. wide. Peduncles 1 to 3 in. long, umbel rays 5 in. or longer, 6 to about 10; pedicels 3 in. or less. Fruit 1 in. long, smooth. Hab. Pools and swamps. Dindings at Lumut. Perak, Temengoh woods (Ridley). Distrib. Indo-Malaya, China.

This is cultivated by the Javanese, and may possibly be an alien here, but in both the spots given above it was far from any houses and appeared quite wild.
Order LXXI. ARALIACEÆ.

Trees or shrubs, often epiphytic (very rarely herbs), often prickly. Leaves alternate, large, compound, or simple; stipules adnate to petiole, or none. Flowers in umbels, racemes or heads. Calyx-tube adnate to ovary, limb truncate or with small teeth. Petals 5 (rarely 6 or 7) valvate, often deciduous in a cap. Stamens as many (very many in Tupidanthus) insert round an epigynous disc. Ovary inferior, 2-celled, or as many cells as stamens, 1-celled in Arthropodium; styles as many as cells. Fruit drupaceous. Seed albuminous often ruminate. Species 340, chiefly tropics and sub-tropics, a few temperate regions (King, Journ. As. Soc. Beng. lxvii. 42).

1. Aralia

2. Schefflera

3. Trevesia

4. Brassia

5. Dendropanax

6. Arthropodium

7. Wardenia

8. Brassaiopsis

9. Hederopsis

10. Scheffleriopsis

11. Tupidanthus

1. Aralia, Linn.

Shrubs, small trees (or herbs) hairy or prickly. Leaves alternate (or whorled) digitate, pinnate or compound; leaflets serrate. Umbels in panicles or racemes or solitary, rarely in compound umbels; pedicels jointed under the flower. Calyx margin truncate or 5-toothed. Petals 5, ovate, imbricate in bud. Stamens 5. Ovary 2- to 5-celled; styles 2 to 5, free or connate at base. Fruit 4- to 5-celled, 4- to 5-angled or sub-globose 2- to 3-celled albumen uniform. Species about 50, Indo-Malaya, Japan, N. America.

Leaves entire or minutely serrate, tomentose beneath. (1) A. Thomsoni
Leaves coarsely serrate with a few white hairs beneath. (2) A. armata
Leaves almost entire, glabrous. (3) A. ferox
(1) **A. Thomsoni** Seeem. Rev. Hed. 91; Clarke, in Hook. fil. F.B.I. ii. 723; King, l.c. 44.

Prickly shrub 6 to 30 ft. tall, pubescent or tomentose. Leaves 2- to 3-pinnate; leaflets thick membranous 5 to 9 in a pinnule, ovate-lanceolate acuminate, base round oblique, edges serrulate, above strigose; nerves pubescent beneath tomentose, 2'5 to 3'5 in. long, 1 to 1'75 in. wide. Panicles 15 to 20 in. long; branches short. Umbels 1 in. across; pedicels in fruit '5 in. long. Fruit '15 in. long. **Hab.** Mountain woods, rarely in lowlands up to 1200 ft. altitude. Pahang, Pulau Chengei. Selangor, Gintang Bidai; Bukit Kutu. Negri Sembilan, Gunong Berumbun (Cantley). Perak, Batang Padang district; Ulu Kerling (Kunstler); Tapah. Penang Hill (Curtis). **Distrib.** India. **Native name:** Poko Dulan-Dulang.

(2) **A. armata** Seeem. Rev. Hed. 91; Clarke, l.c. ii. 723; King, l.c. 45.

A prickly shrub, glabrous except the young parts. Leaves tripinnate, large; rachis puberulous; leaflets 9 to 11 in a pinnule, thin membranous, ovate-lanceolate acuminate, coarsely serrate, base round oblique and sometimes slightly cordate, sparsely hairy above with white hairs beneath on nerves, 3 to 5 in. long, 1'5 to 2 in. wide. Panicle 15 to 18 in. long, pubescent on branches; branchlets umbellate; pedicels 3 to 4 in. long. Fruit nearly 2 in. long, ridges broad, flat. **Hab.** Lankawi; Kwah (Curtis). **Distrib.** India, Burma.

(3) **A. ferox** Miq. Fl. Ind. Bat. i. (1), 270; King, l.c. 45.

Stems scandent 20 to 30 ft. long, 2 in. through, thorny, thorns short recurved. Leaves bi- or tri-pinnate, pinnae 3 to 4 pairs, leaflets thin, coriaceous, 3 to 5 in a pinna, ovate acute in opposite pairs, bases round often unequal, nearly entire or serrate, glabrous, 1 to 2 in. long, '75 to 1 in. wide; petiolules unequal, side ones '15 to '3 in. long. Panicle terminal 8 to 15 in. long, 6 in. wide with numerous branches and secondary branches; pedicels 3 to '5 in. long. Fruit ovoid globose, 5-ridged, '1 in. long. **Hab.** Mountain woods, Pahang, Tahan River. Selangor, Semangkok Pass. Perak, Ulu Bubong (Kunstler); Maxwell’s Hill. **Distrib.** Java, Borneo.

2. **Schefflera**, Forst.

*(Heptapleurum, Gaertn., Clarke and King.)*

Shrubs rarely tree-like, usually at first epiphytic, later terrestrial. Leaves coriaceous digitate, rarely simple, or trifoliate or bipinnate, very rarely toothed. Panicles simple in the upper axils with distant short branches, each terminated by an umbel or compound and branched, very rarely *(S. Wravyi)* with racemose branches. Flowers small, Calyx-edge usually entire short.
Petals 5- to 9-valvate. Stamens as many (very rarely double); anthers ovate. Disc convex. Ovary as many cells as there are petals. Stigma conic sessile or on a short style. Fruit sub-globose fleshy angled when dry. Seed laterally compressed. Albumen not ruminate. Species 100, Old World tropics.

Harms in "Pflanzenfamilien" has put Heptapleuranum under the older name of Schefflera, a genus based on two Fiji and New Zealand plants which seem to be truly Heptapleura, so the later genus Heptapleuranum is now reduced to Schefflera.

Flowers umbelled.
Lower leaves simple lanceolate, upper trifoliate (1) S. lanceolata
Leaves all trifoliate.
Panicle longer than leaves, lax (2) S. lurida
Panicle shorter than leaves, dense (3) S. tristis
Leaves 5- or more-foliate.
Flowers sessile or sub-sessile in small heads racemose.
Bracts minute or 0; leaves glabrous.
Leaflets oblong cuspitate 9 by 5 in. (4) S. cephalotes
Leaflets lanceolate 6 by 1 in. (5) S. capitellata
Leaflets elliptic narrowed at base; flowers very short pedicelled (6) S. Klossii
Umbel-bracts ovate scurfy.
Leaves 10 in. long, 4 in. wide, oblong; panicles long.
Leaves 5 by 2'5 in. ovate round; panicles short.
Leaves thickly woolly beneath.
Inflorescence of several elongate or short simple racemes of umbels; flowers stalked.
Ovary 12-celled; leaflets 12 by 4 in. thin (10) S. singalangensis
Ovary 9-celled; leaflets coriaceous round 3'5 in. wide (11) S. latifoliata
Ovary 6-celled.
Leaflets coriaceous oblong, cuspitate 10 in. long; flowers white (12) S. Hullettii
Leaflets coriaceous, oblong- acuminate, 4 by 1 in. (13) S. elegans
Leaflets long acuminate 2'5 in. long; pedicels of flowers 1 in. long.
Leaflets coriaceous, lanceolate acuminate 4 in. long; pedicels '05 in. long.
Leaflets elliptic cuspitate, 9 by 4 in.; pedicels short (14) S. scandens
Leaflets elliptic cuspidate, 9 by 4 in. (15) S. subracemosa
Leaflets elliptic cuspidate, 9 by 4 in.; pedicels short (16) S. subulata
Panicle branched.
Branches few and short; ovary 5- to 6-celled.
Leaflets lanceolate 3 by 1'25 in.; panicle 2 in. long (17) S. nervosa
Leaflets elliptic cuspidate 4 by 1'5 in.; panicle 6 in. long (18) S. affinis
Leaflets oblong elliptic 6 by 2 in. or more; panicle 6 in. long (19) S. Ridleyi
Leaflets thin elliptic; panicle wide spreading 9 in. long (20) S. Roxburghii
Leaflets coriaceous; flowers medium; panicle short, dense (21) S. venulosa
Leaflets thin fleshy; panicle very slender; flowers minute ............... (22) S. micrantha
Lower leaves large digitately decompound.
Leaflets entire, oblong; umbel peduncles long ............ (23) S. heterophylla
Leaflets entire, linear oblong, umbel peduncles short .... (24) S. biternata
Leaflets toothed; leaves bipinnate ........ ............ (25) S. Curtisii
Flowers not umbelled in simple racemes .......... ............ (26) S. Wrayi

(1) S. lanceolata Ridl. Journ. F.M.S. Mus. x. 137. Heptapleurum avene King, l.c. 47, not of Seemann.
Slender climber. Leaves uppermost trifoliate, lower simple, coriaceous, narrow lanceolate, blunt, base narrowed 4 to 5 in. long, '75 to 1 in. wide; nerves visible when dry 8 pairs, distant; petioles slender '5 in. long. Peduncles 1'5 in. long with 4 or 5 short peduncled umbels of about 7 flowers, scurfy when young. Bracts (caducous) lanceolate broad as long as umbel-peduncles. Flowers glabrous, '15 in. long. Calyx campanulate, truncate. Petals 6 falling off in a cap. Stamens 6; no style. Fruit small, ellipsoid. Hab. On rocks by the sea and also epiphytic. Singapore, Sungei Morai; Kranji; Pulau Ubin; Pulau Tekong.

(2) S. lurida Ridl. Heptapleurum luridum, King, l.c. 48.
Epiphyte 2 to 3 ft. long. Leaves trifoliate; petioles 1 to 1'75 in. long, fleshy; leaflets very coriaceous, deep green, elliptic-oblong acute, base narrowed; nerves invisible, 2'5 to 4 in. long, '5 to '75 in. wide; petiolules thick, '4 in. long (terminal one) or shorter. Panicles 6 to 7 in. long, slender; branches 2 to 4 in. long slender, with umbels of 3 to 8 ovoid flowers, '1 in. long; pedicels '1 in. long in flower, '2 to '3 in. long in fruit. Calyx campanulate, truncate. Petals united in a cap. Stamens 6. Fruit '15 in. long, red, 6-ridged when dry. Hab. On big trees at 3500 to 4000 ft. altitude. Pahang, Telom. Perak, Thaiping Hills (Kunstler).

A tree or shrub 2 to 8 ft. tall. Branches thick. Leaves trifoliate; petioles 1'5 to 2 in. long; leaflets thickly coriaceous glabrous, broadly elliptic, blunt or shortly apicate, base round; nerves 10 to 12 pairs close together, 2'25 to 3'25 in. long, 1'5 to 2 in. wide; petiolules, lateral '5 in. long, terminal '8 in. long. Panicles terminal, 2 in. long, branching from base; branchlets '5 in. long. Flowers ovate '15 in. long, pale green; pedicels '1 in. long. Petals 5, broad, elliptic. Fruit narrow oblong, 5-ridged, '2 in. long. Hab. Mountains at 4900 ft. altitude. Pahang, Gunong Tahan 4000 ft. altitude. Perak, Ulu Batang Padang (Wray); Gunong Berumbun. Distrib. Sumatra.

(4) S. cephalotes Harms, Pflanzenfamilien, p. 36. Heptapleurum cephalotes Clarke, in Hook. fil. F.B.I. ii. 731; King, l.c. 49.
Tall shrub. Leaves digitate; petioles 8 to 12 in. long; leaflets
7 to 8, oblong elliptic abruptly cuspidate, base round minutely puberulous beneath when young, 12 in. long, 4 in. wide; petiolules 4 in. long. Panicles 16 in. long; rachis stout, '25 in. thick, tomentose; branches numerous '3 in. long bearing numerous globose heads '5 in. through. Flowers sessile. Fruit oblong, stellate white-tomentose, 5- to 8-ribbed. Hab. Often on rocks by the sea. Singapore, Bajau; Kranji; Bukit Timah; Barn Island. Malacca (Griffith).

(5) **S. capitellata** Ridl. *Journ. F.M.S. Mus.* x. 137.
Epiphyte. Leaves 8-foliolate; leaflets lanceolate acute, narrowed to base; nerves fine, coriaceous, puberulous beneath, 3 to 5 in. long, '1 in. wide; petiolules '1 in. long; petioles 7 in. long. Racemes scurfy tomentose '18 in. long; peduncles '5 in. long, heads '4 in. through. Bracts minute or 0. Flowers puberulous truncate, 5-angled in bud, quite sessile. Petals connate in a cap. Stamens 6, purple. Hab. Mountain forests. Perak, Bujong Malacca. Penang Hill, 2500 ft. altitude (Curtis 837).

(6) **S. Klossii** Ridl. *l.c.* 137.
A large climber. Branches pale, shining; young parts and inflorescence white scurfy. Leaves, petioles stout '2'5 in. long; leaflets 5, coriaceous glabrous elliptic, abruptly short acuminate, base narrowed; nerves elevate beneath 5 pairs, 7 in. long, 3 in. wide; petiolule of middle one '1'4 in. long. Panicles 5, scurfy, 9 in. long. Umbels simple, numerous, peduncle '25 in. long. Flowers 5 in an umbel very shortly pedicelled. Calyx obconic scurfy '05 in. long, lobes very obscure. Corolla in bud pink and white, blunt ovoid '05 in. long. Petals 5, ovate blunt. Stamens 5. Styles forming truncate cone with 5 minute stigmas. Hab. Perak, Changkat Mentri (Kloss).

(7) **S. Scortechinii** Ridl. *Heptapleurum Scortechinii* King, *l.c.* 49.
Epiphyte. Leaves digitate; petioles 2'5 to 3'5 ft. long; leaflets 8 to 10, very coriaceous oblong, base round, tip apiculate, glabrous; nerves 6 to 9 pairs, elevate beneath, 9 to '13 in. long, 4 to 6 in. wide; petiolules 2'5 to 4 in. long. Panicles of several raceme-like branches, scurfy; branchlets 40 to 50, and '35 to '75 in. long, with a broad ovate convolute woolly bract at base and a globular umbel of globose flowers '1 in. long. Calyx truncate, tapering to base. Petals 6 to 7. Ovary 5-celled. Hab. Perak (Scortechinii); Telom. Kedah, Yan.

This is very near *S. capitellata*, but has leaves with fewer prominent nerves and heads smaller and with large bracts.

Erect treelet. Leaves digitate; petioles 14 in. long; leaflets 8, thinly coriaceous, elliptic-ovate cuspidate, rounded or slightly

Erect shrub about 4 to 6 ft. tall; stem 4 in. through, little branched; petioles, underside of leaf and young parts whitish woolly tomentose. Leaves digitate; petioles 9 to 12 in. long; leaflets 5 to 7, coriaceous, oblong-elliptic, caudate-acuminate, light green bullate, glabrous above, 8 to 10 in. long, 2.75 to 3.5 in. wide; petiolules 1.5 to 2.5 in. long. Panicles 2, racemose 4 to 5 in. long; branches 12, 2 to 4 in. long with a globular umbel of 8 to 10 ovoid blunt glabrous cream-coloured flowers 15 in. long; pedicels 1 in. long, pubescent. Petals white. Fruit 1.2 in. long, 5-ridged and 5-celled, cream colour. Hab. Dense wet woods, terrestrial. Not common. Lowland country. Selangor, Kuala Lumpur; Ulu Gombak; Batu Tiga. Dindings, Gunong Tungul. Perak, Thaiping Waterfall; Changkat Mentri (Kloss). Distrib. Sumatra.

Epiphyte, scandent. Leaves digitate; petioles 12 to 15 in. long; leaflets membranous 5, elliptic short acuminate, base narrowed, with a few teeth or none, glabrous; nerves 7 to 8 pairs, 7 to 12 in. long, 3.25 to 5.25 in. wide; petiolules 1.25 to 2.25 in. long. Panicles 12 to 18 in. long, covered with deciduous pubescence, 2 in. wide; branches numerous, 1.5 in. long, bearing an umbel of 5 to 10 obovoid flowers 2.5 in. long; pedicels 1 to 3 in. long. Calyx-tube campanulate. Petals 9, connate by edges. Stamens 9. Stigmas united in a fleshy ring. Ovary 12-celled. Hab. Perak (Scortechini). Distrib. Sumatra.

(11) S. latifoliata Ridl. Heptapleurum latifoliatum King, l.c. 51.
Bush. Leaves digitate; petioles stout 7 to 11 in. long; leaflets 11 coriaceous thick, glabrous, round ovate blunt, base round; nerves 7 to 8 pairs, prominent beneath, 3 to 5 in. long, 1.75 to 3.5 in. wide; petiolules 1.5 in. long. Panicles terminal in pairs, 5 to 8 in. long; branches short, 4 in. long bearing an umbel of 10- to 15-pedicelled flowers. Fruit ovoid, 9-ridged, 9-celled, crowned with 9 styles, red. Hab. Perak, Gunong Bubu (Wray) at 5000 ft. altitude.

(12) S. Hullettii Ridl. Heptapleurum Hullettii King, l.c. 34.
An epiphyte or small shrub about 4 ft. tall. Leaves digitate;
petioles 10 to 24 in. long; leaflets coriaceous, dark green, 7 to 11, oblong, short abruptly acuminate, narrowed to rounded base; nerves 5 to 8 pairs, 6 to 12 in. long, 2 to 3.25 in. wide; petiolules 2 to 3.5 in. long. Panicles 9 to 12 in. long, several branches short, horizontal, 5 to 1 in. long with terminal umbels of 8 to 12 white, 6-merous flowers, 1 in. across. Fruit elliptic, 6-ridged with 6 distinct styles; pedicel 2.5 to 3 in. long. Hab. Damp woods, a very pretty plant. Singapore, Chan Chu Kang; Chua Chu Kang. Johor. Perak, Sunki (Kunstler); Waterfall, Thaiping (Wray).


Tall, slender-stemmed. Leaves digitate; petioles 10 in. long; leaflets 10, elliptic coriaceous cuspidate; nerves 6 pairs indistinct; petiolules 1 in. long. Panicles erect about 5 scurfy, 12 in. long with distinct umbels, 5 in. long. Flowers about 20 in umbels. Bracts very small, lanceolate, scurfy brown; pedicels 1 in. long. Petals ovate obtuse. Hab. Mountain woods, local. Pahang, Gunong Tahan in small woods on the Padang 4500 ft. altitude (Ridley).

(14) S. scandens Ridl. Heptapleurum scandens Seem, Rev. Hed. 43; King, l.c. 53.

Slender creeper 3 to 5 ft. long. Leaves digitate; petioles 1 to 2.5 in. long; leaflets 3 to 5, thin coriaceous, lanceolate caudate acuminate tapering to base, glabrous 1.5 to 3.5 in. long, 5 to 8 in. wide; petiolules 2 to 2.5 in. long. Panicles 4 to 8 in. long, slender, lax, spreading; branches 1 in. long ending in an umbel of 8 to 9 globular flowers, on pedicels 1.5 to 3 in. long. Fruit elliptic, 5-ridged 1 in. long. Hab. Mountain jungle. Pahang, Telom. Perak, Tea Gardens, Thaiping Hills at 200 ft. altitude (Curtis). Distrib. Java, Sumatra, Bangka.

(15) S. subracemosum Ridl. Heptapleurum subracemosum

King, l.c. 49.

Scrambling shrub 2 to 3 ft. long. Leaves 3- to 5-foliate; petioles 1.5 to 2.5 in. long, glabrous; leaflets coriaceous elliptic-lanceolate, caudate-acuminate, narrowed at base, finely reticulate when dry, 2.25 to 4 in. long, .75 to 1.1 in. wide; petiolules lateral 3 to 4 in. long terminal 8 to 1.25 in. long. Panicle solitary terminal, narrow sub-racemose 2-branched, 3 in. long, .65 in. across; branchlets 1 to 2 in. long, bearing an umbel of 3 to 5 oblong green flowers .15 in. long. Fruit oblong .2 in. long with 5 blunt ridges, pale green tipped blue. Hab. Open jungle, limestone rocks. Perak, Kwala Dipang (Kunstler).


A scrambling epiphyte. Leaves digitate; petioles 2 to 6 in. long; leaflets 4 or 5, thinly coriaceous, oblong-elliptic cuspidate acuminate,
base shortly narrowed, glabrous, reticulate when dry; nerves 4 pairs, 2.5 to 7 in. long, 1 to 3.5 in. wide; petiolules 2 to 2 in.
long. Panicles puberulous, slender, 6 to 9 in. long in flower, longer and stouter in fruit; branches very short, 2 in. long, with lanceolate-
acuminate bracts half as long, puberulous. Umbels of 12 to 20
flowers; buds globular, 0.5 in. through; pedicels 2 in. long. Fruit
broad, ovoid, 5-ridged, 1.5 in. long. Hab. On rocks and trees, common. Singapore, Chan Chu Kang, Johor, Pulau Tiaman;
Sungei Tebrau. Malacca (Maingay); Selandor; Chabau (Cantley).
altitude (Robinson). Penang Hill, Moniot's Road at 1000 ft.
Kayu Mentas; Kukau. Use: A decoction used to calm children after a fright, and for fever (external application). The whole plant has a turpentine odour when crushed or broken.

(17) S. nervosa Ridl. Heptapleurum nervosum King, l.c. 55.
Small shrub. Leaves digitate; petioles 2 to 2.25 in. long;
leaflets 6 very coriaceous, lanceolate acute, base narrowed; nerves
7 to 10 pairs impressed above, prominent beneath, 1.5 to 2.5 in.
long, 0.5 to 0.9 in. wide; petiolules 0.75 (terminal pair) to 0.35 in.
long in laterals. Panicles 1.5 to 2 in. long, puberulous then glabrous;
branches 2 ending in an umbel of 8 to 10 glabrous flowers, 2 in.
long; pedicels 1 to 1.5 in. long. Calyx-tube cylindric, campanu-
late. Petals triangular. Fruit round, ovoid, 6-ridged, 0.3 in. long.
Hab. Perak, Gunong Chabong (Scortechini). Rare.

(18) S. affinis Ridl. Heptapleurum affine King, l.c. 54.
Shrub 6 to 8 ft. tall, glabrous. Leaves digitate; petioles 3.5 to
4 in. long; leaflets 5 to 6, coriaceous, ovate acuminate, base rounded,
edge undulate, 2.25 to 4 in. long, 1.25 to 1.75 in. wide; petiolules
0.75 to 1.5 in. long. Panicles scurfy at base when young, 2.5 to
5 in. long and as wide; branches 3 or 4; branchlets 1 in. long
bearing umbels of about 12 flowers (branchlets sometimes opposite
or whorled). Flowers ovate, green 2 in. long. Petals brown.
Fruit broadly ovate apiculate, 6-ridged, nearly 2.5 in. long. Hab.
Mountains at about 3500 to 4000 ft. altitude. Selangor, Gunong
Mengkuang Lebah (Robinson). Perak, Larut Hills (Kunstler);
Gunong Inas (Wray).

(19) S. Ridleyi Ridl. Heptapleurum Ridleyi King, l.c. 54.
Low shrub about 3 ft. tall. Leaves digitate; petioles 5 to
10 in. long; leaflets 5, coriaceous, oblong or oblanceolate-oblong
acute, broad but very shortly narrowed at base, bright green;
nerves 8 pairs, secondaries and wide reticulations almost as con-
spicuous, 4 to 6.5 in. long, 2 to 2.75 in. wide; petiolules 1 to 1.25 in.
long. Panicles 5 to 6 in. long with spreading branches; branchlets
0.5 in. long with umbels of 10 to 20 globular yellow flowers, 1.5 in.
across. Petals 5, elliptic. Fruit ovoid, succulent, faintly 6-ridged,

(20) **S. Roxburghii** Gamble, *Flora of Madras*, 570.


*Distrib.* India.


Epiphyte. Leaves, petioles 5 in. long; leaflets 7, stiff coriaceous, elliptic with a short blunt point, base narrowed; nerves 4 pairs ascending prominent as are the lax reticulations 5 in. long, 2 in. wide; petioles 2 in. long. Panicles 4 to 5 in. long with 3 or 4 branches, 3 in. long. Umbels of 12 flowers on peduncles '5 in. long; pedicels '1 in. long. Calyx short, obconic. Petals very small, oblong blunt. Stamens short. Fruit strongly 5-angled, oblong, '15 in. long on pedicels '5 in. long, claret colour. *Hab.* Selangor, Kwala Lumpur. Perak, Ulu Bubong (Kunstler), var. with larger
Schefflera.] LXXI. ARALIACEÆ. 881


var. Curtisii Ridl.

Leaflets fleshy, elliptic with a broad base and acute point. Panicle as in typical venulosum but rather smaller flowers. Fruit more rounded on shorter pedicels strongly 5-angled. Penang, Pulau Betong (Curtis 972).

This may be specifically distinct; the venation of the leaves is approximately the same, but the texture is quite different.

(22) S. micrantha Ridl. Paratropia micrantha Miq. Fl. Ind. Bat. Suppl. 337.

Epiphyte. Branches ribbed. Leaves, petioles 4 to 5 in. long; leaflets thin membranous 5 ovate elliptic, shortly narrowed to the tip, base rounded; nerves 3 to 4 pairs with lax reticulations, elevate beneath, 4 in. long, 2-5 in. wide or less; petiolules 2 in. long. Panicles very slender, 6 in. long; branches 4-5 in. long or less, few. Umbels distant, few; peduncles .5 in. long. Flowers 7 to 14, very small on very slender .15 in. long pedicels. Calyx very small, semi-globose, campanulate. Fruit obovoid, narrowed to base, 5-ribbed. Hab. Mangrove swamps. Singapore, Kranji. Malacca (Maingay). Distrib. Sumatra.


Shrub or treelet. Lower leaves ternately decompound, upper ones smaller twice digitate; leaflets 3 to 5 on each petiolule, light green coriaceous, oblanceolate to ovate-acuminate, base narrowed or rounded, edges occasionally with 1 to 2 teeth near tip, 2-5 to 7 in. long, 1 to 2-5 in. wide; petiolules .1 to .25 in. long, terminal .5 in. long. Panicles pubescent, 10 to 15 in. long, 1-5 to 2 in. wide; branches .5 to 1 in. long. Umbels of about 14 small flowers. Fruit 5-ribbed, .25 in. long, claret colour. Hab. Forests, terrestrial. Malacca, Pulau Undan (Cantley). Perak, Goping (Kunstler); Kwala Dipang; Temengoh River bank. Penang Hill (Wallich 4919); Balik Pulau. Distrib. Sumatra. Native name: Akar Chabang Lima.

(24) S. biternata Harms l.c. 38. Heptapleurum biternatum Clarke, l.c. ii. 735.

Small tree 3 ft. tall or more. Young parts pubescent. Leaves decompound twice pinnate; leaflets in threes at each node of rachis, coriaceous, narrow oblong-acuminate, base rounded slightly narrowed, 2 to 3·5 in. long, .5 to .75 in. wide; petioles .1 in. or less long; nerves 6 pairs, and reticulations conspicuous beneath. Panicles 8 in. long, 1·5 in. across; pedicels .2 in. long. Ovary 5-celled. Hab. Forests. Malacca, Hulu Rejang (Derry). Penang on blocks of stone (Maingay).

I suspect this is but a variety of S. heterophylla.
(25) S. Curtisii Ridl. Heptalepurrum Curtisii King, l.c. 56.
Large shrub. Lower leaves bipinnate, upper trifoliate; petioles 8 in. long; leaflets thin, coriaceous, oblong-elliptic to obovate, coarsely serrate at top, 3 to 6 in. long, 1.5 to 2.5 in. wide. Panicles shorter than petioles with rusty stellate tomentose bracts; branches scurfy; branchlets 2.75 in. long. Umbels 10- to 20-flowered. Fruit oblong, 5-ribbed, disc conic. Ovary 5-celled. Hab. Penang, Pulau Betong (Curtis). Very rare.

(26) S. Wrayi Ridl. Heptalepurrum Wrayi King, l.c. 55.
Small furfuraceous tree. Leaves digitate; petioles 6 to 9 in. long; leaflets 7 to 9 thinly coriaceous, glaucous beneath, elliptic abruptly cuspidate serrate, base rounded; nerves 5 to 9 pairs, 3 to 5 in. long, 1.75 to 2.25 in. wide; petiolules 1.5 to 2.5 in. long. Panicles to in. long pubescent; branches at base 6 in. long; branchlets 2 to 3 in. long. Flowers racemose distant on the branches, pale green, 1.5 in. wide on slender pedicels, 2 in. long. Calyx-tube funnel-shaped, 5-toothed. Petals 5. Fruit oblong, 5-ridged, 1.5 in. long, crowned by the long confluent styles. Hab. Mountains, at 7000 ft. altitude. Perak, Gunong Brumber Pahang (Wray).

This, with some Indian allies, is remarkable for having the flowers racemose and not umbelled, a very rare condition in the order.

3. TREVESIA, Vis.
Prickly or unarmured tree-like shrubs. Leaves palmate, the petiole united at the lower part by a wing. Flowers in dense umbels in a panicle, large. Calyx-edge entire or toothed. Petals 8- to 12-valvate cohering in a cap. Stamens and ovary-cells as many as the petals. Styles connate. Fruit ovoid fleshy. Species 6 or more, tropical Asia.

Plant nearly glabrous .......................... (1) T. cheiranth a
Petiole and inflorescence densely covered with flat red setae .............................. (2) T. rufo-setosa

Stem stout prickly often branched, 5 ft. or more tall, 2 in. through at the base, shoots red pubescent. Leaves sub-coriaceous, 2 to 8 in. across, lobes elliptic cuspidate; narrowed at the base, toothed, 5 to 6 in. long, 3 in. wide; petiolules united in a wing nearly or quite to the lobes; petioles 6 in. long or more. Panicles 8 to 12 in. long, red tomentose; peduncle 6 to 12 in. long. Pedicels 1 to 1.5 in. long. Flowers nearly 1.5 in. wide in umbels 2.5 to 3 in. through. Fruit ovoid round, 1.75 in. through. Hab. In forests. Not rare. Singapore, Bedoh. Malacca, Lubok Kedondong, Mt. Ophir. Pahang, Kwala Tembeling; Tahan River. Selangor, Batu Caves. Perak, Larut (Kunstler) and Goping; Waterfall, Thaiping (Wray). Kelantan, Kwala Aring (Yapp); Chaning.
Penang (Wallich 4925); Penara Bukit. *Distrib.* Burma, Sumatra. *Native names* : Kakabu; Tapak Rimau.

(2) **T. rufo-setosa** Ridl.

A shrub with the habit of the preceding. Leaves palmate of 7 lobes cut down for 7 in., more or less elliptic shortly cuspidate, edge undulate with up-curved thorns, glabrous except nerves and centre red-hairy, covered with small raised dots; nerves 9, 2 on the lowest lobes which are dilate on the lower edge. Whole leaf 12 in. long and wide, lobes 3 to 4 in. wide; petioles stout, 2 ft. long, densely covered with red-brown flat acuminate setæ. Inflorescence entirely covered with similar setæ, 8 in. long, flexous. Flowers unisexual -25 in. across. Bracts linear acuminate caudate, -5 in. long. Calyx obconic setose, limb very short and obscure. Corolla spreading, star-like, lobes 5, triangular coriaceous, hairy beneath. Stamens 5. Style in female flowers cylindric; ovary 5-celled. Stigmas bilobed. *Hab.* Hill forests, Selangor, Semangkok Pass, 2500 ft. altitude (Ridley).

4. **BRASSAIA**, Endl.

Small trees about 20 ft. tall. Leaves digitate, long-petioled, coriaceous. Panicles spike-like tall with short branches bearing globose heads of sessile flowers, each surrounded by a whorl of 4 bracts as long or longer than the calyx. Calyx obconic, limb very short entire. Petals usually 10 to 12, thick valvate connate. Stamens as many; anthers ovate or oblong. Ovary usually 10- to 12-locular; styles connate in a short cone. Fruit sub-globose, pyrenes compressed. Species 4, Malaya, Australia.

Harms reduces this genus to a section of *Schefflera*, including in it *S. cephalotes*. From this latter the genus is separated by the larger number of petals and stamens and the whorl of bracts round the flower. The beautiful *B. actinophylla* of Australia is often cultivated in Singapore Gardens.


Leaves digitate; petioles over 6 in. long, base widely dilate; leaflets 15, stiffly coriaceous oblong-ovate, blunt rounded at both ends, 3 to 4 in. long, 1.75 to 2.5 in. wide; petiolules 1.5 in. long. Panicles 18 in. long, stout; branches -5 in. long, thick; heads about -5 in. through of about 10 sessile flowers. Bracts ovate acuminate, longer than calyx-tube. Calyx very short, margin undulate. Corolla calyptrae rounded; petals connate 5, coriaceous. Stamens 9 to 12; filaments short; anthers oblong-linear. Stigma sub-sessile conic. *Hab.* In forests. Rare. Singapore, Bukit Timah (Ridley).

Mr. Robinson sent from Gunong Mengkuang Lebah in Selangor a specimen of another *Brassaia*, but unfortunately too incomplete to be properly described. The petiole of the only leaf is 5 in. long,
the leaflets coriaceous, 3 in. long, narrow oblong with no visible nerves; petiolules 5 in. long; the inflorescence of 6 or more rather slender branches 9 in. long with distant heads only 15 in. through and a peduncle 25 in. long; the flowers surrounded by scurfy bracts, but petals and stamens all fallen. The small size of the heads is unique in the genus. It is to be hoped this species will be collected again in earlier flower.

5. DENDROPANAX Decne and Planch.


Leaves ovate or lanceolate acute . . . . (1) D. Maingayi
Leaves lanceolate acuminate . . . . (2) D. lancifolium

(1) D. Maingayi King, l.c. 58. D. parviflorum Clarke, in Hook. fil. F.B.I. ii. 733, not of Bentham.

Low shrub 2 to 3 ft. tall. Leaves ovate or lanceolate acute, base rounded or narrowed, glabrous thin coriaceous, midrib prominent with two lateral nerves, 2 to 3-25 in. long, 1 to 1-75 in. wide; petioles 25 to 1-5 in. long. Umbel simple terminal; pedicel 35 to 5 in. long. Flowers 8 to 12, oblong, 2 in. long. Calyx campanulate cylindric, puberulous. Fruit globular succulent, 3 in. through, lead-colour. Hab Mountain woods, Malacca, Mt. Ophir (Maingay, Griffith, etc.). Pahang, Telang at 4000 ft. altitude (leaves very narrow lanceolate 4-5 in. long, 1 in. wide). Perak, Bujong Malacca. Kedah Peak (Ridley).


A tree. Branches slender angled. Leaves coriaceous lanceolate acuminate at both ends, edges crenulate undulate; midrib winged on both sides; nerves and reticulations very fine, 3 to 2-5 in. long, 1 to 1-5 in. wide; petioles 1 to 2 in. long, the upper ones 3 in. long. Umbels 4 or 5 on peduncles 4 in. long. Flowers 5-05 in. wide, 10 to 13; pedicels 1 in. long. Calyx campanulate; limb undulate not toothed. Petals 5, calyptrate, oblong. Stamens 5. Ovary 1-celled. Hab. Mountains at 4900 ft. altitude. Rare. Perak, Ulu Batang Padang (Wray).

This is a somewhat dubious plant. It differs from typical Dendropanax in having the petals joined in a cap, and not spreading freely, but the leaves are all simple, and the lowest pair of nerves shows signs of running parallel to the leaf-edge. Fruit has not been collected.

6. ARTHROPHYLLUM, Bl.

Unarmed shrubs or small trees. Leaves glabrous or nearly, fleshy to coriaceous, the lower ones pinnate, upper or all simple;
leaflets oblong or lanceolate. Stipules forming a ligule within the petiole. Inflorescence, a number of short peduncled umbels in the upper axils or terminal. Calyx-teeth minute 5. Petals 5-valvate, green. Stamens 5. Ovary i-celled, i-ovuled; style short simple. Fruit pulpy ovoid. Seed sub-globose, ruminate. Species about 10, Malayan.

Trees.
Lower leaves with leaflets 6 in. long, 1.75 in. wide, oblong or ovate .................. (1) A. ovalifolium
Lower leaves, leaflets about 27, linear-lanceolate 6 by .5 in .................. (2) A. angustifolium

Shrubs.
Lower leaves; leaflets coriaceous elliptic 2.5 by 1.25 in.
Nerves sunk above; peduncles 1.75 in. long; fruit beaked .................. (3) A. montanum
Leaves smooth above; peduncle .5 in. long .................. (4) A. nitidum
Leaflets about 7, 6 in. long, 2 in. wide; umbels 3 in. long; fruit not beaked .................. (5) A. pinnatum
Leaflets upwards of 30, elliptic cuspidate 1 by .5 in.; umbels 2 in. long .................. (6) A. alternifolium
Leaves all simple ovate, coriaceous; nerves deep sunk above .................. (7) A. ovatum

Small tree.
Inflorescence axillary.
Lower leaves 11 or more leaflets; pedicels .1 in. long .................. (8) A. congestum

(1) A. ovalifolium Miq. Flor. Ind. Bat. i. (1), 768, t. xi. A. diversifolium Clarke, l.c. and King, l.c. 59, not of Blume.
Tree about 30 ft. tall, glabrous. Leaves pinnate simple, subcoriaceous; leaflets 13 oblong or elliptic, slightly narrowed and often oblique at base, acuminate, 5 in. long, 1.75 in. wide; petiolules .2 in. long, uppermost leaves on the flowering branches smaller simple nearly ovate. Umbels on peduncles, .75 in. long, in uppermost axils 1 or 2 and umbellate 6 to 9 together at the apex. Flowers green, about 10 in an umbel; pedicels slender, .15 in. long; buds cone-shaped blunt. Calyx-margin undulate. Petals .1 in. long. Fruit green globose, crowned by calyx and style. 

Small tree. Lower leaves pinnate over 2 ft. long; leaflets 29, coriaceous, linear-lanceolate acuminate 6 in. long, .5 in. wide; nerves faint sunk above; petiolules .1 in. long. Upper leaves simple broader and shorter; petioles slender 1 in. long. Inflorescences axillary and terminal; peduncles 1.5 in. long or less; pedicels .1 in. long. Flowers very small. Calyx very short


A shrub about 20 ft. tall. Leaves pinnate 2 ft. long; leaflets 12 pairs, lanceolate or linear-lanceolate acuminate acute, 4 to 6 in. long, .5 to 1 in. across; nerves 3 to 4 pairs, sunk above, elevate beneath; petiolules .25 in. long. Umbels on simple peduncles, .5 in. wide, sometimes in compound umbels; peduncle 4 in. long. Flowers 9 to 20 in an umbel; pedicels .12 in. long. Fruit .25 in. long, ovoid globose, crowned with the calyx and conic style. Hab. Mountains at 4000 to 6000 ft. altitude. Selangor, Semangkok, Perak, Gunong Borumbun (Ridley).


Small shrub. Leaves 12 in. long, pinnate; leaflets 9 to 15, coriaceous oblong to elliptic-lanceolate, base oblique 2-5 to 3-25 in. long, 1 in. wide; petiolules .25 to .4 in. long. Umbels 11 to 12 of 18 to 20 flowers; peduncles 1 to 1.25 in. long; pedicels .2 in. long. Calyx-lobes blunt, round. Buds obovoid blunt. Hab. Mountains, Kedah Peak (Robinson).

5. **A. pinnatum** Clarke, in Hook. *fil. F.B.I.* ii. 734; King, l.c. 60.

Small shrub or treelet, glabrous. Leaves pinnate 6 in. long; leaflets 3 to 7, sub-coriaceous, elliptic to lanceolate-caudate-acuminate narrowed at base, 3-5 to 4 in. long, 1 to 2.25 in. wide; petioles 3-5 in. long; petiolules .2 in. long or more, terminal one 1 in. long. Panicles spreading, 1.5 to 4 in. long, 2.5 in. wide; branchlets .5 in. or longer. Umbels of about 20 flowers, small, green. Fruit sub-ovoid globose, pulpy .2 in. long. Hab. Hill woods. Local but not rare. Penang Hill (Wallich, Maingay).


Dwarf shrub. Stems slender. Leaves 4.5 to 8 in. long; petioles 2 in. long; leaflets coriaceous 14 or more, rhomboid ovate to lanceolate-acuminate to caudate blunt, 1.5 to 2 in. long, .2 to .5 in. wide; petioles .1 in. long. Umbels solitary on peduncles, 1 to 1.25 in. long, in upper leaf axils, several. Flowers 21 or more on pedicels .2 in. long, very small. Fruit globose, crowned with style, .2 in. long. Hab. Mountain tops. Local. Malacca, Mt. Ophir (Griffith, Maingay and all collectors).


(8) **A. congestum** Ridl. *Journ. F.M.S. Mus.* x. 137.

Small tree. Leaves 10 in. or more long with 11 leaflets, fleshy coriaceous, oblong-lanceolate acuminate, base broad oblique; nerves slender, 7 pairs, very faint, 4 in. long, 1-25 in. wide; petiolules •15 to •2 in. long. Upper leaflets simple oblong, very oblique at base, •2.5 in. long, 1-25 in. wide; petioles slender, •25 to •75 in. long. Inflorescence axillary and terminal; peduncles 1-5 in. long or less; flowers crowded in a head; pedicels •1 in. long. Calyx very short, edge undulate. Petals 4. Buds ovoid. *Hab.* Dry wooded hills, Selangor, Klang Gates. Dindings, Lumut (Ridley).

7. **WARDENIA**, King.


(1) **W. simplex** King, *l.c.* 60.

Shrub 6 to 8 ft. tall, red-pubescent at tip. Leaves elliptic acuminate, base slightly cordate, minutely stellate-hairy all over, 8 to •15 in. long, 3-5 to 7 in. wide; petioles 5 to 10 in. long. Flower buds •1 in. through, conical; pedicels •6 to •9 in. long. Umbels •10- to 20-flowered. Petals glabrous. Fruit elliptic, globose, •2 in. long. *Hab.* Perak, near Ulu Kerling (Kunstler).


- Leaves palmate, lobed
  - Leaves entire or digitate


Small tree sparingly prickly, little branched; young shoots tomentose. Leaves 9 to •15 in. across, coriaceous round cordate, palmate-lobed half-way; lobes 5 to 9, oblong acuminate, serrate, glabrous; petioles 10 to 20 in. long. Inflorescence rusty tomentose terminal panicled. Umbels many-flowered, bracteolate. Flowers •15 in. across; pedicels •5 to •7 in. long. Fruit broad elliptic terete, •3 in. long; cocci 1 or 2 with chartaceous pericarp. *Hab.*
Mountain forests. Perak, Gunong Kerbau (Robinson); Maxwell's Hill; Tapah. Distrib. India.


Shrub. Young parts red-tomentose. Leaves simple or digitate; leaflets lanceolate-acuminate, base long narrowed, edges minutely toothed, 7 in. long, 2 to 2·5 in. wide; petiolules 1·5 in. long; petioles 5·5 in. long. Stipules connate, 2-toothed, teeth acuminate. Panicles long, lax; peduncles slender, 4·2 in. long; branches 1·75 to 5 in. long, tomentose. Umbels 5·5 in. long; flowers 13, pedicels 2 in. long. Bracts acuminate, tomentose. Calyx obconic, teeth short tomentose. Petals 5, oblong blunt. Stamens 5; styles connate. Ovary bilocular. Hab. Selangor, Ulu Langat (Kloss).


Tree glabrous unarmed. Leaves 1- to 3-foliate; leaflets lanceolate denticulate or nearly entire, base of petiole much dilate. Umbels panicked; pedicels jointed close under flowers. Calyx margined, 5-toothed. Petals 5, valvate. Stamens 5. Ovary 5-celled; styles connate. Fruit berried, large, sub-globose, crowned by style. Seeds 4 or 5 ruminated. Species 1.

(1) **H. Maingayi** Clarke, *in Hook. fil. F.B.I. ii. 739*; King, *l.c. 62.

Leaflets membranous ovate-lanceolate acuminate, base narrowed; nerves faint, 3 to 5 in. long, 1·5 to 2 in. wide; petiolules 1 to 2 in. long (simple leaves 8·5 in. long, 4 in. wide), petioles 1 to 2 in. long; peduncles tomentulous, 1 in. long. Calyx-tube sub-globular, puberulous. Petals ovate-lanceolate, 1·5 in. long. Fruit over 5 in. long. Hab. Malacca (Maingay). Only known from Maingay's specimen.


This resembles Schefflera, but has serrate leaflets and numerous stamens and an 8-celled ovary.


Leaves digitate; petioles 9 in. long; leaflets 5, oblanceolate or oblong-lanceolate, coriaceous, acuminate blunt, base narrowed, serrate, smooth above; nerves about 9 pairs, faint, reticulations faintly visible beneath when dry, 4 to 6 in. long, 1·25 to 1·75 in. wide; petiolules 1·5 in. long. Panicles 5 in. long; branchlets 5 in. long; umbels of 4 or 5 flowers; pedicels 2 in. long, stout. Calyx campanulate, edge thin truncate entire, 1 in. long. Petals 5, shorter, ovate blunt, calyptrate. Stamens 14 to 16; anther as long as filaments. Ovary 8-celled; style 0. Stigma sessile on a
cone. *Hab.* Hill-tops, very rare. Perak, Gunong Keledang (Ridley).


Large glabrous shrub, eventually climbing. Leaves digitate; leaflets coriaceous. Inflorescence a compound umbel or small panicle. Calyx margin none. Petals closely connate forming a cap. Stamens very many in 2 or more series. Ovary-cells and stigmas numerous. Fruit globose, depressed, succulent.

(1) **T. calypratus** Hook. fil. and Thoms. Bot. Mag. t. 4908; King, l.c. 63.

Leaflets 7 to 9, oblong or oblong-ovate 4 to 7 in. long, 1·75 to 3·5 in. wide; petiolules 1 to 2 in. long; petioles 6 to 15 in. long. Inflorescence umbellate 3- to 4-branched; branches short, stout. Bracts large, coriaceous. Umbels of 3 to 7 pedicelled flowers nearly 1 in. across. Stamens 50 to 70. Fruit 1·25 to 1·5 in. across. *Hab.* Mountains at 4500 ft. altitude, rare. Perak, Gunong Ulu Sungei (Wray). *Distrib.* India.

**Order LXXII. CORNACEÆ.**

Shrubs or trees (rarely herbs). Leaves opposite or alternate, coriaceous, entire rarely serrate, exstipulate. Flowers usually small in axillary or terminal cymes, panicles or heads. Calyx-tube adherent to ovary, limb truncate or toothed, persistent in fruit. Petals 4 to 5, epigynous (rarely 20 or absent). Stamens insert with the petals and equal in number, rarely 2 or 3 times as many. Ovary inferior 1- to 4-celled crowned by a large fleshy disc. Style 1; ovule 1 rarely 2. Stigma truncate or capitate. Fruit drupaceous 1 (rarely 4-celled). Species 90, chiefly in the North Temperate regions (King, *Journ. As. Soc. Beng.* lxxi. 72).

Flowers bisexual in cymes or panicles.
- Flowers small in terminal compound cymes.
- Flowers medium to large in axillary cymes; petals linear.
- Flowers small, often male only, in large compound panicles.
- Flowers unisexual in heads.

1. **MASTIXIA**, Bl.

Trees often tall. Leaves opposite or alternate, entire. Flowers bisexual, small in terminal panicled cymes. Calyx-tube campanulate, pubescent or silky 4- to 5-toothed. Petals very small 4 or 5 ovate, leathery, silky. Stamens 5 or 4; anthers cordate, oblong. Ovary 1-celled; ovule 1; style cylindric. Drupe ellipsoid crowned by calyx-limb, putamen grooved down one face. Species 18, S. India, Malaya.
Flowers tetramerous.
Leaves stiff coriaceous, strong-nerved and tomentose or pubescent beneath; corymbs tomentose.
Leaves sub-glabrous or quite glabrous.
Leaves pale beneath, strong-nerved, elliptic acuminate, stiff.
Leaves glabrous, coriaceous, ovate acute.
Leaves thin, small 3 by 1.25 in., elliptic-acuminate.
Leaves thin, 6-25 by 2.25 in., elliptic, abrupt cuspidate or acuminate.

Flowers pentamerous; leaves alternate.
Cymes small with linear bracts 3 to 4 in. long.
Bracts minute, lanceolate.
Bracts whorled at base of pedicels.
Fruit "75 in. long.

(1) **M. Maingayi** Clarke, *in Hook. fil. F.B.I.* ii. 746; King, l.c. 74.
Big tree. Branchlets, petioles, underside of leaves, inflorescence and calyx softly tomentose. Leaves coriaceous opposite, elliptic or elliptic-ovate, acute; nerves 6 pairs impressed above, strongly elevate beneath, 4 to 6 in. long, 1.5 to 2 in. wide; petioles 0.75 to 1 in. long. Cymes stout 1 to 1.25 in. long, sub-terminal, 1.5 in. across. Flowers numerous 0.15 in. long. Calyx campanulate, 4-lobed. Petals 4 to 5. Fruit ellipsoid not compressed, narrowed to tip, 1.2 in. long, 0.6 in. wide. *Hab.* Lowland forests. Singapore (Maingay).

Tall tree. Leaves opposite, elliptic shortly acuminate, base slightly narrowed, glabrous above, minutely silvery tomentose beneath; nerves 5 pairs prominent beneath, 3-75 in. long, 1.5 in. wide; petioles 0.4 in. long. Panicles 1.5 in. long and wide, dichotomously branched, appressed pilose. Flowers 1 in. long. Calyx campanulate, teeth 4, minute. Petals 4, ovate. Drupe ovoid 1 in. long. *Hab.* Lowland forests. Malacca (Maingay); Sungei Hudang (Derry). Penang Hill (Curtis). *Distrib.* Java. *Native name*: Kayu Maura.

(3) **M. propinqua** Ridl. *Journ. F.M.S.* Mus. iv. 25.
Tree. Leaves ovate acute, base narrowed, coriaceous, glabrous; nerves impressed above, elevate beneath, midrib puberulous, 5 in. long, 2 in. wide; petioles pubescent, 0.5 in. long. Panicles shorter than leaves, pubescent. Bracts lanceolate, one below each branch. Calyx hairy; lobes very short, pubescent. Petals 4, ovate, pubescent outside. Stamens 4. *Hab.* Pahang, Telom forests at 4000 ft. altitude (Ridley).

(4) **M. Clarkeana** King, l.c. 75.
Tree 40 to 60 ft. tall, 10 to 15 in. through. Leaves opposite, thin coriaceous oblong or oblong-lanceolate, base round or subacute, glabrous; nerves 5 to 7 pairs, slender, prominent beneath, 3 to 4.75 in. long, 1 to 2 in. wide; petioles 3 to 3.5 in. long. Cymes

var. macrophylla King. Leaves 6.25 in. long, 2.5 in. wide, elliptic cuspidate. Perak (Scortechini).

(5) M. bracteata Clarke, l.c. ii. 746; King, l.c. 73; Wangerin, Pflanzenreich 26, pl. 1, n-o.

Tree 50 to 60 ft. tall. Leaves alternate, thinly coriaceous, elliptic abruptly acuminate, base cuneate, glabrous; nerves 5 to 6 pairs, impressed above, prominent beneath, 1.75 to 3 in. long, .75 to 1.35 in. wide; petioles .25 to .5 in. long. Cymes 1.75 to 1.5 in. long, spreading, many-flowered, with linear-oblong bracts at bases of branches: Flowers 1 in. long, light yellow. Calyx funnel-shaped, silky, hardly toothed. Corolla hemispheric in bud. Petals ovate 5. Fruit obconic. Hab. Malacca, Selandor (Holmberg). Perak, Larut (Kunstleri).

(6) M. Scortechinii King, l.c. 73.

Small tree, glabrous. Leaves coriaceous, elliptic-oblong or oblanceolate narrowed to base, acuminate at tip; nerves 4 or 5 pairs, 1.75 to 2.5 in. long, .85 to 1.25 in. wide; petioles .25 to .5 in. long. Cymes corymbose, 1.25 to 1.75 in. long, puberulous. Flowers sessile. Calyx-tube narrow, campanulate, teeth 5. Corolla depressed globose in bud, petals 5, ovate acute. Ovary 1-celled. Hab. Perak (Scortechini), apparently very rare.

(7) M. gracilis King, l.c. 74.

Small tree. Branches angled. Leaves thin coriaceous, lanceolate caudate-acuminate, base narrowed acuminate; nerves very fine, 8 to 14 pairs, 2 to 4.5 in. long, 8 to 1.5 in. wide; petioles .2 to .25 in. long. Cymes in threes, much shorter than leaves; branches short and crowded at the tips, many-flowered with a whorl of bracts at base of flower-pedicels. Flowers 1 in. long, ovoid. Calyx campanulate, obscurely 5-toothed. Petals 5. Hab. Perak at 5000 ft. altitude (Wray 1528).

I have not seen this. King wrote up a sheet of Wray's 128 as Mastixia gracilis in Kew Herbarium, but it is an Araliaceous plant (Dendropanax lancifolia Ridl.), and the description given by him does not fit it at all.

(8) M. megacarpa Ridl.

Tree 30 to 40 ft. tall. Leaves thin coriaceous, oblong elliptic cuspidate, base cuneate, pale beneath, glabrous; nerves 5 pairs slightly elevate beneath, 5 in. long, 2 in. wide; petioles .75 in. long. Flowers unknown. Fruit oblong .75 in. long, disc radiated from the short persistent style. Hab. Penang, Pulau Betong reserve (Curtis 919).

I have only seen a fruiting specimen of this, but it is quite distinct from any other species known to me.
2. ALANGIUM, Lam.

Trees or shrubs. Leaves alternate. Flowers in axillary fascicles or cymes, bisexual, hairy, white, rather large. Calyx-tube toothed or truncate. Petals 5 to 6, linear oblong, valvate. Stamens as many, twice as many or more. Anthers long, linear; filaments short, hairy. Ovary 1-celled, 1-ovuled (or 2- to 3-celled at base); style very long. Stigma large. Fruit a flattened drupe with thin pulp, crowned by the calyx. About 16 species, Asia, Africa, Australasia.

Stamens more than 6 (15 to 20) . . . (1) A. Lamarckii
Stamens 5 or 6; fruit much compressed; stigma not lobed; leaves thickly coriaceous, large.
Calyx with distinct teeth; leaves broad elliptic, cordate hairy beneath often oblique . . (2) A. nobile
Calyx-limb nearly or quite entire; leaves oblique at base.
Leaves oblong, glabrous; cymes sessile . . . . (3) A. Ridleyi
Leaves oblong, glabrous; cymes peduncled . . . (4) A. ebenaceum
Leaves thin, coriaceous, base cuneate glabrous
Calyx toothed; leaves thin 4 in. long, bases oblique.
Leaves lanceolate acuminate . . . . (6) A. uniloculare
Leaves oblong ovate, densely hairy beneath . . (7) A. begoniacefolium


Shrub or treelet. Leaves oblong elliptic to ovate round, base round, blunt apiculate, glabrous above, hairy beneath; nerves 4 to 5 pairs, 3 to 6 in. long, 2 to 3.5 in. wide; petioles 2 to 3 in. long. Flowers in short fascicles of 4 to 8, about 2.75 in. long; peduncle and calyx tomentose. Calyx cupular, slightly 6-toothed. Petals lanceolate, hairy outside with a hairy line inside. Stamens 18 pilose. Fruit ellipsoid contracted below calyx, tomentose .75 to 1 in. long, .65 in. through. Hab. Forests in low country, not common. Singapore, Sungei Jurong; Changi (Ridley). Perak, Larut (Kunstler). Distrib. Indo-Malaya.

(2) A. nobile Harms, Pflanzenfamilien iii. (8), 262; King, l.c. 79. Marlea nobilis Clarke, l.c. ii. 743.

A big tree up to 150 ft. tall. Stem 3 to 4 ft. through. Leaves coriaceous, elliptic or obovate, tip rounded, base rounded, minutely cordate, above glabrous midrib and nerves tomentose beneath densely tomentose (as are young shoots); nerves 8 to 10 pairs, elevate beneath, 4.5 to 2 in. long, 3 to 6 in. wide; petioles 8 to 1.75 in. long. Cymes 4- to 8-flowered, very short, about 1 in. long. Flowers .5 to .6 in. long. Calyx narrow campanulate, 6-grooved; teeth large lanceolate 6. Petals narrow oblong, tomentose. Stamens 6. Fruit ellipsoid, tomentose, 1 in. long, .65 in. wide. Hab. Forests on hills. Singapore (Maingay); Bukit Timah. Malacca, Selandor (Cantley). Selangor, Sungei Buloh (Long).
Perak, Goping; Ulu Kal (Kunstler). Penang, road to highlands (Curtis). *Native names*: Setubal; Kalong.

(3) **A. Ridleyi** King, *l.c.* 78.

A big tree about 80 ft. tall, 2 ft. through. Leaves coriaceous, elliptic or obovate, short, blunt acuminate, base cuneate, glabrous; nerves 10 pairs, prominent beneath, 6 to 8 in. long, 2·5 to 3·5 in. wide; petioles 9 to 1·3 in. long. Cymes sessile, short, 3- to 5-flowered. Flowers 1 in. long; pedicels 2 to 2·5 in. long, velvety. Calyx campanulate truncate, velvety. Petals 6, oblong lanceolate, sub-acute white. Fruit ellipsoid, grooved dark purple, 2 in. long.

**FIG. 75.—**Alangium Ridleyi.

*Hab.* Lowland woods, apparently rare; I have only seen one tree. Singapore, rockery in Gardens (Ridley). *Native name*: Lidah Kerbau.

(4) **A. ebenaceum** Griff. King, *l.c.* 78. Marlea ebenacea Clarke, *l.c.* ii. 742.

Tree 30 to 40 ft. tall. Leaves coriaceous, oblong acuminate, base cuneate, round, glabrous above, minutely scaly beneath; nerves 13 to 16 pairs, prominent beneath, 6 to 10 in. long, 2·5 to 4 in. wide; petioles 35 to 8 in. long. Cymes 1 in. long, 6- to 12-flowered. Flowers sessile 6·5 in. long, 1 in. through. Calyx cupular, short, obscurely toothed. Petals 6 (or 5), linear pubescent. Fruit ovate compressed ridged, 1 in. long, 6 in. wide. *Hab.* Dense damp forests. Johor, Sungei Tebrau. Malacca, Alor Gajah
(Griffith). Selangor, Sungei Buluh (Foxworthy); Weld’s Hill, Kwaia Lumpur (Foxworthy). Perak, Larut (Kunstler). Native names: Lidah Kerbau Putih; Lidah Lidah Kayu; Melidah; Puchut Kuning.


This plant is supposed to have the property of keeping off tigers, for which purpose pieces of the wood are worn as a charm. Possibly an introduced plant in Singapore, but I have never seen any of it from elsewhere.

(6) **A. uniloculare** King, l.c. 77. Marlea unilocularis Griff. Notulæ iv. 679. M. Griffithii Clarke, l.c. ii. 742.


Tree. Leaves ovate acuminate, base round or slightly cuneate, oblique, glabrous except nerves above, densely yellowish tomentose beneath; nerves 5 radiating from base, prominent beneath 6-5 in. long, 4-75 in. wide; peltioles tomentose 1-25 in. long. Cymes several-flowered; peduncle 1-75 in. long, branches as long. Flowers 3 to 15. Calyx turbinate, teeth triangular. Petals 1 in. long, silky. Drupe glabrous, ovoid, ellipsoid, 4 in. long. Hab. Penang, Pulau Betong (Curtis). Distrib. India, China, Japan, Malay isles.

3. **ARALIDIUM** Miq.

aboring; styles distinct subulate. Fruit a large ovoid drupe. Seed 1, rugose. Albumen large, ruminate. Species 1, Malayan. This plant has often been referred to the Order Araliaceae. It is quite unlike anything in that Order, and is abnormal for Cornaceae.

(i) **Aralidium** Miq. Fl. Ind. Bat. i. 763, t. 13; Clarke, in Hook. **fils.** F.B.I. ii. 726; Hemsley, **fils.** Pl. t. 1549.

A tree about 20 ft. tall, glabrous except the inflorescence. Leaves light shining green, 12 to 18 in. long, 8 to 9 in. wide, entire or lobed, the entire leaves oblong shortly acuminate 9 in. long, 4 in. wide; nerves 7 pairs; the lobed forms with 8 to 10 oblong acuminate lobes decurrent on the midrib, 1 in. or more wide; petioles 1.5 to 5 in. long. Panicles much branched, pendulous, 18 in. long, puberulous. Flowers very numerous, minute, white. Petals pubescent. Drupe ellipsoid pointed, fleshy, white turning black, 1.35 in. long, 0.6 in. through. **Hab.** Common in woods, in lowland districts. Singapore, Bukit Timah (Hullett); Kranji. Johor, Sedenak; Batu Pahat. Malacca, Tabong (Griffith); Ayer Panas (Cantley); Jasen (Derry). Pahang, Kwala Tembeling. Negri Sembilan, Bukit Klana (Cantley). Selangor, Rawang (Kloss); Kwala Lumpur (Curtis). Perak, Larut (Kunstler); Changkat Serdang (Wray). Kedah, Yan. **Distrib.** Sumatra, Borneo. *Native names:* Poko Balai; Sahalat; Lempedu Buaya; Sebalai Tingal.

4. **NYSSA**, Linn.

Tree (or shrubs). Leaves alternate. Flowers capitate on axillary peduncles unisexual, one or few females and many males in a head, each flower bracteate or the males coalescing. Male flowers, calyx short, cup-shaped, 5- to 7-toothed. Petals 5 to 7, imbricate, hairy. Stamens 10, round a circular disc. Female flowers, calyx-tube campanulate, 5-toothed. Petals none. Ovary i-celled, i-ovuled. Drupe oblong or ovoid. Species 5 or 6, chiefly North American, one or more in the tropical Asian mountains.

(i) **Nyssa sessiliflora** Hook. **fils.** Gen. Pl. i. 952; Clarke, F.B.I. ii. 747; King, l.c. 79.

A tree. Leaves coriaceous, oblanceolate tapering to both ends or elliptic acuminate, 4 to 8 in. long, 1.5 to 2 in. wide; nerves about 8 pairs; petioles 0.4 to 0.6 in. long. Peduncles 0.5 to 1 in. long. Heads 0.3 in. through. Flowers green. Fruit oblong 0.6 to 0.75 in. long. **Hab.** Mountain woods. Very rare. Perak, Gunong Batu Putih at 3400 ft. altitude (Wray). **Distrib.** India, Burma, Sumatra, Java.
# INDEX OF ORDERS, GENERA, SPECIES, AND SYNONYMS

## VOLUME I

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ERRATA.

P. 179, line 36, for Vieillara, read Vieillard.
P. 586, line 20, for Adinobotrys, Linn., read Adinobotrys, Dunn.

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